## CLASS 427, COATING PROCESSES

### SECTION I - CLASS DEFINITION

A. This is the generic class for applying or obtaining a coating on a surface. The coating may be hard or soft, permanent or transitory, supplied solely by extraneous materials or supplied wholly or in part by the base material.

B. This is the generic class for impregnating a base by causing a coating material to extend or penetrate into the base material, or into the interstices of a porous, cellular or foraminous material. (1) Throughout this class the term "base" or "substrate" refers to the surface upon which a coating is formed except in those instances in which a surface has been previously coated and a second coating is applied, in which case the initial surface is considered the base or substrate. In the case of laminated products the base or substrate is the surface upon which the coating is directly applied. (2) Throughout this class, the term "coating" is used in the generic sense to include both surface coating and impregnation.

C. This class also takes preparatory treatments of the base material, subsequent treatments of the coated base material and other ancillary noncoating operations claimed, per se, processes limited to etching for making a base more compatible with, or adherent to, the coating wherein the base is the substrate (work) onto which a coating is applied are included, when there is no class which specifically provides therefor.

### SECTION II - LINES WITH OTHER CLASSES AND WITHIN THIS CLASS

NONSIGNIFICANT COATING PROCESSES

A. A patent containing a claim to a coating composition or compound, which claim is, per se, classified in Classes 106, 252, 260, 423, and 520, and also a claim to a nonsignificant process of utilizing the claimed compound or composition to coat a substrate, is classified with the claimed compound or composition. The following guide lines are used to determine if a process step is significant.

1. Any pretreatment or post-treatment of a base or applied coating is a significant process step; processes limited to etching or making a base more compatible with, or adherent to, the coating wherein the base is the substrate (work) onto which a coating is applied are included, e.g., curing, drying, or smoothing a coating, or cleaning or drying a base.

2. A specific recitation of how the coating is applied; e.g., brushing, dipping, spraying, immersion, etc., is significant. General statements of applying, covering, or coating, etc. are not significant.

3. Processes resulting in plural coatings are considered significant.

4. A process resulting in a coating having a specific thickness or lack of uniformity is considered significant.

5. Specific recitation as to the condition of a coating being applied is generally significant except: (a) A condition also included in an independent composition claim, e.g., pH concentration, etc., is not significant. (b) Statements that a coating material is molten or in an organic, inorganic, or aqueous solution is not significant unless accompanied by a recitation of specific times or temperatures or chemically defined solvents.

6. Structural limitations regarding the base to which the coating is applied are considered to render the process significant if the product produced is not classified in Class 428, Stock Material or Miscellaneous Articles.

B. Patents containing only claims to a process of coating a substrate wherein no significant process steps are recited, are classified in Class 428, Stock Material or Miscellaneous Articles, according to the product produced by the process. 1. Guidelines for use in determining if a process is significant are the same as set out under "A" note above. Note especially the reference to structural limitations of the base being coated.

C. Patents containing (1) a claim to a compound or composition classifiable in Classes 106, 252, 260, 423, and 520 (2) a coated product claim which, per se, does not have significant structure for Class 428 and (3) a claim to a significant process which is, per se, classifiable in Class 427 is classified as an original in Class 428.

CLATHRATES AND INTERCALATES

Clathrates and intercalates (inclusion compounds), per se, are classified hierarchically and subject to the limitations set forth in the compound (element) classes based both on the encapsulant and encapsulate. For example, a clathrate of urea and hydrogen peroxide is classified in Class 564, subclass 32, urea and an organic compound in Class 564, subclass 1.5, dextran and iodine in Class 536, subclass 112, etc. Where a patent does not state that

a material is either a clathrate or an intercalate, the assumption is made that the material is either a coated or encapsulated product classified in Class 428, subclasses 402+.

References to Other Classes, below, contain the following areas:

Coating Processes Classified Elsewhere, including Bleaching, Dyeing, Chemical Modification of Textiles and paper, Certain Named Fluid Treatments of Textiles. And Hazardous or Toxic Waste Product in Coating Processes

## SECTION III - REFERENCES TO OTHER CLASSES

SEE OR SEARCH CLASS:

8, Bleaching and Dyeing; Fluid Treatment and Chemical Modification of Textiles and Fibers, for: Dyeing--Class 8 takes dyeing in general and combined processes of dyeing and coating in any sequence. The application of a colored solidifiable coating to a surface is classified in this class (427). Class 427 takes the coating of a dyed article except where the coating is a mordant or fixing agent, a weighting agent for a textile or is reacted with a textile base to chemically modify the same. Treatments of textiles which are ancillary to or closely associated with dyeing such as, for example, mordanting, weighting, and fastness improving are also included in Class 8. Bleaching --Class 8 takes bleaching in general, however, the bleaching of a base preparatory to the application of a coating or impregnating composition is in Class 427. Where the coating or impregnant is merely employed as a mask to delineate areas to be bleached or for stabilizing or improving the whiteness of the treated material, the process belongs in Class 8. Chemical Modification of Textiles and Paper.--Class 8, Particularly subclasses 115.51+ takes reactive fluid treatments of textile materials and paper where there is chemical modification of the textile or paper base, even though combined with a coating operation with, per se, is classifiable in this class (427). Chemical and Fluid Treatment of Hides, Skins, and Leather.--Class 8, subclasses 94.1+ takes the treatment of hides, skins, feathers, and animal tissues not elsewhere provided for. For the line between this class and Class 8, in regard to such treatment, see the reference to Class 427 under "Search Class" in the notes to the definition of Class 8, subclass 94.1. Certain Named Fluid Treatments of Textiles.--Class 8 also takes special fluid treatments, namely, weighting mordanting, carroting, swelling or plasticizing artificial fibers, protection of textiles against the deleterious effect of agents used in the processes provided for in Class 8 and cleaning or laundering of textiles and fibers. (Coating Processes Classified Elsewhere).

28, Textiles: Manufacturing, appropriate subclasses, particularly subclasses 169, 178+, 261, and 265+ for combinations of fluid treatments and significant textile operations. (Named Fluid Treatments of Textiles)

29, Metal Working, provides for processes of making articles where the process includes a metal working operation and a coating operation, and is not provided for by Class 72, Metal Deforming. subclasses 17.2+ of Class 29 provides for processes of making thin sheet metal and metal foil where the process of manufacture includes coating a form or base with metal and then removing the material of the form or base from the coating; subclasses 400.1+ particularly subclasses 527.1+ provides for processes for manufacture of miscellaneous articles where the process includes a coating and a metal working operation; subclass 424 contains processes of coating a base with a protective layer, treating or shaping the coated base, and then removing the coating; subclass 458 provides for processes of assembling and/or joining preceded by a coating step, and subclass 460 contains processes followed by a coating step. (Named Fluid Treatments of Textiles).

34, Drying and Gas or Vapor Contact With Solids, subclass 307 for processes of drying wherein the object being dried is shielded by a coating, partial or complete, to retard the drying process. For the line between Classes 34 and 427, see the note to the main class definition of Class 34. (Named Fluid Treatments of Textiles).

51, Abrasive Tool Making Process, Material, or Composition, for a process of coating which is peculiar to abrasive tool making. (Named Fluid Treatments of Textiles).

57, Textiles: Spinning, Twisting, and Twining, subclass 362 for processes including coating in combination with the operations provided for in that class. (Named Fluid Treatments of Textiles).

65, Glass Manufacturing, appropriate subclasses, especially subclasses 45+ for glass molding combined with a coating step. (Named Fluid Treatments of Textiles).

72, Metal Deforming, subclasses 46 and 47 for processes of plastic deformation of a metal workpiece including a coating step. (Named Fluid Treatments of Textiles).

75, Specialized Metallurgical Processes, Compositions for Use Therein, Consolidated Metal Powder Compositions, etc., subclass 332 for processes of producing solid particulate free metal directly from liquid metal (e.g., liquid comminuting, etc.) with subsequent coating of the particles. (Named Fluid Treatments of Textiles).

86, Ammunition and Explosive-Charge Making, subclass 19 for coating processes peculiar to the treatment or preparation of ammunition and explosive devices. (Named Fluid Treatments of Textiles).

101, Printing, for processes of printing and stenciling, except those processes utilizing a particular composition wherein the mere fact of printing or stenciling is stated, which are classified in this class (427). Processes which include specific manipulation of the stencils or the use of specific stencils are in Class 101, Printing, subclass 129. See the Search Class 101 note under subclass 144 of this class. (Named Fluid Treatments of Textiles).

117, Single-Crystal, Oriented-Crystal, and Epitaxy Growth Processes; Non-Coating Apparatus Therefor, for processes for growing therein-defined single-crystal of all types of materials and by all techniques, including epitaxy. (Named Fluid Treatments of Textiles).

144, Woodworking, subclasses 329+ for a process of coating wood combined with woodworking operations. (Named Fluid Treatments of Textiles).

148, Metal Treatment, particularly subclasses 206+ for processes of coating a metal substrate with an external source of carbon, nitrogen, or both resulting in a coating that contains a combination of the carbon or nitrogen or both with a component from the metal substrate. Class 148, also, takes as original processes of treating a metal substrate with an agent other than a carbon or nitrogen containing agent to form a coating on the metal by combination of the external agent with a component of the metal substrate, other than by a Class 204 operation. Combinations of coating operations with a process of heat treatment to modify or maintain the internal physical structure (i.e., microstructure) or chemical property of metal, goes to Class 148 as original, unless metal casting, fusion bonding, machining, or working is involved. If metal casting, fusion bonding, machining, or working is involved in the combination, placement goes to Class 148 only if the heat treatment is a <u>significant</u> heat treatment as defined in section III, A, of the Class 148 definition. Since diffusion may be involved in a coating operation of metal and diffusion involves the microstructure of metal, per se, coating operations (i.e., other than reactive coating operations) go as originals in Class 427 if the specified diffusion occurs during the coating step. However, a heat treatment step of the solid metal, independent of the coating step which causes diffusion to affect the microstructure of the metal goes as original to Class 148. See particularly, subclasses 516+ of Class 148 for combinations of coating with Class 148 operations. Class 427 takes simultaneous ion implantation and diffusion as proper for Class 427 if coating is present. However, inclusion of a separate step which by itself would be classifiable in Class 148 is enough to place the combination in Class 148. Moreover, a combination of a metal working step proper for one of the metal working classes and ion implantation for coating purposes will be proper for Class 148. See particularly subclass 239 of Class 148 for ion implantation of a metal substrate according to these distinctions. When limited to coating, per se, claims to coating by either reactive coating as in Class 148 or a coating process of Class 427 reside as original in the generic Class 427. If there is a combined coating operation involving reactive coating (other than carburizing or nitriding) and an electro coating operation, that combination goes to Class 204. However, if an additional operation which by itself would be classifiable in Class 148 is included in the combination with reactive coating of Class 148 and Class 204, electrocoating, this will go to Class 148. Reactive coating for Class 148 occurs on the metal substrate and not externally thereof. Thus, Class 427 provides for coating a metal substrate with a resin composition in an immersion bath wherein metal ions leaching from the metal substrate enter the immersion medium and react or complex externally of the metal substrate to deposit a coating containing an ele-

ment from the metal substrate. (Named Fluid Treatments of Textiles).

149, Explosive and Thermic Compositions or Charges, subclasses 3+ for processes of making explosives combined with a coating operation as well as patents for processes of coating, per se, of an explosive or with an explosive coating. Patents directed to coating of an explosive to merely protect or to completely desensitize it are in Class 427. (Named Fluid Treatments of Textiles).

156, Adhesive Bonding and Miscellaneous Chemical Manufacture, particularly subclasses 278+ for laminating processes combined with a coating step. (Named Fluid Treatments of Textiles).

162, Paper Making and Fiber Liberation, particularly subclasses 158+ for processes of applying a coating material to a web deposited from a liquid fibrous suspension prior to the final drying of the web, and subclasses 135+ for paper making combined with coating after ultimate drying. (Named Fluid Treatments of Textiles).

164, Metal Founding, subclass 14 for processes of making a mold and subsequently coating the mold, subclasses 72+ for metal casting processes including the coating of a mold surface with a treating agent, and subclass 75 for processes of coating a preformed workpiece prior to compositing by metal casting. (Named Fluid Treatments of Textiles).

166, Wells, subclasses 285+ for processes of cementing a well. (Named Fluid Treatments of Textiles).

204, Chemistry: Electrical and Wave Energy, subclasses 155+ for a process of coating involving chemical preparation of a compound or element by application to a base of electrical or wave energy in a magnetic field (but without involving electrolysis as provided for in Class 205), where said base supplies a part or all of the coating (e.g., by conversion at the surface, etc.); subclasses 164+ for a process of coating involving chemical preparation of a compound or element by application of an electrostatic field or electrical discharge to a base which supplies a part or all of the coating; subclasses 471+ for a process of coating by electrophoresis or electro-osmosis; and subclasses 192.12+ for coating by glow discharge deposition (e.g., cathode sputtering, etc.). See the subclass 450 (1) Note for the definition of "electrophoresis" as used in Class 204. All combinations of plural coating methods (except in cases where electrolysis is involved) in which at least one coated layer is formed by electrophoresis, electro-osmosis, or cathode sputtering are classified in Class 204. A patent with a claim to a coating process classifiable in Class 427 and a claim to a coating process classifiable in Class 204 will be placed as an original in Class 427 and cross-referenced to Class 204. (Named Fluid Treatments of Textiles).

205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, subclasses 80+ for electrolytic coating processes and subclasses 183+, 188+, 191+, and 198+ for processes involving plural coating steps, at least one but not all of which is electrolytic. Combinations of preparatory electrolytic processes, other than coating, with processes of coating falling within the scope of Class 427 are classified in Class 427. A patent with a claim to a coating process classifiable in Class 427 and a claim to a coating process classifiable in Class 205 will be placed as an original in Class 427 and cross-referenced to Class 205. (Named Fluid Treatments of Textiles).

209, Classifying, Separating, and Assorting Solids, subclasses 47 through 70, for processes of separating components of a mixture of solids by coating some of the components with a material. (Named Fluid Treatments of Textiles).

210, Liquid Purification or Separation, subclasses 777+ for a separating process employing a precoat or filter aid. (Named Fluid Treatments of Textiles).

216, Etching a Substrate: Processes, appropriate subclasses for etching combined with a coating process where the etching is a manufacturing step and is not intended to improve the adherence of the applied coating to the substrate. (Named Fluid Treatments of Textiles).

228, Metal Fusion Bonding, subclasses 101+ provides for the process of coating a base and then treating the coated base, as by rolling or forging, to effect or improve the bond between the base and coating; subclasses 101+ also provides for soldering, brazing or welding independent self-sustaining parts together; and see particularly subclasses 208+ for bonding involving precoating with a bond facilitating metal. (Named Fluid Treatments of Textiles).

241, Solid Material Comminution or Disintegration, appropriate process subclasses for comminution combined with prior coating operations. (Named Fluid Treatments of Textiles).

242, Winding, Tensioning, or Guiding, subclasses 18+, 370+, 520+, and 550+ for a winding or unwinding device adapted to move an elongated material relative to an unclaimed coating station, and subclasses 18+ and 520 for winding with a nominal wetting station that may temporarily cause windings to remain in position in a coil. (Named Fluid Treatments of Textiles).

264, Plastic and Nonmetallic Article Shaping or Treating: Processes, appropriate subclasses, for processes of molding or shaping combined with coating. For a detailed line between this class and Class 264, see the class definitions of Class 264 and the notes in subclass 129 of 264. (Named Fluid Treatments of Textiles).

283, Printed Matter, for processes of making fraud preventing printed matter or blanks therefor which include more than a coating process. (Named Fluid Treatments of Textiles).

399, Electrophotography, subclass 57 for liquid control developing, subclasses 58+ for concentration control of developing material, subclasses 168+ for charging, subclasses 246+ for sprayed liquid developing, subclass 248 for immersion, and subclasses 265+ for application of dry developing. (Named Fluid Treatments of Textiles).

404, Road Structure, Process, or Apparatus, for processes of building roads or pavements combined with a coating step. (Named Fluid Treatments of Textiles).

424, Drug, Bio-Affecting and Body Treating Compositions, appropriate subclass for a process of applying a composition of that class to an animal (including human) body. (Named Fluid Treatments of Textiles).

426, Food or Edible Material: Processes, Compositions, and Products, for processes of coating involving food and see the notes thereto for a detailed line between the classes. (Named Fluid Treatments of Textiles).

430, Radiation Imagery Chemistry: Process, Composition, or Product Thereof, for: a. Processes of coating a base with a radiation sensitive material for the purpose of imaging by subsequent exposure to radiation. b. Applying a non-radiation sensitive coating to a radiation sensitive surface wherein the radiation sensitive surface is intended to be used in imaging when exposed to radiation. c. Processes of perfecting or protecting previously exposed images by a coating operation. (Named Fluid Treatments of Textiles).

435, Chemistry: Molecular Biology and Microbiology, for processes having a significant or non-significant coating step and otherwise proper for the class; see subclasses 4+ for processes of making measurement or test compositions, strips, or films; and for compositions for preparing micro-organisms, cells or tissues for microscopic examination and processes of applying said compositions to the micro-organisms, cells, or tissues to be examined subclasses 174+ for processes of making carrier-bound or immobilized enzyme or microbial cell, such as within a polymer or gel or absorbed on a resin; subclasses 183+ for methods of making a modified or stabilized enzyme or composition thereof (other than immobilized); and subclasses 243+ for methods of making a composition containing a micro-organism. When there are only generic claims and multiply disclosed species or when there are equally comprehensive species claims and when the species are classifiable in Class 427 and in Class 435, placement of the original is in Class 435 with appropriate cross-references to Class 427. (Named Fluid Treatments of Textiles).

445, Electric Lamp or Space Discharge Component or Device Manufacturing, subclasses 1+ and 60+ for method and apparatus for manufacturing electric lamp and electric space discharge devices. (Named Fluid Treatments of Textiles).

502, Catalyst, Solid Sorbent, or Support Therefor: Product or Process of Making, for a composition comprising a catalyst or sorbent, per se, or a process of making such a composition which may include a coating step. (Named Fluid Treatments of Textiles).

505, Superconductor Technology: Apparatus, Material, Process, subclasses 300+ for processes of producing high temperature ($T_c > 30$ K) superconductors, particularly subclasses 434, 446+, 452, or 470+. (Named Fluid Treatments of Textiles).

588, Hazardous or Toxic Waste Destruction or Containment, subclasses 249 through 260 for a coating or a covering process to permanently contain hazardous or toxic waste (Named Fluid Treatments of Textiles); appropriate subclasses for the chemical destruction or containment of hazardous or toxic waste. (Hazardous or Toxic Waste Product in Coating Processes).

588, Hazardous or Toxic Waste Destruction or Containment, appropriate subclasses for the destruction or containment of hazardous or

toxic waste. (Hazardous or Toxic Waste Product in Coating Processes).

SUBCLASSES

**1** This subclass is indented under the class definition. Processes of taking prints, impressions or patterns of human or other animal skin surfaces wherein the body member, per se, is the printing device or of making body member prints visible.

(1) Note. This subclass takes processes of making fingerprints, footprints, noseprints, etc., usually for the purpose of identification.

**2.1 MEDICAL OR DENTAL PURPOSE PRODUCT; PARTS; SUBCOMBINATIONS; INTERMEDIATES (E.G., BALLOON CATHETER, SPLINT):**
This subclass is indented under the class definition. Processes in which the product is intended to be used for a medical or dental purpose, other than coating a living body, parts, subcombinations, or intermediates thereof or therefor.

(1) Note. Subject to the limitations and caveats of Class 427 definition, subject matter proper for this and indented subclasses includes the following:

(a)processes which make a medical or dental product and which product is proper for placement in, or which product is intended for use in a process proper for placement in, Class 128 (including Classes 600, 602, 604, and 606), Class 424, Class 433, or Class 623;

(b)other processes which make a product which is intended for, or which is intended for use in a process having, a clearly medical or dental use. For example, an in vitro diagnostic testing process or product (e.g., for bodily fluids) such as a test color-change strip or an immunoassay device, surgical gloves, gowns, or other apparel. See the Search Class notes below.

(2) Note. Coating of articles (not otherwise satisfying the definition of medical or dental products) are not proper herein when the coating is a biocide intended to preserve or protect the article; such is classified elsewhere in Class 427 if significant coating is claimed, and otherwise is classified according to the article or composition preserved or protected.

(3) Note. Coating a living body is not proper for Class 427; see Search Class notes hereinbelow that reference this note.

(4) Note. Search various appropriate subclasses elsewhere in Class 427 for significant coating of cosmetics, biocides, or other nonmedical, nondental compositions of Class 424.

SEE OR SEARCH THIS CLASS, SUBCLASS:

164+, for coating processes relating to optical lenses not intended to be implanted, such as corrective or contact.

SEE OR SEARCH CLASS:

2, Apparel, for garments such as surgical gloves, gowns, masks, etc.

8, Bleaching and Dyeing; Fluid Treatment and Chemical Modification of Textiles and Fibers, for processes of dyeing, bleaching, chemical modification of textiles and paper, or chemical and fluid treatment of hides, skins, and leather. See Class 427 definition for elaboration of the class line.

36, Boots, Shoes, and Leggings, appropriate subclasses for foot coverings and foot devices; see subclasses 140+ for orthopedics.

128, Surgery, for (A) methods of treatment of the living body, (B) apparatus used in the inspection and treatment of diseases, wounds, and other abnormal conditions of the bodies of animals, including articles and stock-materials directed to products when (1) solely disclosed to be worn by or attached to the body (e.g., sanitary napkin, diaper) and to be a receptor

for a body discharge, (2) solely disclosed as a shield or protective device to be worn on, or attached to, a body member or part (e.g., bandage, dressing) and having a therapeutic use, or (3) disclosed as having a Class 128 utility of (1) or (2) or in the class definition and a general utility for Class 428, but in which one claim is specific to the Class 128 disclosed use, and (C) methods and means for manufacturing surgical appliances not classified elsewhere. (see the (3) Note above)

135, Tent, Canopy, Umbrella, or Cane, for staffs, crutches, stilts, etc., used as aids to walking but not adapted to be secured to the limbs.

351, Optics: Eye Examining, Vision Testing and Correcting, subclasses 41+ for spectacles and eyeglasses as aids to vision, and subclasses 160+ for removable contact lens having specific optical characteristics for its use.

422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, for chemical apparatus which may have an in vitro medical use such as subclasses 50+ for analyzer, indicator, or lab device (subclasses 55+ for structured visual or optical indicators such as test papers, strips, or columns).

424, Drug, Bio-Affecting and Body Treating Compositions, for: compositions (A) for preventing, alleviating, treating, or curing abnormal and pathological conditions of the living body, for maintaining, increasing, decreasing, limiting, or destroying a physiologic body function, for diagnosing a physiological condition or state by an in vivo test, for controlling or protecting an environment or living body by attracting, disabling, inhibiting, killing, modifying, repelling, or retarding an animal or micro-organism, (B) for deodorizing, protecting, adorning, or grooming a body, (C) for fermentates and extracts for use in A or B and not elsewhere provided for, and (D) such compositions defined in terms of specific structure; methods of making the above compositions; methods of using the class-defined compositions for purposes in A and B; and methods of using per se compounds for purposes in A and B. Especially see subclasses 400+ for a composition defined in terms of specific structure having a utility for Class 424 and the methods of making which involve nonsignificant coating. (See the (3) Note above).

428, Stock Material or Miscellaneous Articles, for therein defined stock-materials (i.e., materials having no significant structure) of the subject matter of Class 433 or Class 623.

433, Dentistry, for methods, apparatus, implements, and devices relating to the treatment of teeth or gums or the replacement of teeth, or for methods normally performed by a dentist. See subclass 217.1 for coating of natural teeth with adhesive or treating agent in the patient. Class 433 provides for the articles while Class 428 provides for the stock-materials. (See the (3) Note above).

434, Education and Demonstration, for apparatus and processes not elsewhere classifiable for providing instruction about a subject; or for means for displaying for purposes of comparison, contrast, or demonstration; or for demonstrating characteristics and advantages of apparatus, objects, or processes. Particularly, see subclasses 262+ for class subject matter relating to human anatomy or physiology, to treatment of the human body to cure some disease or disorder, or to a cutting operation on the human body to correct some improper condition, and subclasses 295+ for class subject matter relating to organisms and vital processes or to the preparation, stuffing, and mounting of animal skins.

435, Chemistry: Molecular Biology and Microbiology, for processes having a significant or nonsignificant coating step and otherwise proper for the class; see subclasses 4+ for processes of making measurement or test compositions, strips, or films; and for compositions for preparing micro-organisms, cells or tissues for micro-

scopic examination and processes of applying said compositions to the micro-organisms, cells, or tissues to be examined subclasses 174+ for processes of making carrier-bound or immobilized enzyme or microbial cell such as within a polymer or gel or absorbed on a resin; subclasses 183+ for methods of making a modified or stabilized enzyme or composition thereof (other than immobilized); and subclasses 243+ for methods of making a composition containing a microorganism. When there are only generic claims and multiply disclosed species or when there are equally comprehensive species claims and the species are classifiable in Class 427 and in Class 435, placement of the original is in Class 435 with appropriate cross-references to Class 427.

436, Chemistry: Analytical and Immunological Testing, for in vitro processes of testing involving a chemical reaction or an immunological binding interaction (including those which may be medical or dental).

523, Synthetic Resins or Natural Rubbers, for solid polymer containing compositions or process of preparing; see subclass 103 for compositions which have reduced health risks upon exposure thereto during incidental handling or body contact, such as a coating composition containing a bitter tasting component or a composition which reduces carcinogenicity (e.g., coating composition of carbon black); and subclasses 105+ for nonmedicated composition or process of preparing, which is specifically intended for contact with living animal tissue (other than apparel), such as surgical related composition (e.g., suture, catheter, dilator), prosthesis composition, contact lens making composition, surgical tape adhesive composition, nonthrombogenic plastics composition (e.g., for making blood pouches, tubes, catheters), composition for use as tooth or bone replacement, restorative, or implant, or composition for dental or denture devices.

528, Synthetic Resins or Natural Rubbers, cross-reference art collection 950 for synthetic resins of any type within the Class 520 series which is intended for use in replacing or restoring partially or wholly hard tissue as normally found in animals (e.g., dentures, bones), and excluding synthetic hair or skin and contact lenses. (Note that polymers which are a part of a composition are found in Class 523).

600, Surgery, for miscellaneous Class 128 subject matter; see subclasses 1+ for radioactive substance applied to body for therapy; subclasses 9+ for magnetic field applied to body for therapy; subclasses 16+ for heart augmentation; subclasses 19+ for antigravitation systems; subclasses 21+ for isolation treatment chamber; subclasses 23+ for speech correction; subclass 25 for surgically implanted vibratory hearing aid; subclasses 26+ for sleep or relaxation inducing therapy; subclasses 29+ for body inserted urinary or colonic incontinence; subclass 36 for blood vessels or grafts; subclass 37 for internal organ support or sling; and subclasses 38+ for substituting for or enhancing human copulation.

602, Surgery: Splint, Brace, or Bandage, for Class 128 subject matter relating to orthopedic bandages or to injury or wound bandages.

604, Surgery, for body treating and medicating methods and apparatus which includes the application, storing, collecting, introduction, or removal of materials from the body, including (1) medicators such as dosing device, hypodermic injector, syringe, depositor, or applicator, container, pump, or valve and (2) receptors such as aspirator, lacteal device, catamenial, diaper, absorbent pad, or material.

606, Surgery, for Class 128 subject matter relating to devices or appliances for use in operative surgery upon the body, or in preparation for operative surgery, or for devices designed to assist in operative surgery.

623, Prosthesis (i.e., Artificial Body Members), Parts Thereof, or Aids and Accessories Therefor, for artificial substitutes or parts for a human body particularly manufactured or adapted to replace (completely or partially) or assist a missing or defective natural body member, or part thereof, for functional or cosmetic reasons. Class 623 provides for the articles (significant structure), while Class 428 provides for the stock-materials (i.e., articles in name only).

**2.11 Analysis, diagnosis, measuring, or testing product (e.g., specimen preparation, microscope slide smearing):**
This subclass is indented under subclass 2.1. Processes in which the product is intended to be subjected to or is intended to be used in analysis, diagnosis, measuring, or testing, which may be in vivo or in vitro; parts, subcombinations, or intermediates thereof or therefor.

SEE OR SEARCH CLASS:
128, Surgery, for apparatus used in the inspection and treatment of diseases, wounds, and other abnormal conditions of the bodies of animals and methods and means for manufacturing surgical appliances not classified elsewhere.
356, Optics: Measuring and Testing, subclasses 244+ for sample, specimen, or standard holder or support (e.g., plate or slide) intended for optical inspection, measuring, or testing.
359, Optics: Systems (Including Communication) and Elements, subclasses 396+ for transparent microscope slide in combination with a microscope.

**2.12 For contacting living body or transfusing bodily fluid (e.g., endoscope, electrode, thermometer, probe):**
This subclass is indented under subclass 2.11. Processes in which the product is intended to contact the living body or to contact a transfusing bodily fluid, such as spinal fluid or blood, in order to accomplish its function; parts, subcombinations, or intermediates thereof or therefor.

(1) Note. Transfusing bodily fluid is that which is being handled, processed, and/or maintained with the intent to return it to a living body.

(2) Note. The living body includes the bodily fluids while they are in the living body, such as blood, bile, or urine in the bladder.

SEE OR SEARCH CLASS:
128, Surgery, for apparatus used in the inspection and treatment of diseases, wounds, and other abnormal conditions of the bodies of animals and methods and means for manufacturing surgical appliances not classified elsewhere.

**2.13 Layer formed contains chemical reagent or chemically reacts with substrate (e.g., cell stain or fix, pH paper, immobilized antigen):**
This subclass is indented under subclass 2.11. Processes in which the layer formed contains or is intended to receive a chemical reagent which causes or participates in a chemical reaction in order to accomplish its analysis, diagnosis, measurement, or test function; parts, subcombinations, or intermediates thereof or therefor.

(1) Note. A chemical reaction here includes covalent bonding, ionic bonding, complexing, ion exchange, and ligand bonding. Not included here are bonds which are no stronger than hydrogen bonding.

(2) Note. Coating a microscope slide with a stain or with a specimen to be stained or staining a specimen are proper for placement here.

(3) Note. Coating with a chemical reagent which does not primarily participate in an analysis, diagnosis, measurement, or test function is not proper for placement in this subclass (on that basis); thus, coating a microscope slide with heparin would be placed in subclass 2.11.

SEE OR SEARCH CLASS:

424, Drug, Bio-Affecting and Body Treating Compositions, and for compositions for preparing micro-organisms, cells or tissues for microscopic examination and processes of applying said compositions to the micro-organisms, cells, or tissues to be examined.

435, Chemistry: Molecular Biology and Microbiology, for processes having a significant or nonsignificant coating step and otherwise proper for Class 427; see subclasses 4+ for processes of making measurement or test compositions, strips, or films; subclasses 174+ for processes of making carrier-bond or immobilized enzyme or microbial cell such as within a polymer or gel or absorbed on a resin; subclasses 183+ for methods of making a modified or stabilized enzyme or composition thereof (other than immobilized); and subclasses 243+ for methods of making a composition containing a micro-organism. When there are only generic claims and multiply disclosed species or when there are equally comprehensive species claims and when the species are classifiable in Class 427 and in Class 435, placement of the original is in Class 435 with appropriate cross-references to Class 427.

436, Chemistry: Analytical and Immunological Testing, for in vitro processes of analysis involving a chemical reaction or an immunological binding interaction (including those which may involve a medical or dental purpose).

**2.14 Particulate or unit-dosage-article base (e.g., tablet, pill, pellet, capsule, liposome, powder, controlled-release implant, suppository; excluding transdermal patch):**

This subclass is indented under subclass 2.1. Processes in which the coating is applied to a base which is a particulate or a unit-dosage-article and such that the coated product has a particulate or unit-dosage physical form; excluding transdermal patch.

(1) Note. A unit-dosage-article is one which is provided as one or a few discrete, readily and independently handleable piece or pieces for the intended medical or dental use. Any of the following terms are *prima facie* indicative of a unit-dosage-article: tablet, capsule, dragee, pill, bead.

(2) Note. A particulate is a small solid bit of matter which typically can be poured like a fluid when handled. Any of the following terms are *prima facie* indicative of a particulate: liposome, powder, microcapsule, granule, pellet, bead, flake, platelet, particle, grain, microsphere, granulate.

(3) Note. Clathrates and intercalates (inclusion compounds) are not proper for placement here. Clathrates and intercalates (inclusion compounds), per se, are classified hierarchically and subject to the limitations set forth in the compound (element) classes based both on the encapsulant and encapsulate. See the main definition for Class 427, section II, LINES WITH OTHER CLASSES, the subsection entitled CLATHRATES AND INTERCALATES, for examples.

(4) Note. Skin patches or transdermal patches are not considered unit-dosage-articles; see subclass 2.31.

SEE OR SEARCH THIS CLASS, SUBCLASS:

212+, for coating or encapsulating of solid granules, pellets, beads, flakes, platelets, or other particles en masse; especially, subclasses 213.3+ for such processes using an emulsion or dispersion to form a solid-walled microcapsule on a solid, such as a liposome; when other than a medical or dental product is produced.

SEE OR SEARCH CLASS:

264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclasses 4.1+ for processes using an emulsion or dispersion to form a solid-walled microcapsule around a

liquid, such as forming a liquid-core liposome.

424, Drug, Bio-Affecting and Body Treating Compositions, for class defined compositions, the nominal processes of making, and the nominal processes of using; see subclass 1.21 for radionuclide containing liposome; subclass 1.29 for radionuclide containing coated or impregnated particulate; and subclasses 400+ for preparations characterized by special form such as coated (notably, subclass 408 for biocide, repellant, or attractant in the form of a capsule, pellet, or tablet; subclass 417 for biocide, repellant, or attractant in the form of a coated particulate such as a liposome; subclasses 422+ for implant or insert such as surgical or suppository; subclasses 439+ for food as carrier for pharmaceutical such as candy coated; subclass 450 for liposome form; subclasses 451+ for capsule; subclasses 464+ for tablet, lozenge, or pill such as coated, printed, or sustained or differential release type; and subclasses 489+ for particulate form such as coated powder, granule, bead, microcapsule, or pellet).

426, Food or Edible Material: Processes, Compositions, and Products, subclasses 89+ for coated food products and subclasses 302+ for processes of surface coating of a solid food with a liquid.

428, Stock Material or Miscellaneous Articles, subclasses 402+ for coated grain, granule, or small bit of matter, such as microcapsule, liposome, or powder. See (1) Note in Class 428, subclass 402 for rules of placement.

**2.15 Fluidized bed utilized:**

This subclass is indented under subclass 2.14. Processes in which a bed or mass of particles or unit-dosage-articles is maintained in a state of fluidized suspension by passing a gas or vapor in a generally upward direction through the particles or unit-dosage-articles.

(1) Note. Coating material may be introduced directly into the fluidized mass or along with the fluidizing gas or vapor.

(2) Note. Placement here does not require that the particles or unit-dosage-articles be coated while in the fluidizing gas or vapor; they may be coated before entry to or after exit from the fluidized bed.

SEE OR SEARCH THIS CLASS, SUBCLASS:

213+, for such processes acting on solid granules, pellets, beads, flakes, platelets, or other particles when other than a medical or dental product is produced.

**2.16 Retarded or controlled-release layer produced (e.g., enteric):**

This subclass is indented under subclass 2.15. Processes in which the product is intended to provide retarded (or delayed), timed, differential, sustained, or intermittent administration (or delivery) of an active ingredient.

(1) Note. Merely providing a product protected for storage or handling is not included here. For placement here, the control layer must do more than protect against ambient conditions or against the conditions of the mouth. Examples of types of products proper for placement here include the following: continuous delivery by slow or slowed release; discontinuous delivery by two or more stages; enteric coating for protection from stomach conditions for product intended to be orally administered; sustained or differential release implant or insert such as a suppository.

SEE OR SEARCH THIS CLASS, SUBCLASS:

2.19, for similar subject matter involving an en masse rotating means rather than a fluidized bed.

2.21, for similar subject matter not involving either a fluidized bed or an en masse rotating means.

SEE OR SEARCH CLASS:

424, Drug, Bio-Affecting and Body Treating Compositions, for pharmaceutical and diagnostic compositions which are defined in terms of specific structure such as coated so that the

active ingredient is released in a retarded (or delayed), timed, differential, sustained, or intermittent manner; see subclasses 422+ for implant or insert; subclasses 457+ for sustained or differential release composition in a capsule; subclasses 468+ for tablet, lozenge, or pill; and subclasses 474+ for enteric coated medicament.

**2.17 Significant color or other intended appearance altering layer formed (e.g., shining, indicia):**

This subclass is indented under subclass 2.15. Processes in which a layer is formed or modified for the disclosed intent to alter the appearance and which is more than a nominally recited application of a dye or pigment.

(1) Note. For purposes of this subclass, differential or non-uniform color application, such as a strip or a printing of a symbol or a letter, is always significant and, therefore, proper for placement in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

2.2, for similar subject matter involving an en masse rotating means rather than a fluidized bed.

2.23, for similar subject matter not involving either a fluidized bed or an en masse rotating means.

**2.18 En masse rotating means employed (e.g., rotating pan, tumbling):**

This subclass is indented under subclass 2.14. Processes in which a bed or mass of particles or unit-dosage-articles is subjected to rotating means (i.e., rotating means acts en masse as opposed to acting on a particle or unit-dosage-article individually) and in which mechanical contact between the particles or unit-dosage-articles and the rotating means occurs and contributes to movement.

(1) Note. Processes employing rotating means which create and/or maintain an emulsion or dispersion or colloid are not proper for placement here; see subclasses 2.14, 2.21, 2.22, or 2.23.

SEE OR SEARCH THIS CLASS, SUBCLASS:

242, for similar processes wherein other than a medical or dental product is produced.

**2.19 Retarded or controlled-release layer produced (e.g., enteric):**

This subclass is indented under subclass 2.18. Processes in which the product is intended to provide retarded (or delayed), timed, differential, sustained, or intermittent administration (or delivery) of an active ingredient.

(1) Note. Merely providing a product protected for storage or handling is not included here. For placement here, the control layer must do more than protect against ambient conditions or against the conditions of the mouth. Examples of types of products proper for placement here include the following: continuous delivery by slow or slowed release; discontinuous delivery by two or more stages; enteric coating for protection from stomach conditions for product intended to be orally administered; sustained or differential release implant or insert such as a suppository.

SEE OR SEARCH THIS CLASS, SUBCLASS:

2.16, for similar subject matter further involving a fluidized bed.

2.21, for similar subject matter not involving either a fluidized bed or an en masse rotating means.

SEE OR SEARCH CLASS:

424, Drug, Bio-Affecting and Body Treating Compositions, for pharmaceutical and diagnostic compositions which are defined in terms of specific structure such as coated so that the active ingredient is released in a retarded (or delayed), timed, differential, sustained, or intermittent manner; see subclasses 422+ for implant or insert; subclasses 457+ for sustained or differential release composition in a capsule; subclasses 468+ for tablet, lozenge, or pill; and subclasses 474+ for enteric coated medicament.

**2.2 Significant color or other intended appearance altering layer formed (e.g., shining, indicia):**
This subclass is indented under subclass 2.18. Processes in which a layer is formed or modified for the disclosed intent to alter the appearance and which is more than a nominally recited application of a dye or pigment.

(1) Note. For purposes of this subclass, differential or non-uniform color application, such as a strip or a printing of a symbol or a letter, is always significant and, therefore, proper for placement in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:
2.17, for similar subject matter further involving a fluidized bed.
2.23, for similar subject matter not involving either a fluidized bed or an en masse rotating means.

**2.21 Retarded or controlled-release layer produced (e.g., enteric):**
This subclass is indented under subclass 2.14. Processes in which the product is intended to provide retarded (or delayed), timed, differential, sustained, or intermittent administration (or delivery) of an active ingredient.

(1) Note. Merely providing a product protected for storage or handling is not included here. For placement here, the control layer must do more than protect against ambient conditions or against the conditions of the mouth. Examples of types of products proper for placement here include the following: continuous delivery by slow or slowed release; discontinuous delivery by two or more stages; enteric coating for protection from stomach conditions for product intended to be orally administered; sustained or differential release implant or insert such as a suppository.

SEE OR SEARCH THIS CLASS, SUBCLASS:
2.16, for similar subject matter further involving a fluidized bed.
2.21, for similar subject matter not involving either a fluidized bed or an en masse rotating means.

SEE OR SEARCH CLASS:
424, Drug, Bio-Affecting and Body Treating Compositions, for pharmaceutical and diagnostic compositions which are defined in terms of specific structure, such as coated so that the active ingredient is released in a retarded (or delayed), timed, differential, sustained, or intermittent manner; see subclasses 422+ for implant or insert; subclasses 457+ for sustained or differential release composition in a capsule; subclasses 468+ for tablet, lozenge, or pill; and subclasses 474+ for enteric coated medicament.

**2.22 Gelatin matrix layer produced:**
This subclass is indented under subclass 2.14. Processes in which the formed layer comprises a matrix or continuous phase of gelatin.

SEE OR SEARCH THIS CLASS, SUBCLASS:
2.15, for similar subject matter further involving a fluidized bed.
2.18, for similar subject matter further involving an en masse rotating means.

**2.23 Significant color or other intended appearance altering layer formed (e.g., shining, indicia):**
This subclass is indented under subclass 2.14. Processes in which a layer is formed or modified for the disclosed intent to alter the appearance and which is more than a nominally recited application of a dye or pigment.

(1) Note. For purposes of this subclass, differential or non-uniform color application, such as a strip or a printing of a symbol or a letter, is always significant and, therefore, proper for placement in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:
2.17, for similar subject matter further involving a fluidized bed.
2.2, for similar subject matter further involving an en masse rotating means.

**2.24 Implantable permanent prosthesis (i.e., artificial body member) (e.g., pacemaker, lens, cornea, glaucoma shunt, heart valve, muscle, spinal disc, breast, internal organ):**
This subclass is indented under subclass 2.1. Processes in which the product is an implantable artificial body member or a part or subcombination thereof, which is intended to physically replace a missing or defective natural body member or part by insertion into the body or attachment onto epidermal tissue in a permanent manner; parts, subcombinations, or intermediates thereof or therefor.

(1) Note. This subclass and its indents are intended to provide for all appropriate processes under subclass 2.1 wherein the product would be found in Class 623 and which is intended to be inserted into the body in a permanent manner, unless proper for a subclass appearing above this one.

(2) Note. Prosthesis herein means a replacement or assistant for a missing or defective part of a living body.

(3) Note. Artificial skin intended to remain on the body; e.g., be absorbed, is placed here.

(4) Note. In the case of generic claims and multiple disclosed utilities, multiple cross-referencing is required; for example, coating of a material disclosed for heart valve, vascular prosthesis, blood bag or IV tubing.

SEE OR SEARCH THIS CLASS, SUBCLASS:

2.1, for similar subject matter which is not intended to be permanently implanted; e.g., splint.
2.24, for coating of a material disclosed for heart valve
2.3, blood bag or IV tubing
2.5, vascular prosthesis.
2.29, for similar subject matter relating to dentistry which is not intended to be permanently implanted.
164+, for coating processes relating to optical lenses not intended to be implanted, such as corrective or contact.

SEE OR SEARCH CLASS:

351, Optics: Eye Examining, Vision Testing and Correcting, subclasses 160+ for contact lens (i.e., removable) having specific optical characteristics for its use.
424, Drug, Bio-Affecting and Body Treating Compositions, subclass 429 for coated or impregnated contact lens.
428, Stock Material or Miscellaneous Articles, appropriate subclasses for lenses lacking structural limitations (i.e., stock-material).
523, Synthetic Resins or Natural Rubbers, for solid polymer containing compositions or process of preparing; see subclasses 105+ for nonmedicated composition or process of preparing, which is specifically intended for contact with living animal tissue (other than apparel) such as prosthesis composition, composition for use as tooth or bone replacement, restorative, or implant.
528, Synthetic Resins or Natural Rubbers, cross-reference art collection 950 for synthetic resins of any type of the Class 520 series which is intended for use in replacing or restoring partially or wholly hard tissue as normally found in animals (e.g., dentures, bones), and excluding synthetic hair or skin and contact lenses. (Note that polymers which are a part of a composition are found in Class 523).
607, Surgery: Light, Thermal, and Electrical Application, subclasses 2+ for electrical therapeutic systems; e.g., pace maker.
623, Prosthesis (i.e., Artificial Body Members), Parts Thereof, or Aids and Accessories Therefor, subclass 3 for corporeal (implantable) artificial heart or aid therefor; subclasses 4+ for eye protheses structurally limited to the prosthetic use; subclass 7 for breast prothesis; subclass 8 for implantable breast prothesis; subclass 9 for larynx, trachea, tracheobronchial, or combination thereof prothesis; subclass 10 for ear or nose prosthesis; subclass 12

for implantable hollow or tubular part or organ prothesis; subclass 13 for implantable ligament or tendon prothesis; subclass 14 for implantable muscle prothesis such as sphincter; subclass 15 for implantable hair or skin prothesis; and cross-reference art collection 901 for documents relating to a process for making an artificial body member.

**2.25 Liquid conveying (e.g., vascular, arterial, bile duct, urethra):**

This subclass is indented under subclass 2.24. Processes in which the product is intended to replace or assist a missing or defective vessel, tubular part, duct, or other structure whose primary function is for conveying bodily liquids (e.g., blood, lymph, or bile); parts, subcombinations, or intermediates thereof or therefor.

SEE OR SEARCH THIS CLASS, SUBCLASS:

2.24, for coating processes relating to an internal organ prosthesis (i.e., a kidney, heart valve, or other structure) which may convey bodily fluids but whose primary function is some other type of processing.

SEE OR SEARCH CLASS:

623, Prosthesis (i.e., Artificial Body Members), Parts Thereof, or Aids and Accessories Therefor, subclass 1 for arterial blood (circulating) prosthesis and subclass 12 for hollow or tubular part or organ for conveying body fluids other than blood.

**2.26 For mineralized body part (e.g., bone, tooth, crown, hip):**

This subclass is indented under subclass 2.24. Processes in which the product is an implantable prosthesis for a mineralized body part, such as bone or tooth replacement; parts, subcombinations, or intermediates thereof or therefor.

(1) Note. The subject matter here must be, at least in part, intended to replace or assist a missing or defective mineralized portion of the body.

(1) Note. The prosthesis itself need not be composed of mineralized material. Commonly used materials found herein include metal and synthetic resin.

SEE OR SEARCH THIS CLASS, SUBCLASS:

2.24, for coating processes relating to implantable fingernail or toenail or hair prostheses and other implantable soft tissue, such as implantable eye or vision related prosthesis, cartilage, ligament, muscle, or internal organ.

2.29, for coating processes relating to nonpermanently implantable or nonimplantable dental products, such as denture appliances or temporary orthodontia devices.

SEE OR SEARCH CLASS:

428, Stock Material or Miscellaneous Articles, for prostheses lacking significant structure (i.e., constituting stock materials).

433, Dentistry, for dental prosthesis or appliance or for methods normally performed by a dentist, especially subclasses 167+ for, per se, dental prosthesis article having significant structure (i.e., not merely a stock-material); and subclasses 215+ for repairing or treating natural teeth.

523, Synthetic Resins or Natural Rubbers, for solid polymer containing compositions or process of preparing; see subclasses 105+ for nonmedicated composition or process of preparing, which is specifically intended for contact with living animal tissue (other than apparel), such as a prosthesis composition or a composition for use as tooth or bone replacement, restorative, or implant.

528, Synthetic Resins or Natural Rubbers, cross-reference art collection 950 for synthetic resins of any type of the Class 520 series which is intended for use in replacing or restoring partially or wholly hard tissue as normally found in animals (e.g., dentures, bones), and excluding synthetic hair or skin and contact lenses. (Note that

polymers which are a part of a composition are found in Class 523.)

623, Prosthesis (i.e., Artificial Body Members), Parts Thereof, or Aids and Accessories Therefor, subclass 10 for ear or nose prosthesis and subclasses 16+ for implantable bone prosthesis having significant structure (i.e., other than merely stock-material).

**2.27 Inorganic oxygen-containing compound containing layer formed (e.g., hydroxyapatite, ceramic, glass):**

This subclass is indented under subclass 2.26. Processes in which the layer formed contains an inorganic compound which contains an oxygen atom; the oxygen being present as an intended component, not merely as an impurity.

(1) Note. The inorganic oxygen-containing compound containing layer does not have to comprise a continuous matrix of the inorganic oxygen-containing compound.

SEE OR SEARCH CLASS:

528, Synthetic Resins or Natural Rubbers, cross-reference art collection 950 for synthetic resins of any type of the Class 520 series which is intended for use in replacing or restoring partially or wholly hard tissue as normally found in animals (e.g., dentures, bones), and excluding synthetic hair or skin or contact lenses. (Note that polymers which are a part of a composition are found in Class 523.)

623, Prosthesis (i.e., Artificial Body Members), Parts Thereof, or Aids and Accessories Therefor, subclass 10 for ear or nose prosthesis and subclasses 16+ for implantable bone prosthesis having significant structure (i.e., other than merely stock-material).

**2.28 Device for creating or holding open an unnatural opening in a membrane or organ (e.g., syringe, scalpel, drainage tube):**

This subclass is indented under subclass 2.1. Processes in which the product is intended to pierce or cut an organ or a membrane so as to create an opening therein (e.g., invasive devices) or to hold open a created (i.e., unnatural) opening in an organ or a membrane; parts, subcombinations, or intermediates thereof or therefor.

(1) Note. Skin is an organ for purposes of this subclass.

(2) Note. The term catheter has been applied to devices which serve purposes other than what satisfies this subclass definition. For coating processes relating to such other purpose devices, proper classification will usually be in subclass 2.1, above.

SEE OR SEARCH CLASS:

604, Surgery, for body treating and medicating methods and apparatus which include the application, storing, collecting, introduction, or removal of materials from the body; subclasses 19+ for means for introducing or removing material from the body for therapeutic purposes; subclasses 317+ for means and methods for collecting body fluids or waste material; and subclass 403 for container for blood or body treating material or for means used therewith (e.g., needle for piercing container closure).

606, Surgery, for Class 128 subject matter relating to devices or appliances for use in operative surgery upon the body or in preparation for operative surgery or for devices designed to assist in operative surgery; subclasses 79+ for orthopedic (bone, bonelike material, or cartilage) cutting; subclasses 110+ for tonsil, adenoid, or polyp removing; subclass 166 for corneal cutter or guide for corneal cutter; subclasses 167+ for cutting, puncturing, or piercing not more hierarchically placed; subclass 222 for suturing needle; and subclasses 228+ for suture or ligature.

**2.29 Dental product (e.g., floss, denture, orthodontia wire):**

This subclass is indented under subclass 2.1. Processes in which the product is related to dentistry, including the treatment of teeth or gums or the replacement of teeth; parts, sub-

combinations, or intermediates thereof or therefor.

(1) Note. The products here may be used by a dentist or by a non-dentist.

(2) Note. Orthodontics which may be attached to the teeth are proper for placement here if the intent is impermanence. Permanent dental prostheses are placed in subclasses 2.24+, especially subclasses 2.26+ if intended to replace mineralized portion of the body such as a tooth.

SEE OR SEARCH THIS CLASS, SUBCLASS:

2.24+, for permanent implantable tooth prostheses, especially subclasses 2.26+ if intended to replace mineralized portion of the body.

SEE OR SEARCH CLASS:

433, Dentistry, for methods, apparatus, implements, and devices relating to the treatment of teeth or gums or the replacement of teeth, or for methods normally performed by a dentist, especially subclasses 2+ for orthodontics. Class 433 provides for the articles while Class 428 provides for the stock-materials.

523, Synthetic Resins or Natural Rubbers, for solid polymer containing compositions or process of preparing, especially subclasses 105+ for nonmedicated composition or process of preparing, which is specifically intended for contact with living animal tissue (other than apparel) such as composition for dental or denture devices.

**2.3 Fluid barrier or fluid transporting product, other than merely absorbing (e.g., surgical glove, condom, lined diaper, membrane filter, IV tubing, cannula, dialysis membrane, urinary catheter):**

This subclass is indented under subclass 2.1. Processes in which the product contains a component which is intended to act as a barrier for a fluid or a fluid portion of a composition or which is intended to function as a fluid transporting means, other than a product functioning by merely sorbing the fluid; parts, subcombinations, or intermediates thereof or therefor.

(1) Note. The product must be intended to function as defined, not just be incidentally a fluid barrier, for example, as might be the case for a simple plaster medical or surgical cast which may provide some liquid resistance but which is not formulated for liquid proofing.

SEE OR SEARCH CLASS:

2, Apparel, for garments such as surgical gloves, gowns, masks, etc., especially subclass 455 if to protect the wearer against unusual conditions (subclass 2.5 for penetration resistant apparel, subclass 9 for face protection, and subclasses 16+ for hand protection); subclasses 69+ for body garments (subclasses 93+ for coats and subclass 161.7 for gloves); and subclass 206 for surgical mask.

128, Surgery, subclasses 830+ for female reproductory tract shield and subclass 844 for male condoms.

523, Synthetic Resins or Natural Rubbers, for solid polymer containing compositions or process of preparing, especially subclasses 105+ for nonmedicated composition or process of preparing, which is specifically intended for contact with living animal tissue (other than apparel), such as surgical related composition (e.g., suture, catheter, dilator), surgical tape adhesive composition, and nonthrombogenic plastics (e.g., for making blood pouches, tubes, catheters).

**2.31 Flexible web, sheet, film, or filament base (e.g., fabric, bandage, suture, transdermal patch, orthopedic cast tape):**

This subclass is indented under subclass 2.1. Processes in which the product comprises a flexible web, sheet, film, or filament base; parts, subcombinations, or intermediates thereof or therefor.

(1) Note. Examples of appropriate subject matter for this subclass include the following: filament; composed of multiple threads (cord); woven or unwoven fibrous material such as paper or gauze;

nonporous sheet, foil, or film material such as metal foil or a synthetic plastic film.

(2) Note. Flexible here means material that a person could normally fold with unassisted bare hands without destroying its functionality. Thus, a process which coats a thin metal foil may be appropriately classified here if it is normally foldable.

(3) Note. Suture includes a product made of threads, cords, or filaments which is intended to be used to close a wound or to tie, bind, or constrict a portion of a body organ.

(4) Note. Methods for making material useful for making a stiff body wrap, such as an orthopedic cast, are proper for placement here so long as the material in the claim is flexible: see subclass 2.3 if there is a liquid barrier feature.

SEE OR SEARCH THIS CLASS, SUBCLASS:

2.24, for artificial skin.

2.29, for dental floss.

2.3, for coating processes related to products which may have a sheet or film base and which are intended to serve as a fluid barrier or fluid transporting product such as surgical glove, condom, lined diaper, membrane filter, IV tubing, cannula, or dialysis membrane.

SEE OR SEARCH CLASS:

2, Apparel, for garments such as surgical gloves, gowns, masks, etc., especially subclass 455 if to protect the wearer against unusual conditions (subclass 2.5 for penetration resistant apparel, subclass 9 for face protection, and subclasses 16+ for hand protection); subclasses 69+ for body garments (subclasses 93+ for coats and subclass 161.7 for gloves); and subclass 206 for surgical mask.

128, Surgery, appropriate subclasses for bandages, body applicators, or body dressings; see Class 424 definition for the line between it and Class 128.

424, Drug, Bio-Affecting and Body Treating Compositions, subclasses 402+ for wearing apparel, fabric, or cloth coated or impregnated with a biocidal or pharmaceutical composition; subclasses 411+ for nominal article comprising a solid carrier or diluent for a biocide, repellent, or attractant, such as wrapping, packaging, lining, or building material or a container (e.g., of, or containing, cellulose); subclasses 414+ for paper or foil comprising a biocide, repellent, or attractant; and subclasses 443+ for web, sheet, film, filament, bandage, or dressing bases with a medicament coating or impregnant. See Class 424 definition for the line between it and Class 128 for bandages, body applicators, or body dressings.

428, Stock Material or Miscellaneous Articles, for stock material product in the form of a single or plural layer, web, or sheet and which contains a biocide; or for an article not elsewhere provided for comprising a coated or impregnated base preserved by a composition or compound which has a Class 424 utility (e.g., moth-proofed textile or termite-proofed wood).

523, Synthetic Resins or Natural Rubbers, subclasses 105+ for nonmedicated composition of the class or process of preparing, which is specifically intended for contact with living animal tissue (other than apparel), such as suture composition.

602, Surgery: Splint, Brace, or Bandage, subclasses 41+ for means to prevent injury to a body portion, to protect or cover a wound upon or under body skin, or to promote healing of an injured body portion. See Class 424 definitions for the line between it and Class 128 for bandages, body applicators, or body dressings.

606, Surgery, for a composition used in sutures where the claim has either significant structure or a significant physical property characterizing said suture. The mere use of the terms “filament” or “fiber” or “suture” is considered significant structure, and use of numerical indices of tensile

strength, handleability, sterility, density, or denier are examples of significant characteristic physical properties proper for Class 128.

**4** This subclass is indented under the class definition. Processes wherein a plant member or an animal specimen, near or in its natural state, is coated.

(1) Note. The intent must be to preserve the member or specimen near to the way it would be in nature. Coating for use as clothing or lumber is excluded.

SEE OR SEARCH THIS CLASS, SUBCLASS:

2.1+, for processes in which a medical or dental purpose product, a part thereof, a subcombination thereof, or an intermediate thereof, is coated or impregnated, for example, preparing a biological specimen.

SEE OR SEARCH CLASS:

8, Bleaching and Dyeing; Fluid Treatment and Chemical Modification of Textiles and Fibers, subclass 94.11 for reactive treatment of biological specimens.

47, Plant Husbandry, for processes of preserving living plants which are more than a coating operation for this class (427). Processes of coating living plants with compositions which do not have any effect upon the growth characteristics of the plant are classified in this subclass (Class 427, subclass 4).

131, Tobacco, subclasses 299 and 300+ for processes of preserving, disinfecting and sterilizing tobacco.

424, Drug, Bio-Affecting and Body Treating Compositions, for coating a living body and read the notes for the line with this class.

504, Plant Protecting and Regulating Compositions, subclass 100 for seeds coated with agricultural chemicals other than fertilizers; e.g., antidotes, plant growth regulators, fungicides, etc., and subclasses 116.1-367 for processes and compositions in which the coating material exerts an effect upon the growth of the plant.

**5** This subclass is indented under the class definition. Processes wherein the base or coating contains a radioactive element or isotope, or a compound thereof.

(1) Note. Elements of atomic number 84 or higher are all considered radioactive.

SEE OR SEARCH CLASS:

252, Compositions, subclasses 517 and 625+ for compositions containing radioactive material.

**6** This subclass is indented under subclass 5. Processes wherein particles are coated en masse (i.e., not individually) or wherein nuclear fuel elements are coated.

**7** This subclass is indented under the class definition. Processes which impart fraud detecting characteristics to the base, or which make the alteration of indicia which may be applied thereto detectable even though application of such indicia is not claimed.

SEE OR SEARCH CLASS:

229, Envelopes, Wrappers, and Paperboard Boxes, subclass 83 for envelopes having sealing flaps containing a dye to indicate unauthorized tampering.

283, Printed Matter, subclasses 72+, and indented subclasses, for safety paper or printed matter having fraud preventing characteristics wherein there are structural features other than the coating or impregnant.

**8** This subclass is indented under the class definition. Processes which include sampling, visually or audibly inspecting, chemically testing, or otherwise physically or mechanically determining some variable condition of the coating.

(1) Note. Included herein are processes for determining imperfections or for determining completeness of a reaction or manipulation as well as determinations of undesired variations. Recitations of optimum or desired temperatures or pressures are considered nominal where no measurement is made and are classi-

fied with the disclosed process on some other basis. Merely dispensing the coating material even if described as metering it out is excluded herefrom since it does not involve any specific measuring.

SEE OR SEARCH THIS CLASS, SUBCLASS:
1, for fingerprinting.
7, for a coating process which enhances detection of fraud or tampering.

SEE OR SEARCH CLASS:
73, Measuring and Testing, for testing, per se.
156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclass 64 for testing, measuring and inspecting when combined with a laminating step.
264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclasses 40.1 through 40.7 for testing, measuring and inspecting when combined with a molding step.
436, Chemistry: Analytical and Immunological Testing, subclasses 1+ for processes of chemical testing.

**9** This subclass is indented under subclass 8. Processes wherein a determination is made as to the depth or variation in the depth of a coating on a base.

**10** This subclass is indented under subclass 9. Processes wherein an electrical or optical test is used to determine the coating thickness.

**11** This subclass is indented under the class definition. Processes wherein a solid coating material is applied by moving it relative to and in contact with the base.

(1) Note. The surface of the solid coating material may be heated to melt said surface making application possible with less force.

(2) Note. Powder, granules or paste are not considered solid coating material for this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:
242, for application of coatings by friction with rumbling or tumbling.

SEE OR SEARCH CLASS:
118, Coating Apparatus, subclasses 76+ for apparatus for rubbing transfer of solid coating material onto work.
156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclasses 230+ for processes of transferring a solid coating from a carrier to a base.
184, Lubrication, for a solid stick lubricant for a named belt, cable or chain, and subclass 99, for a similar device adapted to be applied to a bearing.
401, Coating Implements With Material Supply, subclasses 49+ for solid material for rubbing contact having a support or an end or surface shaped to contact the work.

**58** This subclass is indented under the class definition. Processes directed to the formation of a product which has a claimed or solely disclosed electrical function.

(1) Note. This subclass and indents hereunder provide for the formation of subcombinations of or incomplete electrical products, e.g., metal coated paper claimed or solely disclosed to be used in a condenser, etc.

(2) Note. For classification here the electrical function of coated product must be direct and not remote, and for example includes light bulbs but not lamp shades and telephone insulators but not telephone poles.

(3) Note. Antistatic coating processes, unless the product formed has an electrical function, are not provided for here.

SEE OR SEARCH THIS CLASS, SUBCLASS:
5, for formation of electrical products with a radioactive base or coating.

127, for magnetic base or coating where the article produced does not include an electrically conductive part.

SEE OR SEARCH CLASS:

29, Metal Working, subclasses 25.01+ and the other classes mentioned in the search notes thereto for the manufacture of barrier layer devices. See subclasses 592.1+ for processes of making various electrical devices by Class 29 operations or by operations not elsewhere provided for.

148, Metal Treatment, particularly subclasses 516+ for processes of coating metal combined with heat treatment of metal to modify or maintain the internal physical structure (i.e., microstructure) or chemical property of metal. See subclasses 206+ of Class 148 for processes of carburizing or nitriding of metal or subclasses 240+ for processes of producing a reactive coating on solid metal, the coating being a metal compound in which an element of the same is furnished by the metal base. See also section III of the Class 427 definition and section III, C, of the Class 148 definition. Class 148 contains processes of heat treating thoriated and similarly coated metal filaments to activate or reduce the coating.

156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclasses 47+ for miscellaneous processes of making electric conductors, where the process involves more than a coating operation and no other class provides for the combination of operations claimed.

204, Chemistry: Electrical and Wave Energy, subclasses 192.1+ for forming electron emissive or conductive coatings by cathode sputtering. Class 204 also provides for bases provided with electron emissive or conductive coatings which are defined as being made by a process coming within the scope of Class 204 except products which comprise two or more contiguous metallic layers for which see Class 29, Metal Working. Such coated bases are classified in Class 204 in the subclass which provides for the process of producing the coated base. Where the sole disclosure of the patent is that the base is coated by a Class 204 process, but the base is not claimed as being coated by a Class 204 process, the patent is classified in Class 29 or 427. Also, see the reference to Class 204 in the class definition of this class (427).

205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, subclasses 80+ for processes of forming electron emissive or conductive coatings by electrolytic coating. Class 205 also provides for bases provided with electron emissive or conductive coatings which are defined as being made by a process coming within the scope of Class 205 except products which comprise two or more contiguous metallic layers for which see Class 29, Metal Working. Such coated bases are classified in Class 205 in the subclass which provides for the process of producing the coated base. Where the sole disclosure of the patent is that the base is coated by a Class 205 process, but the base is not claimed as being coated by a Class 205 process, the patent is classified in Class 29 or 427. Also, see the reference to Class 205 in the class definition of this class (427).

252, Compositions, subclass 62.2 for the composition of electrolytes for electrical circuit components, and subclass 62.3 for barrier layer compositions, subclasses 500+ for electron emissive and conductive compositions. The general line stated in the class definition of Class 427 as to the line between Class 427 and the composition classes applies to the line between these subclasses in Class 427 and subclasses 500+ of Class 252.

264, Plastic and Nonmetallic Article Shaping or Treating: Processes, appropriate subclasses for processes within the class definition, of making electrodes from nonmetallic plastic material by a significant plastic working operation when combined with a coating opera-

tion. The process of shaping broadly followed by coating is classified in Class 427, as is the process of coating a previously shaped body. Also in Class 264, see subclasses 29.1+ and 171.1+ for patents which may disclose making of electrical conductors, and subclasses 104+ specifically for molding or shaping of electro conductive material.

428, Stock Material or Miscellaneous Articles, subclasses 615+ provides for metal coated metal bases as compound metal stock, even though the coated product is claimed as being electrically conductive or emissive.

445, Electric Lamp or Space Discharge Component or Device Manufacturing, subclasses 35+, 46+, and 60+ for other methods and apparatus for manufacturing electrodes of electrodes of electric lamp and electric space discharge devices.

**59** This subclass is indented under subclass 58. Processes for coating processes producing electrodes used in electric welding.

(1) Note. Many of the patents in this subclass are for processes of coating consumable metal electrodes with a flux coating. Where the coated welding rod may be used in either electric or gas welding processes, the process of coating is placed in this subclass unless all the claims are limited to the use in gas welding.

SEE OR SEARCH CLASS:

219, Electric Heating, subclasses 145.1+ and 146.1+ for welding electrodes having significant structure other than a mere coating.

428, Stock Material or Miscellaneous Articles, subclasses 560+ for welding rods having a coating which includes metal particles.

**60** This subclass is indented under subclass 59. Processes wherein the coated welding rod is subjected to a post-treatment with a solid treating member such as a roller, die, grinder, etc., to remove excess or otherwise treat the coating.

**61** This subclass is indented under subclass 59. Processes wherein the coating material includes a metal in elemental form or includes beryllium, magnesium, calcium, strontium, or barium in compound form.

SEE OR SEARCH THIS CLASS, SUBCLASS:

5, for coating with a material containing radium.

**62** This subclass is indented under subclass 58. Processes for coating processes producing a superconductive electrical product; i.e., cryogenic device.

SEE OR SEARCH CLASS:

29, Metal Working, subclass 599 for processes of making superconductors involving manufacturing steps more than coating.

326, Electronic Digital Logic Circuitry, subclasses 1+ for superconducting electronic digital logic circuits.

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 186, 366+, and 527+ for miscellaneous superconductive circuits.

365, Static Information Storage and Retrieval, subclasses 160+ for a superconductive device with storage of signals.

505, Superconductor Technology: Apparatus, Material, Process, subclasses 300+ for processes of producing high temperature ($T_c > 30$ K) superconductors, particularly subclasses 434, 446+, 452, or 470+.

**63** This subclass is indented under subclass 62. Processes wherein the coating is (1) applied only to selected portions of a base (2) applied in such a manner as to produce a coating of nonuniform thickness or (3) varies from area to area as to physical or chemical properties.

**64** This subclass is indented under subclass 58. Processes wherein the product produced is capable of emission of light when excited by electrons, ultraviolet radiation, or X-rays or after such excitation has been removed.

(1) Note. This subclass provides for coating cathode-ray tubes, luminescent screens, etc., even though the patent does not state that the article has fluorescent or phosphorescent characteristics since such articles are assumed to have these characteristics. Further, it is not necessary that the coating being applied is the fluorescent or phosphorescent coating since such articles may have additional coatings.

SEE OR SEARCH THIS CLASS, SUBCLASS:

157+, for processes of coating producing a fluorescent or phosphorescent product which is not an electrical product.

SEE OR SEARCH CLASS:

250, Radiant Energy, subclasses 458.1+, for devices or bases having fluorescent or phosphorescent coatings which include structure other than a mere base with a coating thereon. Devices, such as screens, which are merely bases having a fluorescent or phosphorescent coating are classified in this class (428).

252, Compositions, subclasses 301.16+ for compositions exhibiting fluorescent or phosphorescent effects.

313, Electric Lamp and Discharge Devices, subclasses 364+, for cathode-ray tubes having a fluorescent or phosphorescent screen or target, and subclasses 483+ for other electric lamps and electronic tubes but which are provided with a fluorescent or phosphorescent material.

**65** This subclass is indented under subclass 64. Processes wherein the electrical product is sensitive to X-rays.

SEE OR SEARCH CLASS:

250, Radiant Energy, subclasses 458.1+ for X-ray sensitive fluorescent or phosphorescent devices.

**66** This subclass is indented under subclass 64. Processes wherein the product produced is a electroluminescent lighting device.

(1) Note. In an electroluminescent lamp or device the luminescent coating is activated by means of contact with a conductive coating and not by means of an electron beam.

**67** This subclass is indented under subclass 64. Processes wherein the product is a lamp with a fluorescent coating which can be activated by means of an electric discharge or excited gas.

(1) Note. This subclass includes processes of making certain articles for lighting purposes wherein the coatings may be described as luminescent, fluorescent or phosphorescent, however, subclass 66 above provides for producing electroluminescent lamps.

**68** This subclass is indented under subclass 64. Processes wherein the fluorescent or phosphorescent coating is in the form of a mosaic or pattern or is used for the production of color images.

SEE OR SEARCH CLASS:

430, Radiation Imagery Chemistry: Process, Composition, or Product Thereof, subclasses 23+ for process of producing a cathode-ray tube element.

**69** This subclass is indented under subclass 64. Processes in which a coating is produced on a base by absorption or condensation of, or reaction with, a vapor or gas.

**70** This subclass is indented under subclass 69. Processes wherein a nonmetallic coating is formed on the base or on another layer by vapor deposition.

**71** This subclass is indented under subclass 64. Processes wherein particles are applied to a base in free flowing condition.

(1) Note. Particles suspended in a liquid or paste are not considered to be in a free flowing condition for this subclass.

**72** This subclass is indented under subclass 64. Processes wherein the base is rotated during or after application of the coating.

**73** This subclass is indented under subclass 64. Processes wherein the coating material is deposited on the base by settling out of a liquid medium.

**74** This subclass is indented under subclass 58. Processes which result in a product which responds to visible, infrared, or ultraviolet illumination by (1) emitting electrons, (2) generating an electromotive force, or (3) varying electrical conductivity.

SEE OR SEARCH CLASS:
136, Batteries: Thermoelectric and Photoelectric, subclasses 243+ for photocells of the generator type.
252, Compositions, subclass 501.1 for compositions whose electrical conductivity varies with exposure to light.
338, Electrical Resistors, subclasses 15+ for photocells of the resistive type.
438, Semiconductor Device Manufacturing: Process, subclasses 57+ for methods of making photoresponsive semiconductor barrier layer-type devices (i.e., photovoltaic devices).

**75** This subclass is indented under subclass 74. Processes wherein the coating is (1) applied only to selected portions of a base or (2) applied in such a manner as to produce a coating of nonuniform thickness or (3) varies from area to area as to chemical or physical properties.

(1) Note. Included herein are target electrodes for television pickup or camera tubes, etc.

**76** This subclass is indented under subclass 74. Processes wherein the photo-sensitive coating applied is selenium, tellurium or a compound thereof.

SEE OR SEARCH CLASS:
423, Chemistry of Inorganic Compounds, subclasses 508+ for manufacture of selenium and tellurium or compounds thereof.

**77** This subclass is indented under subclass 58. Processes for coating processes which result in an electrical product which functions to emit or suppress emission of electrons into space.

(1) Note. This subclass provides for applying alkaline earth compound coatings on directly or indirectly heated cathodes or filaments for thermionic tubes, etc.

(2) Note. This subclass does not provide for producing products which emit electrons by arcing. For arcing or sparking see subclass 580.

SEE OR SEARCH THIS CLASS, SUBCLASS:
59+, for processes which result in welding electrodes.
74+, for processes which result in a photoemissive electrical product.

**78** This subclass is indented under subclass 77. Processes in which a coating is produced on a base by absorption or condensation of, or reaction with, a vapor or gas; or in which the coating material is projected by mechanical force toward the base.

**79** This subclass is indented under subclass 58. Processes wherein the product produced is intended for use in a device comprising two conducting surfaces separated by an insulating material or dielectric, the device being capable of storing electrical energy and controlling the flow of direct and alternating current.

SEE OR SEARCH CLASS:
29, Metal Working, subclasses 25.41+ for processes of making condensers involving manufacturing steps beyond coating.
361, Electricity: Electrical Systems and Devices, subclasses 271+ for nonelectrolytic condensers.

**80** This subclass is indented under subclass 79. Processes wherein the condenser or capacitor either (a) comprises two conducting electrodes wherein the anode has a metal oxide film acting as a dielectric and the assembly is operable in the presence of an electrolyte or (b) wherein

the depletion layer of a semiconductor is employed.

SEE OR SEARCH CLASS:

29, Metal Working, subclass 25.03 for processes of making electrolytic condensers involving more than coating.

252, Compositions, subclass 62.2 for the composition of electrolytes and subclass 62.3 for barrier layer compositions.

361, Electricity: Electrical Systems and Devices, subclasses 503+ for electrolytic condensers.

**81** This subclass is indented under subclass 79. Processes wherein gaseous pressures are established which are greater or less than ambient.

SEE OR SEARCH THIS CLASS, SUBCLASS:

294+, for vacuum pretreatment in general.

350, for vacuum post-treatment in general.

**96.1 Integrated circuit, printed circuit, or circuit board:**

This subclass is indented under subclass 58. Process of coating for producing an integrated circuit, printed circuit, or circuit board (e.g., a circuit in which conductive wire has been replaced by a conductive coating or a combination of interconnected circuit elements produced by coating, etc.).

SEE OR SEARCH THIS CLASS, SUBCLASS:

79 through 81, for a process of coating an integrated circuit involving a condenser or capacitor.

SEE OR SEARCH CLASS:

29, Metal Working, subclasses 825 through 885, especially subclasses 846-853 for miscellaneous methods of making printed circuits, etc., involving more than coating.

174, Electricity: Conductors and Insulators, subclasses 250 through 268 for printed circuits.

438, Semiconductor Device Manufacturing: Process, appropriate subclasses for methods of making semiconductor-based integrated circuits.

439, Electrical Connectors, subclasses 55 through 85 for an electrical connector comprising or combined with a preformed panel circuit (e.g., a printed circuit board, etc.).

**96.2 Protective coating (e.g., encapsulating, etc.):**

This subclass is indented under subclass 96.1. Process for coating a protective layer onto a substrate (e.g., encapsulating to surround entire substrate with a sealed encasement to act as a guard or barrier to passage of a contaminant, forming a scratch or puncture-resistant layer, etc.).

(1) Note. This subclass and the subclasses indented hereunder are only intended to provide for coating of a layer which is expressly stated to function as a protective layer for at least a portion of the substrate and is not intended to include mere application of a coating mask which is removed after coating.

SEE OR SEARCH THIS CLASS, SUBCLASS:

212 through 222, for a process of coating or encapsulating particles, flakes, or granules, in general.

**96.3 Electromagnetic wave energy shield (e.g., electromagnetic wave shield (EWS), etc.):**

This subclass is indented under subclass 96.2. Process in which the protective layer inhibits transmission of electromagnetic wave energy (e.g., electromagnetic wave shield (EWS), etc.).

**96.4 Conformal (e.g., thin film <.02 mm thick, etc.):**

This subclass is indented under subclass 96.2. Process in which the protective layer conforms to a shape, profile, or surface configuration similar to that of the substrate before coating (e.g., thin film <.02 mm thick, etc.).

(1) Note. Use of the term “conformal” to describe the protective layer is presumed to fit the definition of this subclass, even if no physical thickness is disclosed. The intent of this subclass is to provide for application of a protective coating thin enough to preserve a shape, profile, or surface configuration similar to that of

the substrate before coating. This type of thin film coating frequently results in encapsulation to surround the entire substrate with a sealed encasement.

**96.5 Mechanical shock, stress, or physical damage absorbing or shielding (e.g., scratch or puncture-resistant coating, etc.):**
This subclass is indented under subclass 96.2.
Process in which the protective layer absorbs or shields mechanical shock, stress, or physical damage (e.g., scratch- or puncture-resistant coating, etc.).

**96.6 Barrier to diffusion of specific fluid (e.g., silicone rubber, selectively permeable membrane which excludes water or moisture, etc.):**
This subclass is indented under subclass 96.2.
Process in which the protective layer is a barrier to diffusion of a specific fluid (e.g., silicone rubber, selectively permeable membrane which excludes water or moisture, etc.).

**96.7 Using mist or aerosol:**
This subclass is indented under subclass 96.1.
Process in which coating material is a dispersion of fine liquid or solid particles (e.g., colloidal, etc.) in a gas or vapor continuous phase.

(1) Note. This subclass is intended to include spraying the substrate with a mist or aerosol.

SEE OR SEARCH THIS CLASS, SUBCLASS:
78, for a process of vapor deposition or spraying to produce an electron emissive or suppressive electrical product (excluding electrode for arc).
96.8, for a process of coating vapor or gas phase material (other than a mist or aerosol) onto a substrate to produce an integrated or printed circuit or circuit board.
110, for a process of spraying a transparent base to produce an electrical product other than an integrated or printed circuit or circuit board.
248.1 through 255.7, for coating of a substrate, in general, by vapor, gas, or smoke (other than mist sprayed through a gas).
421.1 through 427.7, for spray coating of a substrate, in general.
469, for utilizing an electrostatic charge, field, or force to deposit coating material consisting of charged particles in a nonuniform or patterned layer onto a substrate.
475 through 486, for utilizing an electrostatic charge, field, or force to apply solid particles or atomized liquid onto a substrate.

SEE OR SEARCH CLASS:
117, Single-Crystal, Oriented-Crystal, and Epitaxy Growth Processes; Non-Coating Apparatus Therefor, appropriate subclasses for a process for growing therein-defined single crystal of all types of materials, including inorganic or organic, and by all techniques, especially subclasses 84 through 109 for vapor or gas phase epitaxy.
516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 1 through 8.1 for continuous gas or vapor phase colloid systems (e.g., smoke, fog, aerosol, cloud, mist) or agents for such systems or processes of making or stabilizing such systems or agents, in general.

**96.8 Vapor or gas deposition:**
This subclass is indented under subclass 96.1.
Process in which coating material is a vapor or gas or is derived from a vapor or gas during coating.

(1) Note. This subclass is intended to include all gas or vapor phase deposition (e.g., by adsorption or condensation from a vapor, by reaction with a vapor for chemical vapor deposition (CVD), etc.) not provided for in above subclasses, even if the coating material is not disclosed as being derived from a vaporized liquid.

SEE OR SEARCH THIS CLASS, SUBCLASS:
69, and 70, for producing an electrical product by vapor deposition coating

of a fluorescent or phosphorescent base.

78, for a process of vapor deposition or spraying to produce an electron emissive or suppressive electrical product (excluding electrode for arc).

96.7, for a process of using a mist or aerosol for coating a substrate to produce an integrated or printed circuit or circuit board.

107, 109, and 124, for a process of vapor deposition to produce an electrical product other than an integrated or printed circuit or circuit board.

248.1 through 255.7 , for coating of a substrate, in general, by vapor, gas, or smoke (other than a mist sprayed through a gas).

497, 509, 582-590, and 593, for a vapor deposition process involving direct application of electrical, magnetic, wave, or particulate energy to a substrate, coated substrate, or coating material.

SEE OR SEARCH CLASS:

117, Single-Crystal, Oriented-Crystal, and Epitaxy Growth Processes; Non-Coating Apparatus Therefor, appropriate subclasses for a process for growing therein-defined single crystal of all types of materials, including inorganic or organic, and by all techniques, especially subclasses 84 through 109 for vapor or gas phase epitaxy.

516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 1 through 8.1 for continuous gas or vapor phase colloid systems (e.g., smoke, fog, aerosol, cloud, mist) or agents for such systems or processes of making or stabilizing such systems or agents, when generically claimed or when there is no hierarchically superior provision in the U.S. Patent Classification System for the specifically claimed art.

**96.9 Front and back of substrate coated (excluding processes where all coating is by immersion):**

This subclass is indented under subclass 96.1.

Process in which both front and back sides of a substrate (i.e., opposite sides) are coated (excluding processes where all coating is by immersion).

(1) Note. This subclass does not provide for merely immersing a substrate to coat both sides but does provide for such a step combined with additionally coating at least one side by another method (e.g., by rolling, etc.).

SEE OR SEARCH THIS CLASS, SUBCLASS:

97.1 through 97.6 , for multilayer coating of a substrate to produce an integrated or printed circuit or circuit board, but not involving both front and back coating of a substrate (excluding processes where all coating is by immersion).

99.5, for coating of a substrate by immersion metal plating from solution (e.g., electroless plating, etc.) to produce an integrated or printed circuit or circuit board.

209 through 211 , for a process of applying a coating to opposite sides of a sheet, web, or strip, in general (excluding processes where all coating is by immersion).

470, for applying superposed diverse or multilayer similar coatings on a substrate utilizing electrostatic charge, field, or force.

471, for applying coatings to opposite sides of a substrate utilizing electrostatic charge, field, or force (excluding processes where all coating is by immersion).

**97.1 Multilayer:**

This subclass is indented under subclass 96.1.

Process in which a product having plural distinguishable coated layers on a substrate is formed.

(1) Note. This subclass is not intended to include plural sequential overlying coating steps which are combined to result in only a single coated layer on the original substrate. To be proper for this subclass, the process must result in two or more separately distinguishable layers on at least one substrate separately distin-

guishable therefrom. However, not all coating steps need to be claimed as long as the net result is the same (e.g., process of coating a coated substrate to result in plural distinguishable layers on a substrate, etc.).

SEE OR SEARCH THIS CLASS, SUBCLASS:

96.9, for coating both front and back of a substrate (excluding processes where all coating is by immersion) to produce an integrated or printed circuit or circuit board.

97.8 through 98.1 , for single-layer coating of a hole wall combined with substrate pretreatment to produce an integrated or printed circuit or circuit board.

98.6 through 99.1 , for single-layer coating combined with substrate pretreatment but without coating a hole wall to produce an integrated or printed circuit or circuit board.

99.5, for single-layer immersion metal plating to produce an integrated or printed circuit or circuit board.

103, for applying superposed diverse coatings or coating a coated base to produce a resistor for current control (excludes heating element).

118, for applying superposed coatings or coating a coated base to produce a wire conductor electrical product.

402 through 419.8 , for applying superposed coatings or coating a coated base, in general.

454, for spray coating utilizing flame or plasma heat (e.g., flame spraying, etc.) to apply superposed diverse or multilayer similar coatings in which at least one applied coating contains a metal oxide.

470, for applying superposed diverse or multilayer similar coatings on a substrate utilizing electrostatic charge, field, or force.

471, for applying coatings to opposite sides of a substrate utilizing electrostatic charge, field, or force (excluding processes where all coating is by immersion).

**97.2 Coating hole wall:**

This subclass is indented under subclass 97.1. Process in which a coating is applied to a side of a hole in a substrate.

(1) Note. The coating applied may or may not fill the hole (e.g., for the purpose of providing a conductive path from one side of a circuit board to the other, etc.).

SEE OR SEARCH THIS CLASS, SUBCLASS:

97.7 through 98.3 , for single-layer coating of a hole wall to produce an integrated or printed circuit or circuit board.

**97.3 Nonuniform or patterned coating:**

This subclass is indented under subclass 97.1. Process in which a coating (1) is applied only to selected portions of a substrate, (2) is applied in such a manner as to produce a coating of nonuniform thickness, or (3) varies from area to area as to physical or chemical properties.

SEE OR SEARCH THIS CLASS, SUBCLASS:

63, for nonuniform or patterned coating to produce a superconductor electrical product.

75, for mosaic or nonuniform coating to produce a photoelectric electrical product.

98.4, and 98.5, for single-layer nonuniform or patterned coating to produce an integrated or printed circuit or circuit board.

102, for nonuniform coating to produce a resistor electrical product for current control (excludes heating element).

256 through 288 , for nonuniform coating of a substrate, in general.

448, for nonuniform or patterned spray coating utilizing flame or plasma heat (e.g., flame spraying, etc.).

466 through 469 , 504, 510 and 511, 526, 552, 555, and 556, for nonuniform or patterned coating involving direct application of electrical, magnetic, wave, or particulate energy to a substrate, coated substrate, or coating material.

SEE OR SEARCH CLASS:

430, Radiation Imagery Chemistry: Process, Composition, or Product Thereof, appropriate subclasses for imagewise configuration coating or a process involving radiation imagery. See the class definition of this class, Lines With Other Classes and Within This Class, section D, Lines and Search Notes to Special Classes, References to Other Classes, See or Search Class, for a more detailed explanation of the class line.

**97.4 With posttreatment of coating or coating material:**

This subclass is indented under subclass 97.3.

Process which includes applying a coating material to a substrate and subsequently modifying a chemical or physical characteristic of the coating material or coating resulting therefrom.

(1) Note. Applying a second coating onto a first coated layer such that both remain distinguishable from each other and from the substrate is considered multilayer coating. See the See or Search This Class, Subclass notes below for references to selected other subclasses in this class.

(2) Note. Removal of excess coating material is properly included in this subclass and the subclass indented hereunder.

SEE OR SEARCH THIS CLASS, SUBCLASS:

60, for coating of a substrate which includes posttreating with a solid treating member to produce a welding electrode.

96.9, for coating both front and back of a substrate (excluding processes where all coating is by immersion) to produce an integrated or printed circuit or circuit board.

97.6, for multilayer deposition of uniform coated layers on a substrate with posttreatment of a coating or coating material to produce an integrated or printed circuit or circuit board.

98.2, and 98.3, for single-layer coating of a hole wall in a substrate with posttreatment of a coating or coating material to produce an integrated or printed circuit or circuit board.

99.2 through 99.4, for other single-layer coating of a substrate with posttreatment of a coating or coating material to produce an integrated or printed circuit or circuit board.

99.5, for single-layer immersion metal plating to produce an integrated or printed circuit or circuit board.

331 through 398.5, for coating of a substrate, in general, with posttreatment of a coating or coating material.

532 through 560, for coating involving direct application of electrical, magnetic, wave, or particulate energy with pretreatment of a substrate or posttreatment of a coated substrate.

SEE OR SEARCH CLASS:

216, Etching a Substrate: Processes, appropriate subclasses for etching combined with a coating process where the etching is a manufacturing step and is not only intended to improve adherence of an applied coating to a substrate

**97.5 Polymer deposited:**

This subclass is indented under subclass 97.4.

Process in which a deposited coating or coating material contains a compound made up of repeating units (i.e., monomers) chemically bound together.

(1) Note. This subclass is intended to have a broad interpretation, including both inorganic (e.g., sulfur molecules, mica, etc.) and organic polymers (e.g., polyethylene, silicone rubber, etc.) derived from natural or manmade sources. Therefore, deposition of a coating which contains any amount of synthetic resin is proper in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

99.4, for single uniform coating of a substrate by depositing a polymer with posttreatment of a coating or coating

material to produce an integrated or printed circuit or circuit board.

340 through 342 , for coating a substrate using a resin, resin precursor, rubber, or hardenable oil containing coating combined with posttreatment of a coating or coating material.

487 through 522 , for coating a substrate combined with polymerization of the coating utilizing direct application of electrical, magnetic, wave, or particulate energy (i.e., including cross-linking, curing, and hardening of organics).

**97.6 With posttreatment of coating or coating material:**

This subclass is indented under subclass 97.1.

Process which includes applying a coating material to a substrate and subsequently modifying a chemical or physical characteristic of the coating material or coating resulting therefrom.

(1) Note. A process of applying a second coating onto a first coated layer such that both remain distinguishable from each other and from the substrate is considered multilayer coating. See the See or Search This Class, Subclass notes below for references to selected other subclasses in this class.

(2) Note. Removal of excess coating material is properly included in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

60, for coating of a substrate which includes posttreating with a solid treating member to produce a welding electrode.

96.9, for coating both front and back of a substrate (excluding processes where all coating is by immersion) to produce an integrated or printed circuit or circuit board.

97.4, and 97.5, for multilayer deposition on a substrate in which at least one coated layer is nonuniform combined with posttreatment of a coating or coating material to produce an integrated or printed circuit or circuit board.

98.2, and 98.3, for single-layer coating of a hole wall in a substrate with posttreatment of a coating or coating material to produce an integrated or printed circuit or circuit board.

99.2 through 99.4, for other single-layer coating of a substrate with posttreatment of a coating or coating material to produce an integrated or printed circuit or circuit board.

99.5, for single-layer immersion metal plating to produce an integrated or printed circuit or circuit board.

331 through 398.5, for coating of a substrate, in general, with posttreatment of a coating or coating material.

532 through 560 , for coating involving direct application of electrical, magnetic, wave, or particulate energy with pretreatment of a substrate or posttreatment of a coated substrate.

SEE OR SEARCH CLASS:

216, Etching a Substrate: Processes, appropriate subclasses for etching combined with a coating process where the etching is a manufacturing step and is not only intended to improve adherence of an applied coating to a substrate.

**97.7 Coating hole wall:**

This subclass is indented under subclass 96.1.

Process in which a coating is applied to a side of a hole in a substrate.

(1) Note. The coating applied may or may not fill the hole (e.g., for the purpose of providing a conductive path from one side of a circuit board to the other, etc.).

SEE OR SEARCH THIS CLASS, SUBCLASS:

97.2, for multilayer coating of a substrate and coating a hole wall to produce an integrated or printed circuit or circuit board.

**97.8 With pretreatment of substrate:**

This subclass is indented under subclass 97.7.

Process in which a substrate is chemically or physically modified before applying a coating (e.g., catalyst treatment of a substrate before

electroless coating, roughening, or addition of a surface active agent before coating, etc.).

(1) Note. Modifying of a coated layer on a substrate for the purpose of improving adhesion of a second distinguishable layer followed by application of the second distinguishable layer thereon is considered multilayer coating of a substrate. However, if a second distinguishable layer is not applied, modification of a single coated layer is considered posttreatment of the coating. See the See or Search This Class, Subclass notes below for references to selected other subclasses in this class.

(2) Note. This subclass and the subclasses indented hereunder provide for a process including a prior step to prepare a substrate (e.g., etching, washing, cleaning, drying, compressing, heating, etc.) before coating to improve adhesion of a subsequently applied coating.

SEE OR SEARCH THIS CLASS, SUBCLASS:

97.2, for multilayer coating of a substrate including hole wall coating to produce an integrated or printed circuit or circuit board.

98.2, and 98.3, for hole wall coating with posttreatment of a coated substrate to produce an integrated or printed circuit or circuit board.

98.5, for nonuniform coating with pretreatment of a substrate to produce an integrated or printed circuit or circuit board but without hole wall coating.

98.6 through 99.1, for coating with pretreatment of a substrate to produce an integrated or printed circuit or circuit board but without hole wall coating.

299 through 330, for coating, in general, with pretreatment of the base (i.e., substrate).

532 through 560, for coating involving direct application of electrical, magnetic, wave, or particulate energy with pretreatment of a substrate or posttreatment of a coated substrate.

SEE OR SEARCH CLASS:

216, Etching a Substrate: Processes, appropriate subclasses for etching combined with a coating process where the etching is a manufacturing step and is not only intended to improve adherence of an applied coating to a substrate.

**97.9 Immersion metal plating from solution (e.g., electroless plating, etc.):**

This subclass is indented under subclass 97.8.

Process in which a metal coating is applied by immersing a substrate in a metal salt solution (e.g., electroless plating, etc.).

SEE OR SEARCH THIS CLASS, SUBCLASS:

99.5, for other immersion metal plating to produce an integrated or printed circuit or circuit board.

304 through 306, for metal coating (e.g., electroless deposition, etc.) of a substrate, in general, with pretreatment of the substrate (i.e., base) by preapplication of a reactant or reaction promoter or hardener (e.g., catalyst, etc.).

430.1 through 443.2, for other immersion or partial immersion coating, in general.

498, and 499, 512, 594, and 601, for coating involving direct application of electrical, magnetic, wave, or particulate energy to a substrate, coated substrate, or coating material and utilizing immersion or partial immersion coating of the substrate.

**98.1 Activating or catalyst pretreatment:**

This subclass is indented under subclass 97.9.

Process which includes preparation of the substrate for coating by activating the substrate or applying a catalyst on the substrate.

(1) Note. This subclass is intended to include treatment of a catalyst previously applied to the substrate when the catalyst does not remain as a distinct layer (e.g., beneath another coated layer which is subsequently applied, etc.). If the catalyst remains as a distinct undercoating and is covered by an overcoating which remains distinguishable from the undercoating and the substrate, the com-

bination would be considered multilayer coating. However, if further treatment of the catalyst layer to prepare it for overcoating did not include another coating step, the combination would be considered posttreatment of a catalyst layer coating. See the See or Search This Class, Subclass notes below for references to selected other subclasses in this class.

SEE OR SEARCH THIS CLASS, SUBCLASS:

97.1 through 97.6, for multilayer coating of a substrate to produce an integrated or printed circuit or circuit board.

99.1, for other coating of a substrate with activating or catalyst pretreatment of the substrate to produce an integrated or printed circuit or circuit board.

99.2 through 99.4, for other coating of a substrate with posttreatment of a coating or coating material to produce an integrated or printed circuit or circuit board.

**98.2 With posttreatment of coating or coating material:**

This subclass is indented under subclass 97.7.

Process which includes applying a coating material to a substrate and subsequently modifying a chemical or physical characteristic of the coating material or coating resulting therefrom.

(1) Note. A process of applying a second coating onto a first coated layer such that both remain distinguishable from each other and from the substrate is considered multilayer coating. See the See or Search This Class, Subclass notes below for references to selected other subclasses in this class.

(2) Note. Removal of excess coating material is properly included in this subclass and the subclass indented hereunder.

SEE OR SEARCH THIS CLASS, SUBCLASS:

532 through 560, for coating involving direct application of electrical, magnetic, wave, or particulate energy with pretreatment of a substrate or posttreatment of a coated substrate.

60, for coating of a substrate which includes posttreating with a solid treating member to produce a welding electrode.

96.9, for coating both front and back of a substrate (excluding processes where all coating is by immersion) to produce an integrated or printed circuit or circuit board.

97.2, for multilayer coating of a substrate and coating a hole wall to produce an integrated or printed circuit or circuit board.

99.2 through 99.4, for other single uniform coating of a substrate with posttreatment of a coating or coating material but without hole wall coating to produce an integrated or printed circuit or circuit board.

99.5, for single-layer immersion metal plating to produce an integrated or printed circuit or circuit board.

331 through 398.5, for coating of a substrate, in general, with posttreatment of a coating or coating material.

532 through 560, for coating involving direct application of electrical, magnetic, wave, or particulate energy with pretreatment of a substrate or posttreatment of a coated substrate.

SEE OR SEARCH CLASS:

216, Etching a Substrate: Processes, appropriate subclasses for etching combined with a coating process where the etching is a manufacturing step and is not only intended to improve adherence of an applied coating to a substrate.

**98.3 Heating (e.g., curing, etc.):**

This subclass is indented under subclass 98.2.

Process in which an applied coating is heated after deposition (e.g., curing, etc.).

SEE OR SEARCH THIS CLASS, SUBCLASS:

98.9, for uniform single-layer coating with heating pretreatment but without hole wall coating to produce an integrated or printed circuit or circuit board.

120, for coating with heat utilized to produce a wire conductor.

461, 522, 542-546, 557-559, and 587-594, for coating and heating involving direct application of electrical, magnetic, wave, or particulate energy to a substrate, coated substrate, or coating material.

**98.4 Nonuniform or patterned coating:**

This subclass is indented under subclass 96.1. Process in which a coating (1) is applied only to selected portions of a substrate, (2) is applied in such a manner as to produce a coating of nonuniform thickness, or (3) varies from area to area as to physical or chemical properties.

SEE OR SEARCH THIS CLASS, SUBCLASS:

63, for nonuniform coating to produce a superconductor electrical product.

75, for mosaic or nonuniform coating to produce a photoelectric electrical product.

102, for nonuniform coating to produce a resistor for current control (excludes heating element).

97.3 through 97.5, for multilayer coating of a substrate including at least one nonuniform or patterned layer to produce an integrated or printed circuit or circuit board.

256 through 288, for nonuniform coating of a substrate, in general.

448, for nonuniform or patterned spray coating utilizing flame or plasma heat (e.g., flame spraying, etc.).

466 through 469, 504, 510 and 511, 526, 552, and 555 and 556, for nonuniform or patterned coating involving direct application of electrical, magnetic, wave, or particulate energy to a substrate, coated substrate, or coating material.

SEE OR SEARCH CLASS:

216, Etching a Substrate: Processes, appropriate subclasses for etching combined with a coating process where the etching is a manufacturing step and is not only intended to improve adherence of an applied coating to a substrate.

430, Radiation Imagery Chemistry: Process, Composition, or Product Thereof , appropriate subclasses for imagewise configuration coating or a process involving radiation imagery. See the class definition of this class, Lines With Other Classes and Within This Class, section D, Lines and Search Notes to Special Classes, References to Other Classes, See or Search Class, for a more detailed explanation of the class line.

**98.5 With pretreatment of substrate:**

This subclass is indented under subclass 98.4. Process in which a substrate is chemically or physically modified before applying a coating (e.g., catalyst treatment of a substrate before electroless coating, roughening, or addition of a surface active agent before coating, etc.).

(1) Note. Modifying of a coated layer on a substrate for the purpose of improving adhesion of a second distinguishable layer followed by application of the second distinguishable layer thereon is considered multilayer coating of a substrate. However, if a second distinguishable layer is not applied, modification of a single coated layer is considered post-treatment of the coating. See the See or Search This Class, Subclass notes below for references to selected other subclasses in this class.

(2) Note. This subclass and the subclasses indented hereunder provide for a process including a prior step to prepare a substrate (e.g., etching, washing, cleaning, drying, compressing, heating, etc.) before coating to improve adhesion of a subsequently applied coating.

SEE OR SEARCH THIS CLASS, SUBCLASS:

97.3 through 97.5, for multilayer coating of a substrate including at least one nonuniform or patterned layer to produce an integrated or printed circuit or circuit board.

97.8 through 98.1, for hole wall coating with pretreatment of a substrate to produce an integrated or printed circuit or circuit board.

98.6 through 99.1, for uniform coating with pretreatment of a substrate to produce an integrated or printed circuit or circuit board.

299 through 330, for coating, in general, with pretreatment of the base (i.e., substrate).

532 through 560, for coating involving direct application of electrical, magnetic, wave, or particulate energy with pretreatment of a substrate or posttreatment of a coated substrate.

SEE OR SEARCH CLASS:

216, Etching a Substrate: Processes, appropriate subclasses for etching combined with a coating process where the etching is a manufacturing step and is not only intended to improve adherence of an applied coating to a substrate.

**98.6 With pretreatment of substrate:**

This subclass is indented under subclass 96.1.

Process in which a substrate is chemically or physically modified before applying a coating (e.g., catalyst treatment of a substrate before electroless coating, roughening, or addition of a surface active agent before coating, etc.).

(1) Note. Modifying of a coated layer on a substrate for the purpose of improving adhesion of a second distinguishable layer followed by application of the second distinguishable layer thereon is considered multilayer coating of a substrate. However, if a second distinguishable layer is not applied, modification of a single coated layer is considered posttreatment of the coating. See the See or Search This Class, Subclass notes below for references to selected other subclasses in this class.

(2) Note. This subclass and the subclasses indented hereunder provide for a process including a prior step to prepare a substrate (e.g., etching, washing, cleaning, drying, compressing, heating, etc.) before coating to improve adhesion of a subsequently applied coating.

SEE OR SEARCH THIS CLASS, SUBCLASS:

97.8 through 98.1, for hole wall coating with pretreatment of a substrate to produce an integrated or printed circuit or circuit board.

98.5, for nonuniform or patterned coating of a substrate to produce an integrated or printed circuit or circuit board.

99.2 through 99.4, for coating of a substrate with posttreatment of a coating or coating material to produce an integrated or printed circuit or circuit board.

299 through 330, for coating, in general, with pretreatment of the base (i.e., substrate).

532 through 560, for coating involving direct application of electrical, magnetic, wave, or particulate energy with pretreatment of a substrate or posttreatment of a coated substrate.

SEE OR SEARCH CLASS:

216, Etching a Substrate: Processes, appropriate subclasses for etching combined with a coating process where the etching is a manufacturing step and is not only intended to improve adherence of an applied coating to a substrate.

**98.7 Swelling:**

This subclass is indented under subclass 98.6.

Process in which a substrate is increased in volume or thickness (e.g., by impregnation with a swelling substance or material, etc.) before coating.

(1) Note. This subclass is intended to include uptake or absorption of a liquid solvent into a solid substrate, either to perfect etching or subsequent coating of the substrate. Swelling may be used to increase substrate surface area or to simply moisten it for better coating adhesion or easier etching of the substrate. Swelling may also be an unintended result of an impregnation step (e.g., swelling a dielectric substrate by impregnation with a conductive composition to decrease the electrical resistance of the substrate, etc.).

(2) Note. If the swelling impregnation is not uniformly distributed in the substrate such that a distinguishable layer is formed thereon, the combination with a subsequent coating such that two separately distinguishable layers are formed on the substrate will be considered multilayer coating of a substrate. Application of a single distinguishable layer on a substrate followed by modification (e.g., swelling, etc.) of the coated layer but without further coating will be considered coating with posttreatment thereof. If no indication is given to the contrary, swelling will be presumed to be a uniform impregnation pretreatment of the substrate before coating. See the See or Search This Class, Subclass notes below for references to selected other subclasses in this class.

SEE OR SEARCH THIS CLASS, SUBCLASS:

97.1 through 97.6, for multilayer coating of a substrate to produce an integrated or printed circuit or circuit board.

98.8, for coating of a substrate with etching or roughening pretreatment of the substrate but without swelling to produce an integrated or printed circuit or circuit board.

99.2 through 99.4, for coating of a substrate with posttreatment of a coating or coating material to produce an integrated or printed circuit or circuit board.

307 through 309, for other coating with etching, swelling, or dissolving out part of the base as a pretreatment.

**98.8 Etching or roughening:**

This subclass is indented under subclass 98.6.

Process in which surface texture of a substrate is altered by selectively removing or reconfiguring material therefrom or thereon (e.g., creating surface topography to increase substrate surface area for perfecting adhesion of a subsequently applied coating, etc.).

(1) Note. This subclass is not intended for mere cleaning pretreatment of the substrate by removing extraneous material therefrom.

SEE OR SEARCH THIS CLASS, SUBCLASS:

97.1 through 97.6, for multilayer coating of a substrate to produce an integrated or printed circuit or circuit board.

98.7, for coating of a substrate with swelling pretreatment of the substrate to produce an integrated or printed circuit or circuit board.

99.2 through 99.4, for coating of a substrate with posttreatment of a coating or coating material to produce an integrated or printed circuit or circuit board.

307 through 309, for other coating with etching, swelling, or dissolving out part of the base as a pretreatment.

SEE OR SEARCH CLASS:

216, Etching a Substrate: Processes, appropriate subclasses for etching combined with a coating process where the etching is a manufacturing step and is not only intended to improve adherence of an applied coating to a substrate.

**98.9 Heating:**

This subclass is indented under subclass 98.6.

Process in which a substrate is heated before coating (e.g., to perfect adhesion of a coating, etc.).

SEE OR SEARCH THIS CLASS, SUBCLASS:

98.3, for single-layer hole wall coating with heating posttreatment of a coating or coating material to produce an integrated or printed circuit or circuit board.

120, for coating with heat utilized to produce a wire conductor.

314 through 321, for other coating with heating or drying pretreatment.

461, 522, 542-546, 557-559, and 585-594, for coating and heating involving direct application of electrical, magnetic, wave, or particulate energy to a substrate, coated substrate, or coating material.

**99.1 Activating or catalyst pretreatment:**
This subclass is indented under subclass 98.6. Process which includes preparation of the substrate for coating by activating the substrate or applying a catalyst on the substrate.

(1) Note. This subclass is intended to include treatment of a catalyst previously applied to the substrate when the catalyst does not remain as a distinct layer (e.g., beneath another coated layer which is subsequently applied, etc.). If the catalyst remains as a distinct undercoating and is covered by an overcoating which remains distinguishable from the undercoating and the substrate, the combination would be considered multilayer coating. However, if further treatment of the catalyst layer to prepare it for overcoating did not include another coating step, the combination would be considered posttreatment of a catalyst layer coating. See the See or Search This Class, Subclass notes below for references to selected other subclasses in this class.

SEE OR SEARCH THIS CLASS, SUBCLASS:
97.1 through 97.6, for multilayer coating of a substrate to produce an integrated or printed circuit or circuit board.
98.1, for hole wall coating by immersion metal plating from solution with activating or catalyst pretreatment to produce an integrated or printed circuit or circuit board.
99.2 through 99.4, for other coating with posttreatment of a coating or coating material to produce an integrated or printed circuit or circuit board.

**99.2 With posttreatment of coating or coating material:**
This subclass is indented under subclass 96.1. Process which includes applying a coating material to a substrate and subsequently modifying a chemical or physical characteristic of the coating material or coating resulting therefrom.

(1) Note. A process of applying a second coating onto a first coated layer such that both remain distinguishable from each other and from the substrate is considered multilayer coating. See the See or Search This Class, Subclass notes below for references to selected other subclasses in this class.

(2) Note. Removal of excess coating material is properly included in this subclass and the subclasses indented hereunder.

SEE OR SEARCH THIS CLASS, SUBCLASS:
60, for coating of a substrate which includes posttreating with a solid treating member to produce a welding electrode.
96.9, for coating both front and back of a substrate (excluding processes where all coating is by immersion) to produce an integrated or printed circuit or circuit board.
97.4, and 97.5, for multilayer coating with at least one nonuniform or patterned layer and with posttreatment of a coating or coating material to produce an integrated or printed circuit or circuit board.
97.6, for uniform multilayer coating of a substrate with posttreatment of a coating or coating material but without hole wall coating to produce an integrated or printed circuit or circuit board.
98.2, and 98.3, for single-layer hole wall coating of a substrate with posttreatment of a coating or coating material to produce an integrated or printed circuit or circuit board.
99.5, for single-layer immersion metal plating to produce an integrated or printed circuit or circuit board.
331 through 398.5, for coating of a substrate, in general, with posttreatment of a coating or coating material.
532 through 560, for coating involving direct application of electrical, magnetic, wave, or particulate energy with pretreatment of a substrate or posttreatment of a coated substrate.

SEE OR SEARCH CLASS:
216, Etching a Substrate: Processes, appropriate subclasses for etching com-

bined with a coating process where the etching is a manufacturing step and is not only intended to improve adherence of an applied coating to a substrate.

**99.3 Planarization:**
This subclass is indented under subclass 99.2.
Process in which a coating or coating material previously applied is smoothed or flattened.

(1) Note. The intent of planarization is often to perfect a coating process by forming a more uniform layer of coating material on a substrate.

SEE OR SEARCH THIS CLASS, SUBCLASS:
98.2, and 98.3, for single-layer hole wall coating of a substrate with posttreatment of a coating or coating material to produce an integrated or printed circuit or circuit board.
348, and 349, for other coating of a substrate with a mechanical posttreatment of a coating by a gas jet or blast.
355 through 371, for other coating of a substrate with posttreatment contacting of a coating by a solid treating member or material.

**99.4 Polymer deposited:**
This subclass is indented under subclass 99.2.
Process in which a deposited coating or coating material contains a compound made up of repeating units (i.e., monomers) chemically bound together.

(1) Note. This subclass is intended to have a broad interpretation, including both inorganic (e.g., sulfur molecules, mica, etc.) and organic polymers (e.g., polyethylene, silicone rubber, etc.) derived from natural or manmade sources. Therefore, deposition of a coating which contains any amount of synthetic resin is proper in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:
97.5, for multilayer coating with at least one nonuniform or patterned layer, deposition of a polymer, and with posttreatment of a coating or coating material to produce an integrated or printed circuit or circuit board.
340 through 342, for coating a substrate using a resin, resin precursor, rubber, or hardenable oil containing coating combined with posttreatment of a coating or coating material.
487 through 522, for coating a substrate combined with polymerization of a coating utilizing direct application of electrical, magnetic, wave, or particulate energy (i.e., including cross-linking, curing, and hardening of organics).

**99.5 Immersion metal plating from solution (e.g., electroless plating, etc.):**
This subclass is indented under subclass 96.1.
Process in which a metal coating is applied by immersing a substrate in a metal salt solution (e.g., electroless plating, etc.).

SEE OR SEARCH THIS CLASS, SUBCLASS:
96.9, for coating of both front and back of a substrate (excluding processes where all coating is by immersion) to produce an integrated or printed circuit or circuit board.
97.9, and 98.1, for substrate hole wall coating by immersion metal plating from solution with pretreatment of the substrate to produce an integrated or printed circuit or circuit board.
304 through 306, for metal coating (e.g., electroless deposition, etc.) of a substrate, in general, with pretreatment of the substrate (i.e., base) by preapplication of a reactant or reaction promoter or hardener (e.g., catalyst, etc.).
430.1 through 443.2, for other immersion or partial immersion coating, in general.
498, and 499, 512, 594, and 601, for coating involving direct application of electrical, magnetic, wave, or particulate energy to a substrate, coated substrate, or coating material and utilizing immersion or partial immersion coating of the substrate.

**100** This subclass is indented under subclass 58. Processes for coating processes producing an electrical article having piezoelectric properties

(i.e., the property of producing voltage under mechanical stress or vice versa).

SEE OR SEARCH CLASS:

29, Metal Working, subclass 25.35 for processes of making a piezoelectric device.

252, Compositions, subclass 62.9 for piezoeletric compositions.

310, Electrical Generator or Motor Structure, subclasses 311+ for piezoelectric devices.

367, Communications, Electrical: Acoustic Wave Systems and Devices, subclasses 157+ for piezoelectric devices for use underwater.

**101** This subclass is indented under subclass 58. Processes wherein the product is intended for use in an electrical circuit to introduce a specified resistance.

(1) Note. This subclass excludes processes of making resistor devices used for producing heat.

SEE OR SEARCH CLASS:

29, Metal Working, subclasses 610.1+ for processes of manufacturing resistors involving more than coating.

252, Compositions, subclasses 500+ for resistor compositions.

338, Electrical Resistors, for electrical resistors in general and the search notes for Class 338.

**102** This subclass is indented under subclass 101. Processes wherein the coating is (1) applied only to selected portions of a base or (2) applied in such a manner as to produce a coating of nonuniform thickness or (3) varies from area to area as to physical or chemical properties.

**103** This subclass is indented under subclass 101. Processes which include sequentially applying a plurality of dissimilar coating materials in superposed relationship on a base or applying diverse coating material to the coating on a previously coated base.

SEE OR SEARCH CLASS:

428, Stock Material or Miscellaneous Articles, subclasses 615+ for a metallic composite defined in terms of the composition of its components.

**104** This subclass is indented under subclass 58. Processes which result in a core for an electrical winding to be used in an induction device or which result in a motor stator.

(1) Note. This subclass provides for coating magnetic sheet material to be used in laminated transformer, motor, and generator cores but does not include making magnetic cores for memory or recording devices.

SEE OR SEARCH THIS CLASS, SUBCLASS:

127, for processes resulting in magnetic cores for memory or recording devices.

SEE OR SEARCH CLASS:

148, Metal Treatment, particularly subclasses 100+ for processes of coating magnetic metal material combined with a treatment that intentionally modifies the magnetic properties of the metal.

**105** This subclass is indented under subclass 58. Processes wherein the product produced has an interior cavity or empty space.

(1) Note. Materials such as foams, felts, etc., are not considered hollow even though they may contain voids.

SEE OR SEARCH THIS CLASS, SUBCLASS:

230+, for coating the interior of hollow articles which have uses other than electrical.

**106** This subclass is indented under subclass 105. Processes wherein the hollow article is glass or quartz.

(1) Note. Attention is directed to the definitions of Class 65, Glass Manufacturing, and Class 106, Compositions: Coating or

Plastic, for a comprehensive definition of the term glass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

64+, for cathode-ray tubes and luminescent or fluorescent lamp bulbs.

108, for processes of coating a glass base which is not a hollow article.

**107** This subclass is indented under subclass 106. Processes wherein the coating is produced on a base by absorption or condensation of, or reaction with, a vapor or gas.

**108** This subclass is indented under subclass 58. Processes wherein the base is capable of transmitting light rays so that objects on the other side may be distinctly seen.

**109** This subclass is indented under subclass 108. Processes wherein the coating is produced on a base by absorption or condensation of, or reaction with, a vapor or gas.

**110** This subclass is indented under subclass 108. Processes wherein the coating material is projected or sprayed onto the base.

**111** This subclass is indented under subclass 58. Processes wherein the coated product is a conductor which is heated by the passage of current therethrough and the intended use is in a lamp or tube.

SEE OR SEARCH THIS CLASS, SUBCLASS:

77+, for processes of coating a filament with an electron emissive coating.

SEE OR SEARCH CLASS:

313, Electric Lamp and Discharge Devices, subclasses 341+ for electric lamp filaments.

**112** This subclass is indented under subclass 111. Processes wherein the filament comprises elemental carbon.

SEE OR SEARCH THIS CLASS, SUBCLASS:

113+, for processes of coating a carbon base which is not a filament.

226+, for processes of carbonizing by heat decomposition.

**113** This subclass is indented under subclass 58. Processes wherein the base on which a coating is applied is carbon.

SEE OR SEARCH THIS CLASS, SUBCLASS:

112, for processes of coating carbon filaments.

**114** This subclass is indented under subclass 113. Processes wherein the carbon substrate functions as a brush in an electric motor or as the electrical connection between the commutator of a motor or generator and the power source.

SEE OR SEARCH CLASS:

310, Electrical Generator or Motor Structure, subclasses 248+ and in particular subclass 253 for carbon brushes.

**115** This subclass is indented under subclass 58. Processes which result in an element for use as a part of an electrochemical generator in which the chemical energy from the reaction of oxygen and a fuel is converted directly into electricity.

SEE OR SEARCH CLASS:

29, Metal Working, subclass 2 for a process or apparatus for making a battery grid, subclasses 623.1+ for a process of making an electric battery cell and subclass 763 for apparatus to assemble or disassemblem an electric cell or battery.

136, Batteries: Thermoelectric and Photoelectric, for a fuel cell or and electrode.

**116** This subclass is indented under subclass 58. Processes wherein an electrical coil or winding is coated or impregnated.

(1) Note. For classification here the article must require the coiled or wound condition to perform its electrical function. A process resulting in an electrical wire coiled for storage purposes is not provided for here.

SEE OR SEARCH CLASS:

29, Metal Working, subclasses 602.1+ for methods of making electrical coils or windings.

242, Winding, Tensioning, or Guiding, subclasses 430+ for a process or apparatus for forming an article by winding material onto a core, subclasses 470+ and 520+ for winding a storage package, per se, and subclasses 550+ for unwinding from a storage package, per se.

335, Electricity: Magnetically Operated Switches, Magnets, and Electromagnets, subclasses 299+ for electromagnet coils.

**117** This subclass is indented under subclass 58. Processes wherein the substrate is a solid or stranded group of slender flexible rod like conductors having a relatively low resistance to current flow.

SEE OR SEARCH THIS CLASS, SUBCLASS:

116, for making a wire in the form of a winding or coil.

SEE OR SEARCH CLASS:

156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclasses 47+ for conductor covering processes therein provided for, which may include a coating step.

174, Electricity: Conductors and Insulators, subclasses 110+ for insulated electric conductors which include electric conductor structure which is more than a mere coated wire, rod or filament.

428, Stock Material or Miscellaneous Articles, subclasses 615+ for a metallic composite wire defined in terms of the composition of its components.

**118** This subclass is indented under subclass 117. Processes wherein plural superposed coatings are applied or a coated wire is coated.

(1) Note. The superposed coating may be either similar or diverse.

**119** This subclass is indented under subclass 117. Processes wherein the coating comprises (1) the natural gum obtained from the latex or sap or "rubber" trees or (2) a material having small cavities randomly dispersed throughout.

SEE OR SEARCH THIS CLASS, SUBCLASS:

373, for processes of producing a cellular or foam coating by heat treatment or drying of a coating.

**120** This subclass is indented under subclass 117. Processes wherein the temperature of the base, coating, or coating material is raised to above ambient.

**121** This subclass is indented under subclass 58. Processes wherein the base to which a coating is applied is either (1) a carbohydrate material derived from the structural matter of plant life or (2) a relatively short, slender, flexible element of macroscopic size and finite length and having a thickness and width of the same order of magnitude.

(1) Note. The article formed by the coating process may be conducting, insulating, or form a part of an electrical device such as a battery separator.

SEE OR SEARCH THIS CLASS, SUBCLASS:

79, for insulated paper for use in a condenser or capacitor.

**122** This subclass is indented under subclass 58. Processes wherein free carbon or a free carbon containing coating is applied.

(1) Note. Carbon compounds such as carbides or organic compounds are not considered as carbon coatings for this subclass unless additional carbon in the elemental state is present.

SEE OR SEARCH THIS CLASS, SUBCLASS:

226+, for processes of forming a carbon coating by carbonizing.

249.1, for processes of forming a carbon coating by vapor deposition.

**123** This subclass is indented under subclass 58. Processes wherein a coating which contains metal in elemental form is applied.

SEE OR SEARCH THIS CLASS, SUBCLASS:
96.1 through 99.5 , for processes of applying metal coatings to form an integrated or printed circuit or circuit board.

SEE OR SEARCH CLASS:
428, Stock Material or Miscellaneous Articles, subclasses 615+ for a metallic composite defined in terms of the composition of its components.

**124** This subclass is indented under subclass 123. Processes in which a coating is produced on a base by absorption or condensation of, or reaction with, a vapor or gas; or in which a vacuum is utilized.

SEE OR SEARCH THIS CLASS, SUBCLASS:
251+, for vapor deposition of metal coatings.

**125** This subclass is indented under subclass 123. Processes wherein a silver, gold, palladium or platinum coating is applied.

SEE OR SEARCH CLASS:
428, Stock Material or Miscellaneous Articles, subclass 669 for a metallic composite in which a component has a precious metal base.

**126.1 Metallic compound coating:**
This subclass is indented under subclass 58. Processes wherein the coating material includes a chemical compound which contains at least one atom of a metal.

SEE OR SEARCH THIS CLASS, SUBCLASS:
108+, for applying a metallic compound (e.g., tin oxide, etc.) to a transparent base to make an electrical product.

**126.2 Glass or ceramic base or coating:**
This subclass is indented under subclass 126.1. Processes wherein the base coated or the coating material is glass or ceramic.

SEE OR SEARCH THIS CLASS, SUBCLASS:
106, for coating of a hollow glass article such as a light bulb.

**126.3 Metal oxide, peroxide, or hydroxide coating:**
This subclass is indented under subclass 126.1. Processes wherein the coating is an inorganic compound containing a metal atom directly bonded to oxygen.

**126.4 Metal is Al:**
This subclass is indented under subclass 126.3. Processes wherein the metal bonded to oxygen is aluminum.

**126.5 Metal is Au, Ag, Pt, Pd, Ru, Rh, Os, Ir:**
This subclass is indented under subclass 126.3. Processes wherein the metal bonded to oxygen is gold, silver, platinum, palladium, ruthenium, rhodium, osmium or iridium.

**126.6 Metal is Ni, Fe, or Co:**
This subclass is indented under subclass 126.3. Processes wherein the metal bonded to oxygen is nickel, iron, or cobalt.

**127** This subclass is indented under the class definition. Processes wherein the base or the coating is disclosed as having magnetic properties.

(1) Note. An iron base, for example, which has magnetic properties is only classified here if the patent states the base has magnetic properties.

(2) Note. The term magnetic in these subclasses is intended to include magnetizable material, i.e., material to which the property of attraction for iron may be imparted as by stimulus of a magnetic field.

(3) Note. Where the magnetic article is part of an electrical article or includes a conductive coating, for instance an insulated core for use in a transformer see subclasses 58+ above.

SEE OR SEARCH THIS CLASS, SUBCLASS:

58+, for processes of coating wherein a product is produced which conducts electricity.

599, for processes of forming magnetic recording devices involving use of a magnetic field.

SEE OR SEARCH CLASS:

148, Metal Treatment, particularly subclasses 100+ for processes of intentionally modifying the magnetic properties of metal.

520, Synthetic Resins or Natural Rubbers, appropriate subclasses, particularly Class 523, subclass 181 for a composition for magnetic purposes but which is devoid of magnetic material or to processes of preparing said composition.

**128** This subclass is indented under subclass 127. Processes wherein the coating is disclosed as having magnetic properties.

**129** This subclass is indented under subclass 128. Processes which include the step of physically or chemically modifying the base prior to the coating step.

**130** This subclass is indented under subclass 128. Processes which include the step of physically or chemically modifying the coating subsequent to the coating step.

SEE OR SEARCH THIS CLASS, SUBCLASS:

547, for post-treating a magnetic coating utilizing magnetic lines of force.

**131** This subclass is indented under subclass 128. Processes which include sequentially applying a plurality of dissimilar coating materials or coating a previously coated base with a different coating material.

SEE OR SEARCH CLASS:

428, Stock Material or Miscellaneous Articles, subclasses 692.1 and 693.1 for stock materials having a defined magnetic layer; and subclasses 800-848.9 for magnetic recording component or stock, with specific chemical composition or physical chemistry.

**132** This subclass is indented under subclass 128. Processes wherein the coating contains metal in elemental form, i.e., not chemically combined with another element.

**133** This subclass is indented under the class definition. Processes wherein a coated article is produced which is intended for use in shaping molten or plastic material.

(1) Note. Shaping members such as cores, matrices, casting surfaces, etc., are considered proper for this subclass.

**134** This subclass is indented under subclass 133. Processes wherein the shaping member is composed largely of sand.

(1) Note. Patents classified herein are generally concerned with molds used in casting metal.

**135** This subclass is indented under subclass 133. Processes wherein the shaping member is a metal, or an alloy or composition containing free metal.

**136** This subclass is indented under the class definition. Processes for coating a pavement or for coating the earth.

(1) Note. Processes of coating the earth are usually for the purpose of making a road or sidewalk but may be for marking of a playing field for a sport such as football, etc.

(2) Note. This class provides for making roadways by a coating process, which may include packing the coating. However, it does not provide for such a process which includes digging up the earth or an old pavement or other significant road building which is provided for in Class 404, Road Structure, Process, or Apparatus.

SEE OR SEARCH CLASS:

138, Pipes and Tubular Conduits, subclasses 97+ for repairing pipe by a coating process wherein some of the

coating material impregnates the earth adjacent the pipe being repaired.

404, Road Structure, Process, or Apparatus, for roadbuilding or pavement repairing by processes involving more than mere coating steps.

**137** This subclass is indented under subclass 136. Processes wherein the coating forms stripes or indicative markings or wherein it contains material particularly adapted to reflect light.

**138** This subclass is indented under subclass 136. Processes wherein the coating contains asphalt, bitumen, oil, or tar.

(1) Note. Included herein are any heavy oil or tar like material with properties similar to those materials specifically set out.

**139** This subclass is indented under subclass 138. Processes which include traversing the coating with a roller to compress or compact the coating material.

**140** This subclass is indented under the class definition. Processes directed to the restoration or repair of coatings or surfaces of objects.

(1) Note. A process, for example, of merely repainting a wall is excluded from this subclass. However, if any pretreatment is set forth to ready the wall for recoating the process is provided for here.

SEE OR SEARCH THIS CLASS, SUBCLASS:

136, for repairing or restoring a road by a coating process.

SEE OR SEARCH CLASS:

138, Pipes and Tubular Conduits, subclasses 97+ for repairing of pipe by a coating process.

264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclass 30 for furnace lining formation or repair and see the notes thereto.

**141** This subclass is indented under subclass 140. Processes wherein the object restored or repaired is carbon paper or on inked ribbon.

**142** This subclass is indented under subclass 140. Processes wherein a metal article is repaired or restored.

**143** This subclass is indented under the class definition. Processes directed to the production of blanks intended for use in the preparation of stencils.

**144** This subclass is indented under the class definition. Processes which are directed to the production of a base having a coating thereon for receiving the negative design in copy printing, usually by imbibition from an inked positive, and from which negative, positive copies may be made.

(1) Note. This subclass provides for uniformly coating a printing plate. However, applying a nonuniform coating to a planos:graphic printing plate is provided for in Class 101.

SEE OR SEARCH CLASS:

101, Printing, for processes of printing, and for processes of manufacturing printing members. The line between Class 101 and Class 427 for processes of making printing members, (e.g., lithos:graphic plates, etc.) is as follows: Class 427 will take coating processes wherein the resultant product is a substrate having a uniformly coated surface even when disclosed or claimed as a printing member, Class 101 provides for processes of coating wherein the process results in a nonuniform coating, (e.g., providing an image) and the disclosed use is as a printing member.

**145** This subclass is indented under the class definition. Processes resulting in a product which has an indistinguishable image, pattern, or design in a coating which can be made visible by chemical or physical treatment; or a process of making the image, pattern, or design in such a product become visible.

(1) Note. This subclass includes the use of invisible inks and color producing coatings.

SEE OR SEARCH THIS CLASS, SUBCLASS:

1, for developing latent images of fingerprints.

7, for producing fraud detecting devices which have latent images.

SEE OR SEARCH CLASS:

250, Radiant Energy, for processes of developing latent images with infrared or heat rays.

430, Radiation Imagery Chemistry: Process, Composition, or Product Thereof, appropriate subclasses for process of imaging or developing a formed image.

**146** This subclass is indented under the class definition. Processes directed to the production of a base with a coating which is (1) transferable as a continuous or a discontinuous film; (2) transferable from the base to another surface by an inscribing operation, when not provided for in another class; or (3) capable of producing a copy of printed or s:graphic subject matter by heat or chemical reaction.

(1) Note. Included herein or in subclasses indented hereunder are processes for making decalcomania and paper supports therefor, embossing foils, carbon paper, typewriter ribbons, and carbonless paper.

(2) Note. This and indented subclasses also include patents directed to producing a stack or pile of sheets or bases provided with transferable coatings where no structure is defined in addition to a stack or pile.

(3) Note. Processes directed to producing a coating which is intended to be completely transferred from its supporting base in the area contacted by the inscribing instrumentality are within the scope of this and indented subclasses.

(4) Note. This subclass includes patents directed to exposing a normally colored but invisible coating by transparentizing or removal of the material which conceals the colored composition or ingredient.

(5) Note. Inscribing is used in the broad sense to include hand-held writing instruments (e.g., pens or pencils) or machines (e.g., typewriters).

(6) Note. Production of coated paper specifically adapted to receive designs or coatings to form transfers is provided for in this subclass and indents herein under.

(7) Note. This subclass will take combinations of making and using a transfer where the transferred material is liquid or powder. For transfer of a solid layer see Class 156, subclasses 230+.

(8) Note. This subclass does not include the production or use of a roller, web or other transfer machine which is not an article of manufacture as a base with a transfer coating.

(9) Note. Ordinary uncoated paper copy sheets are not copy sheets within the scope of this and indented subclasses when claimed alone.

(10) Note. Processes for making carbon paper and typewriter ribbons are examples of transferable coated papers within the scope of this and indented subclasses.

SEE OR SEARCH THIS CLASS, SUBCLASS:

7, for preparation of transfers containing means for identifying, or preventing reuse or counterfeiting of said transfer.

SEE OR SEARCH CLASS:

8, Bleaching and Dyeing; Fluid Treatment and Chemical Modification of Textiles and Fibers, subclasses 467+ for transfers containing dyes.

156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclasses 230+ for processes of transferring laminae and, processes of transferring an adhered coating from a carrier to a base, per se, or combined

with a step of coating a carrier with a transferable coating.

178, Telegraphy, subclasses 36+ for recorders.

205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, subclasses 52+ for electrolytic marking and subclass 68 for processes of electroforming recording devices.

250, Radiant Energy, subclasses 316.1+ for infrared or thermal pattern recording, and subclass 330 for infrared to visible imaging.

346, Recorders, subclass 135.1 for a base coated with a record receiving material which is more than a mere coated base.

400, Typewriting Machines, subclasses 237+ for typewriter ribbons which are more than mere coated or impregnated bases.

430, Radiation Imagery Chemistry: Process, Composition, or Product Thereof, appropriate subclasses for radiation sensitive transfer material and process, especially subclasses 199+.

434, Education and Demonstration, subclass 425 for erasable surfaces of special materials.

462, Books, Strips, and Leaves for Manifolding, for carbon paper and similar manifolded articles which are more than mere stacks or piles of coated sheets.

**147** This subclass is indented under subclass 146. Processes directed to producing a base having a coating which is intended to be transferred as a continuous film.

(1) Note. This subclass includes a coating process which results in a decalcomania or embossing foil.

(2) Note. Production of coated paper specifically adapted to receive designs or coatings to form transfers are provided for in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

7, for preparation of transfers to be used for fraud or tamper detecting.

SEE OR SEARCH CLASS:

8, Bleaching and Dyeing; Fluid Treatment and Chemical Modification of Textiles and Fibers, subclasses 467+ for transfers containing dyes.

156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclasses 230+ for processes of transferring laminae including using a decal.

462, Books, Strips, and Leaves for Manifolding, subclasses 69+ for carbon paper or the like which is more than a mere coated base.

**148** This subclass is indented under subclass 147. Processes wherein the transfer is intended to be made with the aid of heat or wherein the transfer is intended to be placed on a base and heat then applied to make it adhere better to the base.

**149** This subclass is indented under subclass 147. Processes wherein the coating is releasable from its carrier sheet by means of a fluid.

**150** This subclass is indented under subclass 146. Processes in which a transferable coating includes a component reactable with a chemical reagent during the transferring operation to produce a color change in situ on the receiving surface or in which a base is coated with a component intended to react with another component to produce a color change.

(1) Note. The reaction of color forming constituents may be initiated, for instance, by heat or pressure from a writing instrument.

(2) Note. The source of heat utilized to effect reaction of the color forming constituents in the production of facsimiles is usually radiant energy. The particular process involved is usually referred to as thermos:graphic duplication.

(3) Note. The copy sheet may include components intended to react to produce a color in situ.

(4) Note. The transferable coating may include a component intended to be treated with a chemical reagent during the transferring operation to produce a color change in situ on the receiving surface.

(5) Note. The processes may be directed to superimposing at least two different coatings onto a base in which at least two of the coatings include a component intended to react with a component of a different coating to produce a color in situ.

SEE OR SEARCH THIS CLASS, SUBCLASS:

146, and 152, for processes directed to exposing a normally colored but invisible coating by transparentizing or removal of the material which conceals the colored composition or ingredient and in which there is no reaction to produce a color.

SEE OR SEARCH CLASS:

8, Bleaching and Dyeing; Fluid Treatment and Chemical Modification of Textiles and Fibers, subclass 444 for dyeing processes involving the use of radiant energy.

250, Radiant Energy, appropriate subclasses for processes for the development, conversion, production, transmission and general utilization of rays of any type.

252, Compositions, subclass 408.1 for analytical, testing or indicating compositions.

346, Recorders, subclass 135.1 for a base coated with a record receiving material which is more than a mere coated base.

436, Chemistry: Analytical and Immunological Testing, subclasses 1+ for analytical and analytical control methods.

**151** This subclass is indented under subclass 150. Processes in which at least one of the reactive components is a heterocyclic organic compound.

(1) Note. The reactive components are usually referred to as leuco, or colorless, color forming materials.

**152** This subclass is indented under subclass 146. Processes which include (1) coating both sides of the base, (2) applying a plurality of diverse coatings to the base or (3) forming nonuniform coats on the base.

(1) Note. Coatings containing essentially the same ingredients but differing in structure (e.g., thickness) or in the proportions of the ingredients are considered to be different coatings.

(2) Note. This subclass includes processes for applying coatings on the opposed sides of a base or applying plural coats to the same side of a base.

SEE OR SEARCH THIS CLASS, SUBCLASS:

209+, for processes for applying coatings to the opposite sides of sheet or web.

256+, for processes for applying nonuniform separate coatings to the same surface of a base.

SEE OR SEARCH CLASS:

400, Typewriting Machines, subclasses 237+ for typewriter ribbons which are more than mere coated or impregnated bases.

**153** This subclass is indented under subclass 146. Processes for producing paper or film coated on one side with carbon or a similar dark-colored substance, which coated paper is intended to be placed between two sheets of paper so that the pressure of writing, drawing, typing etc., on the upper sheet makes a copy on the lower.

(1) Note. The coating may be something other than carbon, e.g., dyes in a wax, etc.

SEE OR SEARCH CLASS:
462, Books, Strips, and Leaves for Manifolding, especially subclass 69 for carbon paper and similar manifolded articles which are more than mere stacks or piles of coated sheets.

**154** This subclass is indented under the class definition. Processes wherein the coating is intended as a temporary protective layer which is to be later removed.

(1) Note. These coatings are usually employed to protect articles during storage, transit or handling and are usually stripped off before ultimate use of the object to which they are applied.

(2) Note. Using a masking coating to shield part of the base for forming a nonuniform coating is excluded herefrom and classified according to the nonuniform coating.

SEE OR SEARCH THIS CLASS, SUBCLASS:
146+, for transfer or decal making.
259, and 272, for making a nonuniform coating by applying a mask or shielding coating which is removable.

**155** Processes 154 wherein the substrate is based on an organic material.

(1) Note. Attention is directed to the definition of Class 260, Chemistry of Carbon Compounds, for the distinction between the term "organic" and "inorganic".

**156** This subclass is indented under subclass 154. Processes wherein the base comprises a metal in elemental form.

**157** This subclass is indented under the class definition. Processes wherein the coating material is capable of emission of light when excited by electrons, ultraviolet radiation, or X-rays or after such excitation has been removed.

SEE OR SEARCH THIS CLASS, SUBCLASS:
64+, for coating processes which results in a electrical product having fluorescent or phosphorescent characteristics.

SEE OR SEARCH CLASS:
250, Radiant Energy, subclasses 458.1+ for devices or bases having fluorescent or phosphorescent coatings which include structure other than a mere base with a coating thereon. Devices, such as screen, which are merely bases having a fluorescent or phosphorescent coating are classified in this class (427).
252, Compositions, subclasses 301.16 through 301.6 for compositions exhibiting fluorescent or phosphorescent effects.

**158** This subclass is indented under subclass 157. Processes wherein the coating is intended to brighten the base material.

SEE OR SEARCH THIS CLASS, SUBCLASS:
157, for marking clothing to be laundered for identification.

**159** This subclass is indented under the class definition. Processes directed to preparing an incandescent mantle by coating.

SEE OR SEARCH CLASS:
252, Compositions, subclass 492 for compositions for preparing or regenerating incandescent mantles, and for processes of making mantles which involve no more than preparing or regenerating the composition of which the mantle is composed.
431, Combustion, subclasses 100+ for mantle structure and residual processes for making a mantle.

**160** This subclass is indented under the class definition. Processes of making a coated product wherein the X-ray, ultraviolet, or infrared qualities of the coated product are set forth.

SEE OR SEARCH THIS CLASS, SUBCLASS:

58+, for processes wherein the coated product is an electrical product with X-ray, ultraviolet, or infrared properties.

457+, for processes wherein electrical, magnetic or wave energy is employed in the coating processes.

**161** This subclass is indented under the class definition. Processes wherein the coating increases the ability of the base to either transmit or diffuse light.

**162** This subclass is indented under the class definition. Processes wherein the coating of the base results in an optical element or wherein an optical element is coated.

(1) Note. Merely stating reflective properties of a decorative screen or shade, for example, is not enough to place the patent in this subclass (162) or subclasses indented hereinunder.

(2) Note. Coating a glass window to reduce glare is considered subject matter for the subclass or indents hereunder.

(3) Note. Included herein are processes of making mirrors, optical filters, coated lenses, etc.

**163.1 Polarizer, windshield, optical fiber, projection screen, or retroreflector:**
This subclass is indented under subclass 162. Processes wherein the optical element is a polarizer, windshield, optical fiber, rod, waveguide, projection screen, or retroreflector.

(1) Note. Windshields and windscreens for boats, trains, aircraft, and automobiles are proper for this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

108+, for applying an electrically conductive coating to a windshield.

SEE OR SEARCH CLASS:

359, Optics: Systems (Including Communication) and Elements, subclasses 483+ for polarization, per se.

**163.2 Optical fiber, rod, filament, or waveguide:**
This subclass is indented under subclass 163.1. Processes wherein the optical element is a fiber, rod, filament, or waveguide having light transmitting regions which transmit radiation (light) in the visible or near visible portions of the spectrum.

SEE OR SEARCH CLASS:

65, Glass Manufacturing, subclasses 413 and 430+ for processes of coating optical fibers, filaments, or waveguides which include a glass-working step.

**163.3 Projection screen:**
This subclass is indented under subclass 163.1. Processes wherein the optical element is a projection screen.

(1) Note. Moving picture and stereopticon screens are considered as projection screens and proper for this subclass.

SEE OR SEARCH CLASS:

359, Optics: Systems (Including Communications) and Elements, subclasses 443+ for projection screens, per se.

**163.4 Retroreflector (e.g., light reflecting small spherical beads, etc.):**
This subclass is indented under subclass 163.1. Processes wherein the optical element comprises (a) a reflecting substrate coated with small spheres or (b) small spheres coated with reflecting material which may be applied to a substrate.

(1) Note. This subclass provides for applying small spherical reflectors (e.g., balls, beads, microspheres, retroreflectors, etc.) to a base to make it reflective.

SEE OR SEARCH THIS CLASS, SUBCLASS:

137, for applying reflective material to a roadway.

**164** This subclass is indented under subclass 164. Processes wherein the base is capable of transmitting light rays so that objects on the other side may be distinctly seen.

SEE OR SEARCH THIS CLASS, SUBCLASS:
108, for a process of coating a transparent base which results in an electrical product.

**165** This subclass is indented under subclass 164. Processes wherein the transparent base is composed of a glass composition.

(1) Note. Attention is directed to the definitions of Class 65, Glass Manufacturing, and Class 106, Compositions: Coating or Plastic, for a comprehensive definition of the term glass.

SEE OR SEARCH THIS CLASS, SUBCLASS:
106, for coating a hollow electrical product such as a light bulb, etc.
108+, for coating a transparent base to make an electrical product.

**166** This subclass is indented under subclass 165. Processes in which a coating is produced on a base by absorption or condensation of, or reaction with, a vapor or gas.

SEE OR SEARCH THIS CLASS, SUBCLASS:
109, for coating a transparent base by vapor deposition to make an electrical product.

**167** This subclass is indented under subclass 166. Processes wherein a coating compound containing silicon and at least one other element is deposited.

**168** This subclass is indented under subclass 165. Processes wherein the coating material is projected onto the glass base.

**169** This subclass is indented under subclass 165. Processes wherein the coating is applied by submerging at least a portion of the base in a pool of coating material.

**170** This subclass is indented under the class definition. Processes wherein a fabric, filament, or yarn is treated to produce a matte or dull finish.

(1) Note. This subclass includes treatment of artificial silk or rayon which possesses high sheen or luster with various salt solutions and dulling pigments.

(2) Note. This subclass does not include processes of coating fabric with compositions which may inherently dull or deluster but in which no dulling or delustering is disclosed.

SEE OR SEARCH CLASS:
8, Bleaching and Dyeing: Fluid Treatment and Chemical Modification of Textiles and Fibers, subclass 443, for luster modifying in connection with weighting, subclasses 129+, for luster modifying in connection with chemical modification, and subclasses 114+ and 127.5, for changing the luster of vegetable or animal fibers by chemical modification.
26, Textiles: Cloth Finishing, and 28, Textiles: Manufacturing, for luster modification of textiles not involving the use of fluids or chemicals.
264, Plastic and Nonmetallic Article Shaping or Treating: Processes, particularly subclasses 165+, for processes within the class definition, for forming continuous or indefinite length articles, which may disclose use of delustering agents in either a spinning solution or a precipitation bath. Subclasses 187+, in particular, is pertinent to cellulose derivative article forming material and precipitating baths therefor.

**171** This subclass is indented under the class definition. Processes which include either (1) extending the base beyond its normal dimension in at least one direction or (2) maintaining the base in a taut condition.

(1) Note. The tensioning or stretching incidental to feeding a fabric through a coating machine or broadly maintaining a surface taut during coating is not pro-

vided for here but in the appropriate subclass hereinafter.

(2) Note. This subclass excludes stretching only small portions of the base such as in embossing.

SEE OR SEARCH CLASS:
118, Coating Apparatus, subclasses 33+ for coating apparatus combined with stretching means.
242, Winding, Tensioning, or Guiding, subclasses 410+ for tensioning a running material of general use.
264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclasses 288.4+ and 291+ for stretching to reform work, such as for biaxial orientation, and for stretching a plastic material beyond its elastic limit; combined with coating.

**172** This subclass is indented under subclass 171. Processes wherein the base is a piece of material handled at points intermediate its ends whereby the length is immaterial to the manner of handling.

SEE OR SEARCH CLASS:
26, Textiles: Cloth Finishing, subclasses 71+ for the structure for expanding a running web of cloth; i.e., subclasses 87+ for spreader structure.

**173** This subclass is indented under subclass 172. Processes wherein at least part of the tensioning or stretching is toward the sides of the running length which tends to widen it.

SEE OR SEARCH CLASS:
26, Textiles: Cloth Finishing, subclasses 87+ for structure for spreading (i.e., transversely stretching) a running length web of cloth.

**174** This subclass is indented under subclass 172. Processes which include applying particles, fibers, granules, pellets, beads, flakes, platelets or powder to the base.

(1) Note. The particle must be free flowing when applied but not suspended in a liquid.

**175** This subclass is indented under subclass 172. Processes wherein the base is a relatively slender and flexible element having a width and thickness of the same order of magnitude.

SEE OR SEARCH CLASS:
264, Plastic and Nonmetallic Article Shaping or Treating: Processes, for stretching a plastic material beyond its elastic limit combined with coating.

**176** This subclass is indented under subclass 172. Processes wherein the base is a material which has been formed by a textile operation.

(1) Note. Textile operations include, for example, weaving, knitting, braiding, twisting, needling, etc.

**177** This subclass is indented under the class definition. Processes wherein the coating process is combined with forming a winding, ball, roll or coil of the coated base.

**178** This subclass is indented under subclass 177. Processes wherein the base is of metal or glass.

(1) Note. Attention is directed to the definitions of Class 65, Glass Manufacturing, and Class 106, Compositions: Coating or Plastic, for a comprehensive definition of the term glass.

**179** This subclass is indented under subclass 177. Processes wherein the base is either a water laid fibrous material or a mat of intertangled fibers.

**180** This subclass is indented under the class definition. Processes wherein the coating material is in the form of small discrete pieces.

(1) Note. Included herein are powder, granules, fibers pellets, beads, flakes, and platelets, etc.

(2) Note. The particles may form the coating, or become part of a coating as when applied over a layer of adhesive.

(3) Note. For classification here the particles must not be in solution or in suspen-

sion in a liquid or paste while being applied.

SEE OR SEARCH THIS CLASS, SUBCLASS:

252+, for pack processes wherein a base is adjacent particles which particles are heated to form gas which coats the base.

SEE OR SEARCH CLASS:

29, Metal Working, subclass 459 for processes of coating a base such as the interior of a tube with particulate material such as grit to increase the frictional characteristics of the base and then joining the base to another part.

75, Specialized Metallurgical Processes, Compositions for Use Therein, Consolidated Metal Powder Compositions, etc., subclasses 255+ for a loose mixture containing metal particles.

118, Coating Apparatus, subclasses 308+ for coating apparatus in which particulate material is projected or flung against the work.

156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclass 279 for mass application of nonadhesive fibers or particles other than between laminae.

264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclasses 112+ for processes under the class definition for forming stratified or layered articles which includes the step of uniting randomly associated particles.

428, Stock Material or Miscellaneous Articles, subclasses 546+ for a metallic composite having metal particles in a component.

**181** This subclass is indented under subclass 180. Processes wherein the particles or fibers are applied to the surface of a cavity or empty space interior of an article.

SEE OR SEARCH THIS CLASS, SUBCLASS:

71, for applying particles to form cathode ray tubes, etc.

133+, for coating molds.

**182** This subclass is indented under subclass 181. Processes wherein a bed or mass of solid coating particles are maintained in a state of fluidization by passing a gas in a generally upward direction through the particles.

**183** This subclass is indented under subclass 181. Processes wherein the hollow article is rotated during or after application of the particles.

**184** This subclass is indented under subclass 180. Processes which include motion of the base wherein (1) the rate of motion is not uniform regardless of the direction or character of motion or (2) the motion is other than in a straight line.

(1) Note. This subclass provides for vibratory motion.

SEE OR SEARCH THIS CLASS, SUBCLASS:

183, for rotating a hollow article while coating its interior with particles.

600, for vibrating a base by sonic or ultrasonic energy.

**185** This subclass is indented under subclass 180. Processes wherein a bed or mass of solid coating particles are maintained in a state of fluidization by passing a gas in a generally upward direction through the particles.

**186** This subclass is indented under subclass 180. Processes wherein the coated product produced is disclosed as useful for covering the top surface of buildings.

**187** This subclass is indented under subclass 186. Processes which include cutting the base before or after coating.

**188** This subclass is indented under subclass 186. Processes wherein particles are applied to localized or restricted areas of wherein particles are removed from localized or restricted areas.

(1) Note. This subclass provides for processes wherein the only difference in the areas is the color.

**189** This subclass is indented under subclass 180. Processes which include treating the particulate coating to make it continuous with no discernible particles.

(1) Note. Flame spraying is excluded from this subclass since it is assumed any particles being flame sprayed are not solid by the time they reach the base. Spraying molten particles is also excluded.

SEE OR SEARCH THIS CLASS, SUBCLASS:

252+, for pack processes wherein a base is adjacent particles which particles are heated to form gas which coats the base.

422, for spraying molten particles onto a base.

446+, for flame spraying.

**190** This subclass is indented under subclass 189. Processes wherein the particles applied comprise metallic compounds.

(1) Note. The particles contain metallic compounds when they are applied. However, upon heating they may be reduced to elemental metal.

**191** This subclass is indented under subclass 189. Processes wherein the particles contain metal in elemental form.

SEE OR SEARCH THIS CLASS, SUBCLASS:

455, for a flame spraying process resulting in a metal coating.

**192** This subclass is indented under subclass 191. Processes wherein the particles are aluminum, copper, or zinc.

**193** This subclass is indented under subclass 189. Processes in which the particles are changed into a glass or glasslike coating.

**194** This subclass is indented under subclass 189. Processes wherein a cylindrical solid member rotating about an internal axis is employed to form the continuous coating.

**195** This subclass is indented under subclass 189. Processes wherein synthetic resin particles are united.

(1) Note. See Class 520, Synthetic Resins or Natural Rubbers, subclasses 1+ for a definition of the term “synthetic resin”.

**196** This subclass is indented under subclass 180. Processes wherein coating materials are applied to a base from a plurality of directions, or wherein particles and a binder are applied to a base simultaneously from different sources.

**197** This subclass is indented under subclass 180. Processes wherein particles or fibers are applied to localized or restricted areas, or wherein particles or fibers are removed from localized or restricted areas.

(1) Note. This subclass provides for processes wherein the only difference in the areas is the color.

**198** This subclass is indented under subclass 197. Processes which include reshaping the base, reshaping the coating or removing particles from localized areas.

**199** This subclass is indented under subclass 197. Processes wherein the particles or fibers applied include a silicon containing compound, a metallic compound, or metal.

**200** This subclass is indented under subclass 197. Processes wherein the coating material is in the form of relatively short, slender, flexible, elements of finite length and having a width and thickness of the same order of magnitude.

**201** This subclass is indented under subclass 180. Processes wherein diverse particulate materials are applied to a substrate.

(1) Note. The particles may be diverse as to color, chemical composition, overall average size, etc.

(2) Note. The particles may be applied simultaneously or at different times.

**202** This subclass is indented under subclass 180. Processes which include sequentially applying a plurality of dissimilar coating materials in superposed relationship on a base or applying diverse coating material to the coating of a previously coated base.

SEE OR SEARCH THIS CLASS, SUBCLASS:
201, for applying a plurality of diverse particulate materials to a base.

**203** This subclass is indented under subclass 202. Processes which include applying a coating on a previously applied coating of particles or fibers.

**204** This subclass is indented under subclass 202. Processes wherein the particles or fibers applied comprise a silicon containing compound.

**205** This subclass is indented under subclass 202. Processes wherein the particles applied contain metal or a compound containing a metal atom.

**206** This subclass is indented under subclass 202. Processes wherein the coating material is in the form of relatively short, slender, flexible elements of finite length and having a width and thickness of the same order of magnitude.

**207.1 COATING REMAINS ADHESIVE OR IS INTENDED TO BE MADE ADHESIVE:**
This subclass is indented under the class definition. Processes which result in a base with a coating having adhesive properties for adhering the base to another surface.

(1) Note. The coating may be dry if it is intended to be made adhesive by the application of moisture, etc.

**208** This subclass is indented under subclass 207.1. Processes wherein the coating is applied to opposing surfaces of the base.

(1) Note. The opposite sides may be coated with the same or with different coating materials.

**208.2 Heat sensitive adhesive:**
This subclass is indented under subclass 207.1. Processes wherein the applied coating is intended to become adhesive upon the application of heat.

(1) Note. For classification here, the intent that the coating become adhesive upon the application of heat must be recited.

**208.4 Pressure sensitive adhesive:**
This subclass is indented under subclass 207.1. Processes wherein the applied coating becomes adhesive when subjected to pressure.

SEE OR SEARCH THIS CLASS, SUBCLASS:
208.2, for applying a coating which will become adhesive upon the application of both heat and pressure.

**208.6 Nonuniform coating (e.g., perforated, etc.):**
This subclass is indented under subclass 208.4. Processes wherein the coating is nonuniform.

(1) Note. See the definition and notes of subclass 256 in this class (427) for an explanation of "nonuniform coating".

**208.8 Applying superposed diverse coatings or coating a coated base:**
This subclass is indented under subclass 208.4. Processes which include applying a plurality of dissimilar coating materials in superposed relationship on a base or applying diverse coating material to the coating on a previously coated base.

(1) Note. See the notes to subclass 402 of this class (427) for further explanation.

(2) Note. Although the last coating applied would not have to be adhesive, per se, the process must result in an article having an expressed adhesive utility.

**209** This subclass is indented under the class definition. Processes wherein a sheet, web, or strip is coated on opposite sides and wherein at least one side is coated other than by immersion.

(1) Note. This subclass does not provide for merely immersing a sheet, web, or strip

to coat both sides but does provide for such a step combined with additionally coating at least one side by another method such as spraying, etc.

SEE OR SEARCH THIS CLASS, SUBCLASS:

206, for coating both sides of a web with flock or fibers.

**210** This subclass is indented under subclass 209. Processes for forming a coating wherein the coating (1) is applied only to selected portions of a base, (2) is applied in such a manner as to produce a coating of nonuniform thickness or (3) varies from area to area as to chemical or physical properties.

(1) Note. See Notes to subclass 256 for a complete list of subclasses involving nonuniform coating.

**211** This subclass is indented under subclass 209. Processes wherein a solid cylindrical member rotating about an internal axis is employed to apply the coating material.

**212** This subclass is indented under the class definition. Processes for coating or encapsulating solid granules, pellets, beads, flakes, platelets or other particles en masse (i.e., not individually).

(1) Note. A process which specifies or is primarily concerned with the coating or encapsulating of solid particles is classified in this Class 427, subclasses 212+. However, there are numerous functional classes which provide for coating or encapsulating particles and the resultant coated or encapsulated particle or a composition containing said particle. Strictly speaking, Class 428 is not a composition class. It is included here only because it also provides for a coated or encapsulated particle. See Class 428, subclass 402, (1) Note for the distinction between Class 428 and those functional classes. These classes, with the exception of Classes 118 and 264, are listed below in decreasing order of superiority under SEARCH CLASS. Classes 118 and 264, though not composition or article classes, were included because of their close relationship to this coating class.

(2) Note. Processes wherein an individual particle is independently coated are classified elsewhere in this class depending on the specific process employed.

(3) Note. The classification of a patent reciting the encapsulating of a core material with no reference to the core being a solid or liquid, the assumption is a solid and therefore classified in this Class 427, subclasses 213.3+ as an original with a suggested cross to Class 264, subclasses 4.1+.

(4) Note. Clathrates and intercalates (inclusion compounds), per se, are classified hierarchily and subject to the limitations set forth in the compound (element) classes based both on the encapsulant and encapsulate. For example, a clathrate of urea and hydrogen peroxide, urea and an organic compound, and dextran and iodine are all classified elsewhere Where a patent does not state that a material is either a clathrate or an intercalate, the assumption is made that the material is either a coated or encapsulated product classified in Class 428, subclasses 402+.

(5) Note. An asterks (*) at the end of the Search Class notes below indicates that the class is not a composition class.

SEE OR SEARCH THIS CLASS, SUBCLASS:

2.14+, for coating or encapsulating solid granules, pellets, beads, flakes, platelets, or other particles en masse, or individually, when the product has an intended medical or dental purpose, such as pharmaceutical preparations.

6, for coating particles wherein the base or coating includes radioactive material.

242, below for coating articles en masse by rumbling or tumbling them in contact with coating material wherein said

articles are considered more than mere particles, flakes, or granules.

SEE OR SEARCH CLASS:

8, Bleaching and Dyeing; Fluid Treatment and Chemical Modification of Textiles and Fibers, subclass 526 for a dye in specified form other than mere powder.

44, Fuel and Related Compositions, see, for example, subclasses 542+, coated or impregnated material.

51, Abrasive Tool Making Process, Material, or Composition, e.g., subclass 295 for a method of impregnating or coating an abrasive tool.

71, Chemistry: Fertilizers, (see subclass 64.11 for slow release forms).

106, Compositions: Coating or Plastic, for a filler or pigment for a coating composition which may include size or structure of the constituent particles or fibers which recitation does not serve to exclude from Class 106. See especially subclass 31.14 (invisible inks), 36, 235, 241, 251, 253+, 266, 272, 275, 276, 280, 281.1+, 400+, 600+, 714+, and 789 in Class 106.

118, Coating Apparatus, subclass 303, for apparatus for spray coating particulate material.

149, Explosive and Thermic Compositions or Charges, subclasses 3+ for a coated component.

204, Chemistry: Electrical and Wave Energy, for pertinent subclass(es) as determined by schedule review.

208, Mineral Oils: Processes and Products, for pertinent subclass(es) as determined by schedule review.

252, Compositions, (nonspecial uses or functions; i.e., subclasses 302+, 363.5, 372+, and 378).

252, Compositions, (special uses or functions) to subclass 194.

252, Compositions, (special uses or functions), subclass 478 and those following, except subclasses 302+, 363.5, 372+, and 378.

264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclasses 4+ for processes of encapsulating liquid core materials.

419, Powder Metallurgy Processes, appropriate subclasses, especially subclass 35 for processes of making articles from metal containing particulate materials by use of pressure and heat wherein the particles are coated with another substance prior to compacting or sintering; and subclass 62 for similar processes not employing heat.

424, Drug, Bio-Affecting and Body Treating Compositions, subclasses 400+ for coated, impregnated or layered feature.

426, Food or Edible Material: Processes, Compositions, and Products, subclasses 89+ for products which are coated solid, encased fluent material, or two or more solid self-sustaining materials integrally connected, and subclasses 302+ for processes of coating a solid food with a liquid.

428, Stock Material or Miscellaneous Articles, subclasses 402.2+ for a microencapsulated product, and subclasses 403+ for coated particles.

429, Chemistry: Electrical Current Producing Apparatus, Product, and Process, for pertinent subclass(es) as determined by schedule review.

430, Radiation Imagery Chemistry: Process, Composition, or Product Thereof, subclass 138 for a microcapsule.

501, Compositions: Ceramic, for pertinent subclass(es) as determined by schedule review.

502, Catalyst, Solid Sorbent, or Support Therefor: Product or Process of Making, subclasses 60+ and 527.11-527.24.

504, Plant Protecting and Regulating Compositions, subclass 100 for seeds coated with agricultural chemicals other than fertilizers; e.g., antidotes, plant growth regulators, fungicides, etc.

508, Solid Antifriction Devices, Materials Therefor, Lubricant or Separant Compositions for Moving Solid Surfaces, and Miscellaneous Oil Compositions.

520, Synthetic Resins or Natural Rubbers, see, for example, Class 523, subclass 161 invisible ink composition and 200+ for a composition containing

product in the form of surface-coated, impregnated, encapsulated, or surface-modified material.

536, Organic Compounds, subclass 112 for dextran and iodine.

564, Organic Compounds, subclass 32 for a clathrate of urea and hydrogen peroxide; subclass 1.5 for urea and an organic compound.

585, Chemistry of Hydrocarbon Compounds, (mixture subclasses).

588, Hazardous or Toxic Waste Destruction or Containment, subclasses 249+ for coating or covering of hazardous or toxic waste.

**213** This subclass is indented under subclass 212. Processes wherein a bed or mass of particles are maintained in a state of fluidized suspension by passing a gas or vapor in a generally upward direction through the particles.

(1) Note. Coating material may be introduced directly into the mass of fluidized particles or along with the fluidizing gas or vapor.

(2) Note. The particles usually are coated while in the fluidizing gas or vapor but may be coated before entry or after exit therefrom.

**213.3 Solid encapsulation process utilizing an emulsion or dispersion to form a solid-walled microcapsule (includes liposome):**
This subclass is indented under subclass 212. Subject matter wherein a medium in the form of an emulsion or dispersion is used to affect encapsulation of the solid; the medium may contain one or more polymers, polymer precursors, monomers or other encapsulating materials; e.g., gelatin wax, etc.

(1) Note. The classification of a patent reciting the encapsulation of a core material with no reference to its physical state, i.e., solid, liquid or gas, the assumption is made that the core material is solid and therefore classified in the Class 427 and a suggested cross into Class 264, subclasses 4+.

(2) Note. Liposomes are formed of mesomorphic walls (i.e., a state of matter intermediate between crystalline solid and normal isotropic liquid) and are classified here based on their solid characteristics.

**213.31 With post-treatment of encapsulant or encapsulating material, (e.g., further coating, hardening, etc.):**
This subclass is indented under subclass 213.3. Subject matter wherein the solid-walled microcapsule is subjected to significant aftertreatment; e.g., contacting microspheres with a solvent to extract material from their surfaces, etc.

(1) Note. The application of well known techniques for recovering, separating or isolating materials, e.g., filtering sieving, centrifuging, drying, precipitating, spray-drying, drum drying, freeze-drying, evaporating are not significant unless accompanied by process limitations, e.g., distillation performed at 650 mm Hg., sieving conducted with specified mesh size, etc.

**213.32 Hardening:**
This subclass is indented under subclass 213.31. Subject matter wherein the after treatment comprises hardening of the microsphere, e.g., chilling, chemically crosslinking etc.

**213.33 Using crosslinking agent:**
This subclass is indented under subclass 213.32. Subject matter wherein a crosslinking agent is used to harden the final product, e.g., chemically crosslinking gelatin microcapsules with compounds such as formaldehyde, glutaraldenhyde, etc.

**213.34 Solid-walled microcapsule formed by in situ polymerization:**
This subclass is indented under subclass 213.3. Subject matter wherein the solid-walled microcapsule is obtained by the polymerization of one or more reactants contained in the colloidal emulsion or dispersion system.

(1) Note. A patent which claims an in situ generated polymer which subsequently reacts with a material; e.g., a crosslinking agent is not classified here but in subclass 213.31.

**213.35 Solid-walled microcapsule formed from gelatin or derivative thereof:**
This subclass is indented under subclass 213.3. Subject matter wherein the solid-walled microcapsule is comprised of gelatin or derivative thereof.

**213.36 Solid-walled microcapsule formed from preformed synthetic polymer:**
This subclass is indented under subclass 213.3. Subject matter wherein the microencapsulation process employed a polymer which was not prepared in situ.

**214** This subclass is indented under subclass 212. Processes wherein a plurality of different coating materials are applied to a mass of particles in superposed relationship or wherein a coating material is applied to an already coated mass of particles.

**215** This subclass is indented under subclass 212. Processes wherein the particulate base material being coated is inorganic.

(1) Note. For the purposes of this subclass coal particles are considered to be carbonaceous inorganic material.

SEE OR SEARCH THIS CLASS, SUBCLASS:
6, for coating particles wherein the base or coating contains radioactive material.

SEE OR SEARCH CLASS:
428, Stock Material or Miscellaneous Articles, subclass 570 for metal powder coated with a metal.

**216** This subclass is indented under subclass 215. Processes wherein the inorganic base material is metal.

SEE OR SEARCH CLASS:
75, Specialized Metallurgical Processes, Compositions for Use Therein, Consolidated Metal Powder Compositions, etc., subclass 332 for processes of producing solid particulate free metal directly from liquid metal (e.g., liquid comminuting, etc.) with subsequent coating of the particles.

**217** This subclass is indented under subclass 215. Processes wherein the coating contains metal in elemental form.

**218** This subclass is indented under subclass 215. Processes wherein the coating contains an insoluble finely divided solid powder intended to impart color.

(1) Note. The colored particles produced are often intended to be used as roofing granules.

SEE OR SEARCH CLASS:
106, Compositions: Coating or Plastic, for pigment materials.

**219** This subclass is indented under subclass 218. Processes wherein the coating material includes a silicon containing compound.

**220** This subclass is indented under subclass 215. Processes wherein the coating is based on an organic material.

(1) Note. Attention is directed to the definition of Class 260, Chemistry of Carbon Compounds, for the distinction between the term “organic” and “inorganic”.

**221** This subclass is indented under subclass 220. Processes wherein the coating contains a material of the resinous, rubber or hardenable oil type.

(1) Note. Linseed, tung, and other drying oils are considered hardenable.

(2) Note. Paint is assumed to contain latex rubber or linseed oil unless otherwise specified.

(3) Note. Shellac and varnish are examples of natural resins.

**222** This subclass is indented under subclass 212. Processes wherein the base comprises an organic synthetic or natural resinous material.

**223** This subclass is indented under the class definition. Processes wherein a coating or surface to be coated is subjected to contact with a flame.

(1) Note. This and indented subclasses exclude flame contact which may take place in flame spraying which is generally provided for in subclasses 446+.

(2) Note. Included in this and indented subclasses are processes in which decomposition of a base or coating takes place.

SEE OR SEARCH THIS CLASS, SUBCLASS:
446+, for jet or plasma flame spraying.

SEE OR SEARCH CLASS:
118, Coating Apparatus, subclass 47 for coating apparatus including flame contact means.

**224** This subclass is indented under subclass 223. Processes wherein any applied coating is subjected to flame contact.

SEE OR SEARCH THIS CLASS, SUBCLASS:
348, for treatment of coating with a gas jet or blast which is not a flame.

**225** This subclass is indented under subclass 223. Processes wherein a free metal coating is formed.

SEE OR SEARCH THIS CLASS, SUBCLASS:
191+, for coating a base with particles and contacting the applied particles with a flame.

**226** This subclass is indented under the class definition. Processes wherein a coating which is on the base is decomposed by heat or wherein part of a base is decomposed by heat.

(1) Note. This and indented subclasses exclude heat decomposition of a vapor or gas to form a coating.

(2) Note. This and indented subclasses include carbonization of a substrate or coating or heat decomposition of a material in a coating such as a temporary binder.

SEE OR SEARCH THIS CLASS, SUBCLASS:
223+, for heat decomposition produced by flame contact.
246, for coagulating a coating to form a microporous product.
248.1+, for heat decomposition of a vapor or gas to form a coating.
314+, for a process which includes preheating a base and then applying a coating composition which is decomposed simultaneously with application.
372.2+, for heat treatment of a coating without decomposition, for instance to evaporate a solvent or polymerize a resin.

SEE OR SEARCH CLASS:
8, Bleaching and Dyeing; Fluid Treatment and Chemical Modification of Textiles and Fibers, subclass 140 for singeing or carbonizing of textiles, per se.
118, Coating Apparatus, subclass 47 for apparatus for subjecting a surface to a carbonizing treatment.

**227** This subclass is indented under subclass 226. Processes wherein a substrate is carbonized or at least a part of the substrate is heat decomposed.

**228** This subclass is indented under subclass 226. Processes wherein a liquid or solid coating is heat decomposed to form elemental carbon or a carbide, which remain as a coating.

SEE OR SEARCH THIS CLASS, SUBCLASS:
122, for processes of forming electrical products including a carbon coating.
226, for decomposing a carbon compound coating completely where neither a carbon or carbide coating is formed.
249, for the heat decomposition of a gas or vapor to form a carbon or carbide coating.
399, for carbide coatings formed by reaction of a metal containing coating with a carbon substrate.

**229** This subclass is indented under subclass 226. Processes wherein a liquid or solid coating is heat decomposed to form free metal coating.

(1) Note. This subclass provides for decomposition of a binder for metal which is already in elemental form as well as decomposition of metal compounds.

SEE OR SEARCH THIS CLASS, SUBCLASS:

228, for the formation of metal carbide coatings.

252, for pack processes and for the decomposition of a gaseous or vapor metal compound to form a metal coating.

**230** This subclass is indented under the class definition. Processes wherein the coating is applied to an inner or concave surface of a cavity, bore, depression or hole in the work.

(1) Note. Materials such as fabrics, foams, felts, etc., are not considered hollow even though they may contain voids.

SEE OR SEARCH THIS CLASS, SUBCLASS:

64+, for coating cathode-ray tubes and fluorescent lamps.

105+, for coating hollow electrical articles such as light bulbs and motor stators, etc.

133+, for coating molds.

142, for repairing articles, some of which are hollow such as radiators and boilers, etc.

181, for processes of coating the interior of a hollow article with particles or fibers.

243+, for coating processes wherein a foraminous product is produced.

476, for a process of coating a hollow article utilizing an electrostatic charge.

SEE OR SEARCH CLASS:

138, Pipes and Tubular Conduits, subclasses 97+ for repairing pipe by a coating process.

**231** This subclass is indented under subclass 230. Processes which include rotating or oscillating the article about an axis therethrough.

SEE OR SEARCH THIS CLASS, SUBCLASS:

72, for applying a coating to a cathode-ray tube while rotating it.

**232** This subclass is indented under subclass 231. Processes which include removing excess coating material from the article.

**233** This subclass is indented under subclass 231. Processes wherein the coating material is projected by mechanical force onto the inside of the article.

**234** This subclass is indented under subclass 231. Processes wherein the article comprises metal in elemental form.

**235** This subclass is indented under subclass 230. Processes which include removing unwanted coating material from the article.

SEE OR SEARCH THIS CLASS, SUBCLASS:

232, for similar processes which include rotating the article.

**236** This subclass is indented under subclass 230. Processes wherein the coating material is projected by mechanical force onto the inside of the article.

SEE OR SEARCH THIS CLASS, SUBCLASS:

233, for similar processes which include rotating the article.

**237** This subclass is indented under subclass 230. Processes wherein a coating is produced on an article by absorption or condensation of, or reaction with, a vapor, gas, mist, or smoke.

**238** This subclass is indented under subclass 230. Processes which include use of pressure above or below atmospheric.

**239** This subclass is indented under subclass 230. Processes wherein the base being coated comprises metal in elemental form.

**240** This subclass is indented under the class definition. Processes which include the use of centrifugal force in coating the base or in post treating the coated base.

(1) Note. This subclass provides for utilizing centrifugal force in a post-treatment for removing excess coating, etc.

(2) Note. Utilizing centrifugal force to ready the coating material for application, such as mixing it, is not provided for in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

231, for processes wherein a hollow article is rotated but no centrifugal force is defined.

242, for processes of applying coatings by rumbling or tumbling where the force employed is a hammering force supplied by gravity rather than centrifugal force.

346, for processes wherein a coated article is rotated, etc., but no centrifugal force is defined.

SEE OR SEARCH CLASS:

118, Coating Apparatus, subclasses 52+ for means to centrifuge work.

156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclass 74 for processes of surface bonding with application of centrifugal force.

**241** This subclass is indented under subclass 240. Processes wherein a coating which contains metal in elemental form is treated or applied.

SEE OR SEARCH THIS CLASS, SUBCLASS:

347, below for manipulation of a metal coated article where centrifugal force is not defined.

**242** This subclass is indented under the class definition. Processes which include mechanically causing the base to be turned over and over during or after coating.

SEE OR SEARCH THIS CLASS, SUBCLASS:

240+, for centrifugal force utilization in a coating process.

**243** This subclass is indented under the class definition. Processes which are peculiar to coating a base so that the resulting product is foraminous or porous.

(1) Note. To be included herein the resulting product must be porous or foraminous. Applying a porous coating to a nonporous base is not included herein but classified according to the coating process.

(2) Note. To be included herein a specific technique for keeping the pores or openings from being filled must be included. Thus coating substrates with large openings which are not easily filled are classified elsewhere on some other basis. Coating of cloth, sponges, and filters, etc., are generally here since specific techniques are usually required to keep the substrate porous.

SEE OR SEARCH CLASS:

205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, subclass 150 for electrolytic coating of perforated, foraminous, or permeable substrates.

428, Stock Material or Miscellaneous Articles, subclass 566 for a consolidated metal powder product having an interconnected void structure, subclasses 596+ for apertured metallic stock, and subclass 613 for porous metallic stock.

**244** This subclass is indented under subclass 243. Processes wherein the product is (1) a porous material through which a fluid is passed for the purpose of removing suspended matter, (2) the porous fibrous skeleton of a marine animal or (3) a cellular mass formed by solidifying a liquid in which gas bubbles are entrapped.

**245** This subclass is indented under subclass 243. Processes wherein the coating includes openings or holes which are very small, generally microscopic in size.

(1) Note. This subclass provides for producing a vapor permeable coating on a base which is used, for example, to make breathable leatherlike material.

SEE OR SEARCH CLASS:

516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 9+ for continuous liquid phase colloid systems (e.g., foams, emulsions, suspensions, dispersions) or agents for such systems or making or stabilizing such systems or agents, when generically claimed or when there is no hierarchically superior provision in the USPC for the specifically claimed art.

**246** This subclass is indented under subclass 245. Processes wherein the coating is a colloidal solution which is caused to become a soft solid mass.

SEE OR SEARCH CLASS:

516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 98+ for colloid systems of continuous or semicontinuous solid phase with discontinuous liquid phase (gels, pastes, flocs, coagulates) or agents for such systems or making or stabilizing such systems or agents, when generically claimed or when there is no hierarchically superior provision in the USPC for the specifically claimed art.

**247** This subclass is indented under subclass 243. Processes wherein the base comprises metal in elemental form.

**248.1 COATING BY VAPOR, GAS, OR SMOKE:** This subclass is indented under the class definition. Process under the class definition wherein a coating is produced on a base (i.e., substrate) by absorption of or condensation of, or reaction with, a vapor (mist), gas, or smoke.

(1) Note. This subclass provides for coating by placing a base in a chamber or reactor filled with mist or smoke. See SEE OR SEARCH THIS CLASS, notes below.

(2) Note. This subclass provides for reaction of a base or previously applied coating with a gas. However, it does not provide for decomposing a coating by heat and reacting it with a gas. See SEE OR SEARCH THIS CLASS, SUBCLASS, found below.

SEE OR SEARCH THIS CLASS, SUBCLASS:

69, for a vapor deposition process resulting in an electrical product having a fluorescent or phosphorescent base or coating.

74, for coating processes which result in a photoconductive product.

96.7, for a process of using a mist or aerosol for coating a substrate to produce an integrated or printed circuit or circuit board.

96.8, for a process of coating vapor or gas phase material (other than a mist or aerosol) onto a substrate to produce an integrated or printed circuit or circuit board.

124, for producing an electrical product by vapor depositing a metal coating material.

166, for vapor depositing on glass to make an optical element.

237, for coating the interior of a hollow article by vapor, gas, mist, or smoke.

226, through 229 for decomposing a coating which is on a base by heat and reacting the decomposition material with a gas.

421.1 through 427.7, for a process of coating by spraying (e.g., projecting a mist against a base, etc.), in general.

587, through 590, for vapor deposition utilizing resistance heating.

SEE OR SEARCH CLASS:

117, Single-Crystal, Oriented-Crystal, and Epitaxy Growth Processes; Non-Coating Apparatus Therefor, appropriate subclasses for coating utilizing a gas, vapor, or smoke by methods of single crystal growing.

148, Metal Treatment, particularly subclasses 206 through 229 for processes of carburizing, nitriding, or both of a metal substrate with a gas or subclasses; and subclasses 240-287 for processes of reactively coating a metal substrate utilizing a gaseous agent that combines with the metal substrate to form a coating thereon containing a constituent of the metal substrate therein.

430, Radiation Imagery Chemistry: Process, Composition, or Product Thereof, subclass 128 for processes of making radiation sensitive products utilizing vacuum deposition.

438, Semiconductor Device Manufacturing: Processes, appropriate subclasses for methods of making a semiconductor device or coating a semiconductor substrate utilizing gas, vapor, or smoke.

588, Hazardous or Toxic Waste Destruction or Containment, subclasses 249 through 257 for coating a hazardous or toxic waste using a gas, vapor, or smoke.

**249.1 Carbon or carbide coating:**

This subclass is indented under subclass 248.1. Process which results in a carbon or carbide coated base.

SEE OR SEARCH THIS CLASS, SUBCLASS:

228, for forming a carbon coating by heat decomposition of a solid or liquid.

**249.2 Chemical vapor infiltration (i.e., CVI) of porous base (e.g., fiber, fibrous web, etc.):**

This subclass is indented under subclass 249.1. Process in which chemical reactants in vapor phase penetrate a porous substrate (e.g., fiber, fibrous web, etc.) wherein a vapor phase reaction subsequently occurs to form a coating that deposits in said porous substrate.

**249.3 Fiber or fibrous web or sheet base: (e.g., strand, filament, fabric, cloth, etc.)**

This subclass is indented under subclass 249.1. Process wherein the carbon or carbide coated base is a fiber, fibrous web, or sheet.

(1) Note. A fiber is considered to be a relatively short, slender, flexible element of macroscopic size and finite length and having a width and thickness of the same order of magnitude. A fiber is generally of staple length to facilitate its being spun, twisted, or otherwise secured together into a composite strand but may be of shorter length requiring bonding, felting, or matting to form a strand or layer. It may be of animal (e.g., wool, rabbit hair, etc.), vegetable (e.g., cotton, jute, hemp, etc.), or mineral (e.g., asbestos, glass, metal, etc.) origin and may be either natural, modified, or synthetic.

(2) Note. A strand is considered to be a relatively slender and flexible element having a width and thickness of the same order of magnitude and a length which is either (a) indeterminate or (b) coextensive with the length or width of a sheet or layer with which it may be associated. A strand may be a monofilament or it may include either a plurality of filaments or fibers disposed in parallelism (e.g., tow, etc.) or constituent fibers and/or filaments knitted, plaited, braided, twisted, interlaced, interlocked, or otherwise secured together to form a unit such as roving, thread, yarn, cord, rope, or cable.

(3) Note. A filament is considered to be a fine threadlike body or structure whose width and thickness are of the same order of magnitude.

(4) Note. A fibrous web is considered to be a sheet of random or organized fibers having length and width each greater than its thickness and with at least its longitudinal dimension indeterminate.

(5) Note. A fabric is used in the manufacture of household furnishings (e.g., draperies, upholstery, etc., and roofing, clothing,

tires, etc.) and is generally claimed as a textile, cloth, or fabric.

**249.4 Inorganic carbon base (e.g., graphite, etc.):**
This subclass is indented under subclass 249.3. Process wherein the base (i.e., fiber, fibrous web or sheet) is inorganic carbon.

SEE OR SEARCH CLASS:
260, Chemistry of Carbon Compounds, the class definition for the definition of an "organic compound." All compounds not encompassed by this definition are considered inorganic.

**249.5 Boron and carbon containing coating (e.g., boron carbide, etc.):**
This subclass is indented under subclass 249.1. Process wherein the resulting coating contains boron and carbon.

**249.6 Graphite coating:**
This subclass is indented under subclass 249.1. Process wherein the resulting coating consists of a crystallized allotropic carbon, characterized by a hexagonal arrangement of its atoms and lattice layers of condensed, aromatic, sp2-hybridized rings.

**249.7 Diamond-like carbon coating (i.e., DLC)**
This subclass is indented under subclass 249.1. Process wherein the resulting coating consists primarily of metastable amorphous carbon and contains both hybridized tetragonal sp3 and trigonal sp2 bonds.

(1) Note. The diamond-like carbon may contain, in addition to the primary amorphous phase, crystals ranging in diameter from 2nm to 20nm.

**249.8 Diamond coating:**
This subclass is indented under subclass 249.1. Process wherein the resulting coating consists of crystallized isometric carbon, characterized by an octahedral arrangement of its atoms and tetragonal sp3 bonds.

SEE OR SEARCH CLASS:
117, Single-Crystal, Oriented-Crystal, and Epitaxy Growth Processes; Non-Coating Apparatus Therefor, subclass 79 for processes for growing therein-defined single-crystal of diamond and subclass 929 for the art collection of carbon single-crystal references.
264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclass 84 for the process of molding nonmetallic material (e.g., diamond, etc.) utilizing ultra high pressure generated by an explosive force.
423, Chemistry of Inorganic Compounds, subclass 446 which is the locus for all diamond making processes (other than coating processes proper for Class 427) and products, whether or not a chemical reaction is involved. In Class 423, subclass 446 is a mandatory search and cross-reference for all patents which claim forming a free-standing single crystal diamond.
425, Plastic Article or Earthenware Shaping or Treating: Apparatus, subclass 1 for apparatus for molding with high pressure generated by an explosive force and subclass 77 for making diamonds by applying ultra high pressure.

**249.9 Patterned or non-uniform coating:**
This subclass is indented under subclass 249.8. Process which includes forming the diamond coating wherein the coating is applied (a) only to selected portions of a base, (b) in such a manner as to produce a coating of non-uniform thickness, (c) to limited areas only on a base by covering the other areas, or (d) such that it varies from area to area as to chemical or physical properties.

(1) Note. This subclass provides for a process wherein a stencil may be temporarily adhered to a base during the step of applying the coating.

(2) Note. This subclass provides for a process wherein a discontinuous cover is applied to a base and a different coating material is then applied to the base through the discontinuities.

(3) Note. This subclass provides for a process wherein a patterned coating may be applied to selected areas or an entire base may be coated with a pattern forming composition; in the latter case,

selected portions of the coating, once formed, may be removed.

**249.11 Hot filament utilized:**
This subclass is indented under subclass 249.8. Process which include forming the diamond coating by using a heated filament.

(1) Note. Generally in hot filament diamond coating processes, a hot filament, usually heated by an electrical resistance, is used to excite a gaseous coating mixture and is preferably positioned in close proximity to the substrate to be coated.

**249.12 Diamond seed crystals utilized:**
This subclass is indented under subclass 249.8. Process which include forming the diamond coating by using diamond seed crystals.

(1) Note. Placement of documents having claims to processes for using diamond seed crystals to orient the deposition of a diamond coating is proper for this subclass.

**249.13 Tungsten containing base:**
This subclass is indented under subclass 249.8. Process wherein the base contains tungsten.

**249.14 Superposed coatings (i.e., layered):**
This subclass is indented under subclass 249.8. Process in which a coating is applied over a previously applied coating.

(1) Note. Documents are proper for placement in this subclass if at least one of the superposed coatings is diamond.

**249.15 Silicon and carbon containing coating (e.g., silicon carbide, etc.):**
This subclass is indented under subclass 249.1. Process wherein the resulting coating contains silicon and carbon.

**249.16 Inorganic carbon base (e.g., graphite, etc.):**
This subclass is indented under subclass 249.15. Process wherein the base is inorganic carbon.

SEE OR SEARCH CLASS:
260, Chemistry of Carbon Compounds, the class definition for the definition of an "organic compound." All compounds not encompassed by this definition are considered inorganic.

**249.17 Metal carbide containing coating:**
This subclass is indented under subclass 249.1. Process wherein the resulting coating contains metal carbide.

SEE OR SEARCH THIS CLASS, SUBCLASS:
250, for pure metal or metal alloy coating processes utilizing vapor (mist), gas or smoke.

**249.18 Chromium (Cr), molybdenum (Mo), or tungsten (W) metal carbide containing coating:**
This subclass is indented under subclass 249.17. Process wherein the metal of the metal carbide containing coating is chromium, molybdenum or tungsten.

**249.19 Titanium (Ti), zirconium (Zr), or hafnium (Hf) metal carbide containing coating:**
This subclass is indented under subclass 249.17. Process wherein the metal of the metal carbide containing coating is titanium, zirconium or hafnium.

**250** This subclass is indented under subclass 248.1. Processes wherein the resulting coatings is metal in elemental form.

SEE OR SEARCH CLASS:
428, Stock Material or Miscellaneous Articles, subclass 938 for composite metallic stock made by a process of this subclass.

**251** This subclass is indented under subclass 250. Processes wherein the base is mechanically moved during the coating operation.

**252** This subclass is indented under subclass 250. Processes wherein the metal is applied to the base by decomposition of a vaporous metallic compound of the coating metal.

(1) Note. Within the scope of this subclass is the process of applying a metal coating or alloy formation on the surface of the base by an exchange of the metal base ions with the metallic ions of the coating compound; i.e., diffusion.

**253** This subclass is indented under subclass 252. Processes wherein the metallic compound contains fluorine, chlorine, bromine, or iodine.

**254** This subclass is indented under subclass 248.1. Processes wherein the base material is derived from the trunks or branches of trees or bushes.

(1) Note. Wood particles or fibers which have been chemically changed; e.g., regenerated cellulose etc., or water layed to form a paper, are not considered to be wood.

**255.11 Base includes an inorganic compound containing silicon or metal (e.g., glass, ceramic, brick, etc.):**
This subclass is indented under subclass 248.1. Process wherein the composition of the base includes an inorganic silicon compound or an inorganic metal containing compound.

(1) Note. This subclass includes coating bases such as glass, ceramic, brick, stone, etc.

SEE OR SEARCH CLASS:
260, Chemistry of Carbon Compounds, the class definition for the definition of an "organic compound." All compounds not encompassed by this definition are considered inorganic.

**255.12 Chemical vapor infiltration (i.e., CVI) of porous substrate (e.g., fiber, fibrous web, etc.):**
This subclass is indented under subclass 255.11. Process in which chemical reactants in vapor phase penetrate a porous substrate (e.g. fiber, fibrous web, etc.) wherein a vapor phase reaction subsequently occurs to form a coating that deposits in said substrate.

**255.13 Glaze coating produced:**
This subclass is indented under subclass 255.11. Process wherein the base is coated with a material (e.g., metallic halide, sodium silicate, etc.) which forms a glossy, nonporous surface.

**255.14 Organic compound containing coating:**
This subclass is indented under subclass 255.11. Process wherein the resulting coating contains an organic compound.

SEE OR SEARCH CLASS:
260, Chemistry of Carbon Compounds, the class definition for the definition of an "organic compound." All compounds not encompassed by this definition are considered inorganic.

**255.15 Plural coatings applied utilizing vapor, gas, or smoke:**
This subclass is indented under subclass 255.11. Process wherein the base has at least two coatings applied using vapor (mist), gas, or smoke.

(1) Note. Documents having claims to plural coatings wherein said coatings might be composed of similar or dissimilar materials are proper for this subclass.

**255.17 Halogen containing coating, reactant, or precursor:**
This subclass is indented under subclass 255.18. Process which includes the use of a halogen containing material as a reactant or precursor wherein the resultant coating may or may not contain halogen.

(1) Note. Coating processes wherein the halogen containing material reacts to become (a) part of the resultant coating, (b) part of the reaction materials used to form the coating, or (c) part of reaction materials used to form other reactants are proper for placement in this subclass.

**255.18 Silicon containing coating:**
This subclass is indented under subclass 255.11. Process wherein the base is coated with a material which contains silicon.

SEE OR SEARCH THIS CLASS, SUBCLASS:
255.14, for processes involving organic silicon containing coating materials.

SEE OR SEARCH CLASS:
260, Chemistry of Carbon Compounds, the class definition for the definition of an

"organic compound." All compounds not encompassed by this definition are considered inorganic.

**255.19 Metal oxide containing coating:**
This subclass is indented under subclass 255.11. Process wherein the resulting coating contains metal oxide.

**255.21 Base includes inorganic metal compound:**
This subclass is indented under subclass 255.11. Process wherein the base contains an inorganic metal compound.

SEE OR SEARCH CLASS:
260, Chemistry of Carbon Compounds, the class definition for the definition of an "organic compound." All compounds not encompassed by this definition are considered inorganic.

**255.22 Iron compound containing base (e.g., ferric oxide, etc.):**
This subclass is indented under subclass 255.21. Process wherein the metal is iron.

**255.23 Mixture of vapors or gases utilized (e.g., deposition gas and inert gas, inert gas and reactive gas, two or more reactive gases, etc.):**
This subclass is indented under subclass 248.1. Process wherein a mixture of gases or vapors is used to form the coating.

**255.24 Fiber or fibrous web or sheet base (e.g., strand, filament, fabric, cloth, etc.):**
This subclass is indented under subclass 255.23. Process wherein the coated base is a fiber, strand, filament or fiber containing web or sheet.

(1) Note. A fiber is considered to be a relatively short, slender, flexible element of macroscopic size and finite length and having a width and thickness of the same order of magnitude. A fiber is generally of staple length to facilitate its being spun, twisted or otherwise secured together into a composite strand but may be of shorter length requiring bonding, felting or matting to form a strand or layer. It may be of animal (e.g., wool, rabbit hair, etc.), vegetable (e.g., cotton, jute, hemp, etc.), or mineral (e.g., asbestos, glass, metal, etc.) origin and may be natural, modified, or synthetic.

(2) Note. A strand is considered to be a relatively slender and flexible element having a width and thickness of the same order of magnitude and a length which is either (a) indeterminate or (b) coextensive with the length or width of a sheet or layer with which it may be associated. A strand may be a monofilament or it may include either a plurality of filaments or fibers disposed in parallelism (e.g., tow, etc.) or constituent fibers and/or filaments knitted, plaited, braided, twisted, interlaced, interlocked, or otherwise secured together to form a unit such as roving, thread, yarn, cord, rope, or cable.

(3) Note. A filament is considered to be a fine threadlike body or structure whose width and thickness are of the same order of magnitude.

(4) Note. A fibrous web is considered to be a sheet of random or organized fibers having length and width each greater than its thickness and with at least its longitudinal dimension indeterminate.

(5) Note. A fabric is considered to be a web, sheet or film used in the manufacture of household furnishings (e.g., draperies, upholstery, etc.) and roofing, clothing, tires, etc. and is generally claimed as a textile, cloth or fabric.

**255.25 Mixture contains liquid or solid particulate suspension:**
This subclass is indented under subclass 255.23. Process wherein the mixture of vapors or gases contains suspended discrete liquid or solid particles.

(1) Note. Particles generally consist of matter so small that they are not ordinarily handled as individual units. Usually particle size falls within the range of 0.1 to 1000 microns in the largest dimension.

**255.26 Coating formed by reaction of vaporous or gaseous mixture with a base (i.e., reactive coating of non-metal base):**
This subclass is indented under subclass 255.23. Process wherein any part of the mixture of vapors or gases is reacted with a base to form a base supplied coating.

SEE OR SEARCH CLASS:
148, Metal Treatment, for processes of coating utilizing a reactive composition which reacts with a metal substrate or composition therefor, also processes of coating a nonmetallic material with a metal or alloy coating and subsequently forming a base supplied coating thereon.

**255.27 Silicon containing coating:**
This subclass is indented under subclass 255.26. Process wherein the resulting coating contains silicon.

**255.28 Coating formed from vaporous or gaseous phase reaction mixture (e.g., chemical vapor deposition, CVD, etc.):**
This subclass is indented under subclass 255.23. Process wherein all or any part of the mixture of vapors or gases is caused to react, resulting in the formation of a coating.

**255.29 Inorganic oxygen, sulfur, selenium, or tellurium (i.e., chalcogen) containing coating (e.g., phosphosilicate, silicon oxynitride, etc.):**
This subclass is indented under subclass 255.28. Process wherein the resulting coating contains inorganic oxygen, sulfur, selenium, or tellurium.

SEE OR SEARCH CLASS:
260, Chemistry of Carbon Compounds, the class definition for the definition of an "organic compound." All compounds not encompassed by this definition are considered inorganic.

**255.31 Metal and chalcogen containing coating (e.g. metal oxide, metal sulfide, metal telluride, etc.):**
This subclass is indented under subclass 255.29. Process wherein the coating includes chalcogen and metal.

(1) Note. Metal compounds containing chalcogen are proper for placement in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:
250, for processes for pure metal or metal alloy coatings utilizing vapor, gas or smoke.

**255.32 Plural metal containing coating (e.g., indium oxide/tin oxide, titanium oxide/aluminum oxide, etc.):**
This subclass is indented under subclass 255.31. Process wherein the chalcogen containing coating includes at least two metals.

**255.33 Zinc (Zn), cadmium (Cd), or mercury (Hg) containing:**
This subclass is indented under subclass 255.31. Process wherein the metal contained in the coating is zinc, cadmium, or mercury.

**255.34 Gallium (Ga), aluminum (Al), or indium (In) containing:**
This subclass is indented under subclass 255.31. Process wherein the metal contained in the coating is gallium, aluminum, or indium.

**255.35 Germanium (Ge), Tin (Sn), or lead (Pb) containing:**
This subclass is indented under subclass 255.31. Process wherein the metal contained in the coating is germanium, tin, or lead.

**255.36 Titanium (Ti) or zirconium (Zr) containing:**
This subclass is indented under subclass 255.31. Process wherein the metal contained in the coating is titanium or zirconium.

**255.37 Silicon dioxide coating:**
This subclass is indented under subclass 255.29. Process wherein the chalcogen containing coating is or contains silicon dioxide.

**255.38 Phosphorus or boron containing coating (e.g., aluminum boride, boron phosphide, etc.):**
This subclass is indented under subclass 255.28. Process wherein the coating contains phosphorus or boron.

**255.39 Halogen or halogen compound containing reactant:**
This subclass is indented under subclass 255.28. Process wherein halogen (i.e., fluorine, chlorine, bromine, iodine, or astatine), in compound or elemental form, is used as a reactant.

(1) Note. A halogen containing reaction may have the halogen as (a) part of the resultant coating, (b) part of reaction materials used to form the coating, or (c) part of reaction materials used to form other reactants.

**255.391 Titanium compound containing coating (e.g., titanium carbonitride, titanium nitride, etc.):**
This subclass is indented under subclass 255.39. Process wherein the resulting coating contains titanium as a compound.

**255.392 Tungsten compound containing coating (e.g., tungsten silicide, etc.):**
This subclass is indented under subclass 255.39. Process wherein the resulting coating contains tungsten as a compound.

**255.393 Silicon containing coating:**
This subclass is indented under subclass 255.39. Process wherein the resulting coating contains silicon

**255.394 Nitrogen containing coating (e.g., metal nitride, etc.):**
This subclass is indented under subclass 255.28. Process wherein the resulting coating contains nitrogen.

**255.395 Inorganic coating:**
This subclass is indented under subclass 255.23. Process wherein the resulting coating consists of inorganic material.

SEE OR SEARCH CLASS:
260, Chemistry of Carbon Compounds, the class definition for the definition of an "organic compound." All compounds not encompassed by this definition are considered inorganic.

**255.4 Base supplied constituent:**
This subclass is indented under subclass 248.1. Processes wherein a nonmetal base reacts with the applied coating material to form a coating of the reaction product.

(1) Note. This subclass provides for reaction products wherein one of the reactants is a coating which was previously applied on a base.

SEE OR SEARCH THIS CLASS, SUBCLASS:
226+, for heat decomposition of a base.
227, for processes wherein a coating is formed by carbonizing or charring a base.
301+, for processes including a reaction between a coating and a preapplied chemical agent.
333, for processes including a reaction between two coatings.
337+, for processes including a reaction between a coating and a subsequently applied chemical agent.

SEE OR SEARCH CLASS:
8, Bleaching and Dyeing; Fluid Treatment and Chemical Modification of Textiles and Fibers, subclasses 115.51+ for the treatment of textiles and paper wherein the textile or paper base supplies a part or all of the coating, and subclasses 94.1+ for the treatment of hides, skins, feathers, and animal tissues wherein the base supplies a part or all of the coating.
148, Metal Treatment, particularly subclasses 240+ for applying a material to a metal base wherein the material and Assisted with metal base react to form a coating of the reaction product.

**255.5 Moving the base:**
This subclass is indented under subclass 248.1. Processes wherein the base is mechanically moved while being coated by the vapor, gas, or smoke.

**255.6 Organic coating applied by vapor, gas, or smoke:**

This subclass is indented under subclass 248.1. Processes wherein the final coating is based on organic materials from the vapor, gas, or smoke.

(1) Note. Attention is directed to the definitions of Class 260, Chemistry of Carbon Compounds, for the scope of the term "organic".

**255.7 Plural coatings applied by vapor, gas, or smoke:**

This subclass is indented under subclass 248.1. Processes wherein at least two different coating materials are applied by vapor, gas, or smoke to form superposed diverse coatings on a base.

**256** This subclass is indented under the class definition. Processes wherein the coating (1) is applied only to selected portions of a base, (2) is applied in such a manner as to produce a coating of nonuniform thickness or (3) varies from area to area as to chemical or physical properties.

(1) Note. The intent has to be form a nonuniform coating; merely coating a rough base which automatically results in a nonuniform coating thickness is not provided for in this subclass.

(2) Note. This subclass provides for applying coatings wherein the only difference in composition of various areas in the color.

(3) Note. A foamed coating is not considered to be nonuniform for the purpose of this subclass unless the disclosure specifically sets forth it is nonuniform.

(4) Note. Merely drilling a hole in a coated base is not provided for here. However, drilling large numbers of holes in a coated base to obtain a nonuniform coating is provided for here.

(5) Note. Partial immersion of a pole to impregnate only the end which will be underground is excluded from this subclass and its indents and is provided for in subclass 441.

SEE OR SEARCH THIS CLASS, SUBCLASS:

63, for a coating process which results in a superconductor having a nonuniform coating.

68, for a coating process resulting in a fluorescent or phosphorescent electrical product having a nonuniform coating.

75, for a coating process resulting in a photosensitive electrical product having a nonuniform coating.

102, for a coating process which results in an electrical resistor having a nonuniform coating.

140+, for restoring or repairing which may result in a nonuniform coating.

143, for stencil blank making.

145, for making a developable latent image.

146+, for transfer or copy sheet making, especially subclass 177.

180+, for applying particle to a base, especially subclass 222 where localized different areas are produced.

197+, for applying particles to localized areas of a base.

230+, for a nonuniform coating applied to a hollow article to form a gasket.

466+, for a coating process utilizing electrostatic attraction or projection which may result in a nonuniform coating.

595+, for a process of forming a nonuniform coating by selective irradiation or for a coating process wherein infrared energy or radiant heat is utilized to form a nonuniform coating.

SEE OR SEARCH CLASS:

8, Bleaching and Dyeing; Fluid Treatment and Chemical Modification of Textiles and Fibers, subclasses 467+, for processes of transferring a dye, usually in the form of a design, from a carrier base.

118, Coating Apparatus, subclasses 211, 301 and 406, for apparatus for applying a coating in a nonuniform manner.

**257** This subclass is indented under subclass 256. Processes in which an irregular surface coating is produced by intentionally employing coating

materials which dry to a wrinkled appearance or which crack on drying to produce a "crackled" finish.

**258** This subclass is indented under subclass 256. Processes which include sequentially applying a plurality or dissimilar coating materials in superposed relationship on a base or applying diverse coating material to the coating on a previously coated base.

(1) Note. It is not necessary that all of the coatings be nonuniform for classification here.

(2) Note. A partial coating is considered a nonuniform coating for the purpose of this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

152, for a process of making a transfer having a nonuniform coating.

273, for a process of treating a nonuniform coating with a fluid wherein the fluid does not form a coating.

SEE OR SEARCH CLASS:

428, Stock Material or Miscellaneous Articles, subclass 601 for metallic stock having a discontinuous surface component.

**259** This subclass is indented under subclass 258. Processes in which the base treated has applied to portions thereof a coating which masks or shields the portions so coated during further treatment of the exposed portions of the base.

(1) Note. The masking coating may be applied to selected areas or the entire base may be coated with the mask-forming composition and selected portions of the coating, thus formed, removed.

SEE OR SEARCH THIS CLASS, SUBCLASS:

154, for removable protective coatings not used as masks.

272, for processes utilizing preformed masks wherein there is surface deformation or selective removal of portions of a coating.

282, for other processes utilizing preformed masks to produce nonuniform coatings.

300, for processes of shielding entire surfaces during a coating operation wherein the shielding means is not a removable protective coating.

SEE OR SEARCH CLASS:

156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclasses 625+ for methods of etching and for combinations of etching and coating where the etching itself is intended as a manufacturing step and not merely a preparatory, perfecting step for the coating.

228, Metal Fusion Bonding, subclasses 215+ for processes of soldering, brazing or welding in which the metal parts have means for confining the fused filler metal to restricted areas.

**260** This subclass is indented under subclass 258. Processes wherein the coating member is a hand-held applicator which comprises (1) bristles secured to a support or (2) a member capable of soaking up coating material.

SEE OR SEARCH THIS CLASS, SUBCLASS:

137, for stippling a coating with a brush.

428.01 through 428.21, for a process of applying a uniform coating with a roller applicator.

429, for a process of applying coating material with a brush or absorbent applicator which results in a uniform coating.

**261** This subclass is indented under subclass 258. Processes wherein the outermost coating applied is nonuniform.

(1) Note. See generic subclass 256 for the scope of the term "nonuniform".

**262** This subclass is indented under subclass 261. Processes wherein a nonuniform coating applied varies in character or color from one area to another and wherein no repetitive pattern is discernible.

(1) Note. Coatings considered to be variegated include marbleized, mottled, stippled, wood grained etc.

SEE OR SEARCH THIS CLASS, SUBCLASS:
257, for producing wrinkled or crackled coatings.
267, for a process of applying a variegated coating and applying a uniform coating thereover.
274, and 280, for a process of applying a variegated coating to a base wherein said variegated coating is the only coating applied.

SEE OR SEARCH CLASS:
8, Bleaching and Dyeing; Fluid Treatment and Chemical Modification of Textiles and Fibers, subclasses 478+ for marbleizing with dyestuffs.

**263** This subclass is indented under subclass 262. Processes wherein the applied coating resembles stone or marble.

**264** This subclass is indented under subclass 261. Processes which include intentionally deforming or removing portions of the surface of the base; or deforming or removing selective portions of the coating.

SEE OR SEARCH THIS CLASS, SUBCLASS:
270, for a similar process wherein the final coating is uniform.
271, for a similar process wherein only a single coating is applied.

**265** This subclass is indented under subclass 261. Processes wherein an additional nonuniform coating is applied.

**266** This subclass is indented under subclass 265. Processes wherein the base is glass or a ceramic material.

(1) Note. Attention is directed to the definitions of Class 65, Glass Manufacturing, and Class 106, Compositions: Coating or Plastic, for a comprehensive definition of the terms “glass” and “ceramic”.

**267** This subclass is indented under subclass 258. Processes wherein a nonuniform coating applied varies in character or color from one area to another and wherein no repetitive pattern is discernible.

SEE OR SEARCH THIS CLASS, SUBCLASS:
257, for producing wrinkled or crackled coatings.
262, for applying plural coatings wherein the final coating is variegated.
274, and 280, for applying a single coating which is variegated.

**268** This subclass is indented under subclass 267. Processes wherein the applied coating resembles stone or marble.

**269** This subclass is indented under subclass 258. Processes wherein the base is glass or a ceramic material.

(1) Note. Attention is directed to the definitions of Class 65, Glass Manufacturing, and Class 106, Compositions: Coating or Plastic, for a comprehensive definition of the terms “glass” and “ceramic”.

**270** This subclass is indented under subclass 258. Processes which include intentionally deforming or removing portions of the surface of the base; or deforming or removing selective portions of the coating.

SEE OR SEARCH THIS CLASS, SUBCLASS:
264, for a similar process wherein a final uniform coating is applied.
271+, for a similar process wherein only a single coating is applied.

**271** This subclass is indented under subclass 256. Processes which include intentionally deforming or removing portions of the surface of the base; or deforming or removing selective portions of the coating.

(1) Note. For the general line between this subclass and Class 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, with regard to the combination of processes of reshaping or deform-

ing plus coating, see the notes to Class 264, subclass 129.

(2) Note. The deformation or removal step, per se, is also included in this and the indented subclasses when not more specifically provided for in other classes.

SEE OR SEARCH THIS CLASS, SUBCLASS:

257, wherein the coating is self-deforming.

264, and 270, for similar processes which include applying a plurality of coatings.

355+, for utilizing a solid treating member on the coating which leaves the coating uniform.

SEE OR SEARCH CLASS:

118, Coating Apparatus, subclass 44 for coating apparatus combined with means to deform the base, and subclasses 100+ for coating apparatus having solid members acting on the coated base to modify the coating.

156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclasses 625+ for methods of etching and for combinations of etching and coating where the etching itself is intended as a manufacturing step and not merely a preparatory, perfecting step for the coating.

264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclass 129, for processes of molding or shaping within the class definition plus a coating step.

**272** This subclass is indented under subclass 271. Processes wherein a nonuniform coating is obtained by covering selected areas of the base being coated.

SEE OR SEARCH THIS CLASS, SUBCLASS:

259, for applying a masking coating plus another coating.

282, for processes employing masks or stencils to obtain nonuniform coatings and not involving surface deformation or the selective removal of portions of the coating.

**273** This subclass is indented under subclass 271. Processes wherein a portion of the coating is removed or deformed by contacting it with a gas or liquid.

(1) Note. The liquid may be a solvent, swelling agent, or other liquid which treats the coating either physically or chemically.

(2) Note. A gas or vaporized liquid may be used to give the coating a physical or a chemical treatment.

SEE OR SEARCH THIS CLASS, SUBCLASS:

336+, and 337+, for treating a coating after its application wherein the coating remains uniform.

**274** This subclass is indented under subclass 271. Processes wherein the nonuniform coating applied varies in character or color from one area to another and wherein no repetitive pattern is discernible.

(1) Note. Coatings considered to be variegated include marbleized, mottled, stippled and wood grained.

SEE OR SEARCH THIS CLASS, SUBCLASS:

257, for producing wrinkled or crackled coatings.

262, for applying a plurality of coatings wherein the final coating is variegated.

280, for applying a variegated coating without any deformation of the base or coating.

**275** This subclass is indented under subclass 271. Processes which include a mechanical or chemical treatment of the base to deform the surface thereof either before or after applying the coating material.

SEE OR SEARCH THIS CLASS, SUBCLASS:

299+, for processes which include pretreating a base prior to applying a uniform coating which pretreating may result in a nonuniform base.

**276** This subclass is indented under subclass 275. Processes wherein the coating is deformed by the same operation which deforms the surface of the base.

(1) Note. The process of this subclass can be carried out or an article wherein both the base and coating are uniform so long as the final article has a nonuniform coating.

**277** This subclass is indented under subclass 271. Processes which include contacting the coating with a solid member to deform or remove a portion thereof.

**278** This subclass is indented under subclass 277. Processes wherein the solid treating member is cylindrical and rotates about an axis.

**279** This subclass is indented under subclass 256. Processes wherein the coating being applied contains glass-like material.

SEE OR SEARCH THIS CLASS, SUBCLASS:

193, for a process of applying vitrifiable particles to a base.

**280** This subclass is indented under subclass 256. Processes wherein the nonuniform coating applied varies in character or color from one area to another and wherein no repetitive pattern is discernible.

(1) Note. Coatings considered to be variegated include marbleized, mottled and wood grained, coatings.

SEE OR SEARCH THIS CLASS, SUBCLASS:

257, for producing wrinkled and crackled coatings.

262, for applying a plurality of coatings wherein the final coating is variegated.

274, for a coating process which includes deformation or removal of a portion of a coating which process results in a variegated surface.

**281** This subclass is indented under subclass 280. Processes wherein the coating resembles stone or marble.

**282** This subclass is indented under subclass 256. Processes wherein coating is applied to limited areas only on a base by covering the other areas.

(1) Note. The mask or stencil may be temporarily adhered to the base during the step of applying the coating.

(2) Note. This subclass provides for a process wherein a discontinuous cover is applied to a base and a different coating material is then applied to the base through the discontinuities. However, if the cover or mask coating is coated while coating through the discontinuities subclass 259 is indicated.

SEE OR SEARCH THIS CLASS, SUBCLASS:

259, for applying plural superposed coatings including a masking coating and see (2) Note to this subclass 307.

272, for a coating process utilizing a mask which process includes deforming the base or coating or removing a portion of the coating.

595+, a process including irradiating selected areas of a coating by utilizing a mask.

SEE OR SEARCH CLASS:

8, Bleaching and Dyeing; Fluid Treatment and Chemical Modification of Textiles and Fibers, subclass 115 for treating a portion of a textile product which may utilizing a mask.

156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclass 247 for laminating processes involving stripping of an adhered lamina and subclass 280 for coating subsequent to a laminating step.

**283** This subclass is indented under subclass 256. Processes wherein a coating contains material which crystallizes or solidifies in situ or reagents which precipitate solid matter in situ.

**284** This subclass is indented under subclass 256. Processes wherein only the edge or border of a base is coated.

(1) Note. This subclass includes processes for coating the edges of stacked or rolled sheets.

SEE OR SEARCH THIS CLASS, SUBCLASS:
282, for processes of bordering or edging using a mask.
286, processes of applying stripes to a base.

SEE OR SEARCH CLASS:
156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclass 107 for processes for sealing the edges of laminated glass.

**285** This subclass is indented under subclass 284. Processes wherein the base is either (1) a water laid fibrous material or (2) a body comprising an assembly of interengaged fibers or filaments.

**286** This subclass is indented under subclass 256. Processes wherein the coating is applied in long narrow lines.

(1) Note. The strips are not required to be parallel or straight.

SEE OR SEARCH THIS CLASS, SUBCLASS:
137, for striping or roads or the earth.
282, for application of strips using a mask.

**287** This subclass is indented under subclass 256. Processes wherein the base being coated is metal; glass or a ceramic material.

(1) Note. Attention is directed to the definition of Class 65, Glass Manufacturing, and Class 106, Compositions: Coating or Plastic, for a comprehensive definition of the terms “glass” and “ceramic”.

SEE OR SEARCH THIS CLASS, SUBCLASS:
266, and 269, for nonuniform coating processes wherein a plurality of layers are applied to a metal, glass, or ceramic base.

**288** This subclass is indented under subclass 256. Processes wherein the base being coated is either (1) a water laid fibrous material or (2) a body comprising an assembly of interengaged fibers or filaments.

**289** Processes under the definition wherein a coating step is combined with contacting the base with a solid member to (1) divide the base into plural parts or (2) remove a portion of the base material.

(1) Note. Making holes in or removing part of the base by chemical action is excluded from this subclass.

(2) Note. Sandpaper is considered a solid member for the purposes of this subclass and thus sandpapering the base is provided for here.

(3) Note. Pricking the base with a small needle like device is also provided for here.

(4) Note. Injecting is assumed to involve severing the base and is provided for here, generally in indented subclass 291.

SEE OR SEARCH THIS CLASS, SUBCLASS:
171+, for processes which include stretching the base.
198, for applying a coating of particles to a base and deforming the base.
275+, for processes of forming nonuniform coatings which include deforming the base.

SEE OR SEARCH CLASS:
156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclass 153 for abrading or grinding of lamina.
451, Abrading, subclasses 28+ for a method of abrading, generally.

**290** This subclass is indented under subclass 289. Processes wherein the cutting, holing, abrading, or severing is performed before the base is coated.

**291** This subclass is indented under subclass 290. Processes wherein the base is derived from the trunks or branches of trees or bushes.

(1) Note. Wood particles or fibers which have been chemically changed; e.g., regenerated cellulose etc., or water layed to form a paper, are not considered to be wood.

(2) Note. Injection is assumed to include making a hole in the wood base and therefore injecting is provided for here unless it is clear no hole is made through which the coating material or impregnant enters. If hydraulic pressure is used to force liquid into the pores without utilizing an instrument to make a hole the patent is not here, but in subclasses 440+ below.

**292** This subclass is indented under subclass 290. Processes wherein the substrate is based on an inorganic material.

(1) Note. Attention is directed to the definition of Class 260, Chemistry of Carbon Compounds, for the distinction between the term "organic" and "inorganic".

**293** This subclass is indented under subclass 289. Processes wherein the base is merely cut to length after the coating has been applied.

**294** This subclass is indented under the class definition. Processes wherein the base is treated with a vacuum or subatmospheric pressure before coating or while the coating is being applied.

SEE OR SEARCH THIS CLASS, SUBCLASS:
238, for utilizing a vacuum to coat a hollow article.
248.1+, for vapor deposition of a coating utilizing a vacuum.
350, for vacuum treatment of a coating.

SEE OR SEARCH CLASS:
588, Hazardous or Toxic Waste Destruction or Containment, subclasses 249 through 260 for the use of a vacuum in a coating process to permanently contain hazardous or toxic waste.

**295** This subclass is indented under subclass 284. Processes wherein the base comprises metal in elemental form.

(1) Note. For the scope of the term "base", see the class definition at I, B, 1.

SEE OR SEARCH CLASS:
428, Stock Material or Miscellaneous Articles, subclasses 539.5, 545, and 567 for such materials having interengaged phases of different materials, usually made by impregnation.

**296** This subclass is indented under subclass 294. Processes wherein the substrate is based on an organic material.

(1) Note. Attention is directed to the definition of Class 260, Chemistry of Carbon Compounds for the scope of the term "organic".

**297** This subclass is indented under subclass 296. Processes wherein the base material is derived from the trunks or branches of trees or bushes.

(1) Note. Wood particles or fibers which have been chemically changed; e.g., regenerated cellulose etc., or water layed to form a paper, are not considered to be wood.

**298** This subclass is indented under subclass 297. Processes wherein the coating is creosote, wax, oil, asphalt, or bitument containing.

(1) Note. Included herein are any heavy oil or tar like material with properties similar to those materials specifically set out.

**299** This subclass is indented under the class definition. Processes wherein prior to applying a coating, steps are taken to chemically or physically modify the base.

(1) Note. "Base" is meant to be an uncoated substrate. Pretreating the first coating prior to applying the second coating is not provided for here. Such treating is considered a post-treatment.

(2) Note. Included herein are such operations as washing, cleaning, drying, compressing, heating, etc.

(3) Note. Processes limited to etching for making a base move compatible with or adherent to the coating, wherein the base is the substrate (work) onto which a coating is applied are included.

SEE OR SEARCH THIS CLASS, SUBCLASS:

129, for pretreatment of a base prior to forming a magnetic coating.

154+, for applying a removable protective coating prior to applying the final coating.

223+, for flame contact processes.

333, and 402+, for applying plural solid film forming coatings even though one of said coating may be in the nature of a preparatory treatment.

444, for a pretreating process without a claimed step of applying a coating.

532+, for a pretreatment involving the direct use of electrical, magnetic, or wave energy.

SEE OR SEARCH CLASS:

8, Bleaching and Dyeing; Fluid Treatment and Chemical Modification of Textiles and Fibers, subclasses 137+ and see the notes thereto for certain cleaning processes.

118, Coating Apparatus, subclasses 72+ for coating apparatus combined with means to prepare the base to receive the coating.

510, Cleaning Compositions for Solid Surfaces, Auxiliary Compositions Therefor, or Processes of Preparing the Compositions, for mere methods of use of such compositions claimed along with the cleaning composition, per se.

**300** This subclass is indented under subclass 299. Processes wherein a base is provided with shielding or spacing means to facilitate or prevent coating.

(1) Note. This subclass includes, for example, the coating of one side of a sheet only, by placing or securing two sheets in intimate contact whereby the contacting surfaces remain uncoated, and the coating of shingles in bundle form by employing spacer means therebetween.

(2) Note. This subclass provides for a process which includes applying a masking coating uniformly to one side of a base so that only the other side is coated.

SEE OR SEARCH THIS CLASS, SUBCLASS:

154, for processes of applying removable protective coatings where the coating is not a mask or shield to prevent application of another coating.

272, and 282, for processes of utilizing a mask or stencil to protect selected areas on the same surface.

284+, for processes of coating edges only of stacked sheets or webs.

**301** This subclass is indented under subclass 299. Processes wherein a material is applied to the base which will react with the coating, or promote a reaction or hardening of the coating, when said coating is applied.

SEE OR SEARCH THIS CLASS, SUBCLASS:

333, for applying a plurality of film forming coatings which react with each other.

337+, for applying a chemical agent to an applied coating and also for a process wherein the pretreating chemical agent supplies a substantial part of the final coating.

**302** This subclass is indented under subclass 301. Processes wherein the coating contains a material of the resinous, rubber or hardenable oil type.

(1) Note. Linseed, tung, and other drying oils are considered hardenable, for example.

(2) Note. Paint is assumed to contain latex rubber or linseed oil unless otherwise specified.

(3) Note. Shellac and varnish are examples of natural resins.

**303** This subclass is indented under subclass 302. Processes wherein the base is a carbohydrate material derived from the structural matter of plant life.

**304** This subclass is indented under subclass 301. Processes wherein a base is treated prior to applying a coating which contains metal in elemental form.

**305** This subclass is indented under subclass 304. Processes wherein the coating contains nickel, copper, cobalt, or chromium in elemental form.

SEE OR SEARCH CLASS:
428, Stock Material or Miscellaneous Articles, subclasses 655+ for a metallic composite in which a component has a transition metal base.

**306** This subclass is indented under subclass 305. Processes wherein the coating is based on an organic material.

(1) Note. Attention is directed to the definition of Class 260, Chemistry of Carbon Compounds for the scope of the term "organic".

**307** This subclass is indented under subclass 299. Processes wherein either a portion of the base is removed by contact with a chemical agent or a solvent for the base is absorbed into the base.

(1) Note. This subclass does not provide for processes where the base is merely cleaned of extraneous material or a material which is not a normal part of the base, but does provide for dissolving out of natural fats, oils etc., prior to coating.

(2) Note. Leaching with a solvent or acid is considered etching for this subclass.

(3) Note. This subclass does not provide for pickling unless etching is set forth.

SEE OR SEARCH THIS CLASS, SUBCLASS:
322, and 327+, for cleaning by more than name only of a substrate prior to coating.
336+, for solvent, swelling or washing treatment of a coating.

SEE OR SEARCH CLASS:
216, Etching a Substrate: Processes, appropriate subclasses for processes of etching where the etching is not to perfect a subsequently applied coating, and for processes of etching combined with a coating process where the etching is a manufacturing step and is not intended to improve the adherence of the applied coating to a substrate.

**308** This subclass is indented under subclass 307. Processes wherein the base is a carbohydrate material derived from the structural matter of plant life.

**309** This subclass is indented under subclass 307. Processes wherein the substrate is based on an inorganic material.

(1) Note. This subclass does not include mere pickling unless etching of the base is set forth.

(2) Note. Attention is directed to the definition of Class 260, Chemistry of Carbon Compounds, for the distinction between the term "organic" and "inorganic".

SEE OR SEARCH THIS CLASS, SUBCLASS:
327+, for pickling a metal base prior to coating.

**310** This subclass is indented under subclass 299. Processes wherein a base is treated with a flux prior to coating, usually to prevent the formation of oxides.

SEE OR SEARCH CLASS:
148, Metal Treatment, subclasses 23+ for flux compositions.
228, Metal Fusion Bonding, subclasses 33+ and 203+ for means and process, respectively, of fluxing prior to metallurgical surface bonding; i.e., welding, soldering or brazing.

**311** This subclass is indented under subclass 310. Processes wherein the flux floats on a molten metal coating bath and the base passes through the flux before contacting the molten metal.

**312** This subclass is indented under subclass 311. Processes wherein the coating contains lead or tin in elemental form.

SEE OR SEARCH CLASS:
428, Stock Material or Miscellaneous Articles, subclasses 643+, 645, and 646+ for a metallic composite in which a component has a tin or lead base.

**313** This subclass is indented under subclass 310. Processes wherein the coating contains lead or tin in elemental form.

SEE OR SEARCH CLASS:
428, Stock Material or Miscellaneous Articles, subclasses 643+, 645, and 646+ for a metallic composite in which a component has a tin or lead base.

**314** This subclass is indented under subclass 299. Processes wherein prior to coating the temperature of the base is raised above ambient or liquid is removed from the base.

SEE OR SEARCH THIS CLASS, SUBCLASS:
189+, for heating to fuse a particle coating.
223, for flame contact prior to coating.
226+, for preheating a substrate to decompose a liquid or solid coating material.
248.1+, for preheating a substrate to decompose a gaseous or vapor coating material.
372.2+, for heat treatment of a coating.
591, for coating processes including dielectric heating or induction.
592, for coating processes including resistance heating.
595, for coating processes including infrared heating.

**315** This subclass is indented under subclass 314. Processes wherein the base is preheated with steam.

SEE OR SEARCH THIS CLASS, SUBCLASS:
377, for processes of treating a coating with steam.

**316** This subclass is indented under subclass 314. Processes wherein the substrate being coated is based on an organic material.

(1) Note. Attention is directed to the definition of Class 260, Chemistry of Carbon Compounds for the scope of the term "organic".

**317** This subclass is indented under subclass 316. Processes wherein the base material is derived from the trunks or branches of trees or bushes.

(1) Note. Wood particles or fibers which have been chemically changed, e.g., regenerated cellulose etc., or water layed to form a paper, are not considered to be wood.

**318** This subclass is indented under subclass 314. Processes wherein a base comprising metal in elemental form is heated or dryed prior to coating.

SEE OR SEARCH CLASS:
148, Metal Treatment, appropriate subclasses for processes of heat treating a metal to modify or maintain the internal physical structure (i.e., microstructure) or chemical property of the metal combined with a coating operation. See section III of the Class 427 definition and section III, C, of the Class 148 definition for further clarification.

**319** This subclass is indented under subclass 318. Processes which result in a coating of metal in elemental form on the base.

**320** This subclass is indented under subclass 319. Processes wherein the coating contains aluminum in elemental form.

SEE OR SEARCH CLASS:
428, Stock Material or Miscellaneous Articles, subclasses 650+ for a metallic composite in which a component has an aluminum base.

**321** This subclass is indented under subclass 319. Processes wherein the coating contains zinc in elemental form.

**322** This subclass is indented under subclass 299. Processes wherein the substrate being treated is based on organic material.

(1) Note. Attention is directed to the definition of Class 260, Chemistry of Carbon Compounds for the scope of the term "organic".

SEE OR SEARCH CLASS:
8, Bleaching and Dyeing; Fluid Treatment and Chemical Modification of Textiles and Fibers, appropriate subclasses for chemical modification of textiles and paper and for fluid treatment of textiles.

**323** This subclass is indented under subclass 322. Processes wherein the base contains a natural protein.

(1) Note. Included herein, for example, are silk, wool, hide, leather, fur, hair, etc.

**324** This subclass is indented under subclass 322. Processes wherein the base is a carbohydrate material derived from the structural matter of plant life.

**325** This subclass is indented under subclass 324. Processes wherein the base material is derived from the trunks or branches of trees or bushes.

(1) Note. Wood particles or fibers which have been chemically changed, e.g., regenerated cellulose etc., or water layed to form a paper, are not considered to be wood.

**326** This subclass is indented under subclass 324. Processes wherein the substrate is a water laid fibrous cellulosic material.

**327** This subclass is indented under subclass 299. Processes wherein the base comprises elemental metal.

(1) Note. This and indented subclasses includes pickling unless etching is set forth for subclass 309.

SEE OR SEARCH THIS CLASS, SUBCLASS:
318+, for heating a metal base prior to application of coating material.

SEE OR SEARCH CLASS:
29, Metal Working, subclasses 81.01+ for the removal of scale by scraping, flexing or treatment with water or steam.
134, Cleaning and Liquid Contact With Solids, for metal cleaning or pickling processes in general, including those processes wherein the acid, alkali or detersive material employed contains an oil or lubricant whereby a film of oil or lubricant may be left on the metal surface after the cleaning treatment.
148, Metal Treatment, subclasses 240+ and the definitions thereof for reactive treatment of a metal base.

**328** This subclass is indented under subclass 327. Processes wherein the coating contains metal in elemental form.

SEE OR SEARCH THIS CLASS, SUBCLASS:
191, for metal coatings produced from powdered metal material which is fused or sintered on the substrate after application.
310+, for pretreating with a flux.
319+, for applying a metal coating to a metal base after heat treating the base.

**329** This subclass is indented under subclass 328. Processes wherein the metal coating is applied by immersion of the base in a molten metal bath.

**330** This subclass is indented under subclass 327. Processes wherein a glassy or porcelain enamel like material is applied to the pretreated base.

SEE OR SEARCH THIS CLASS, SUBCLASS:

193, for vitreous coatings produced from powdered vitrifiable material which is fused or sintered on the substrate after application.

**331** This subclass is indented under the class definition. Processes which include applying a coating material to a base and thereafter modifying the coating by changing its chemical or physical characteristics.

(1) Note. Applying a second coating to a first coating wherein no modification of the coatings takes place is not here, but provided for in subclasses 402+. Employing an inert atmosphere above a coating bath is not here, but in subclass 432.

(2) Note. Removal of excess coating material is included herein.

SEE OR SEARCH THIS CLASS, SUBCLASS:

130, for post-treatment of magnetic coatings.

140, for processes directed to the restoration or repairing of coating.

206, for excess removal of particulate or fibrous coating material.

235, for removal of excess coating material from a hollow or cylindrical article.

289, for cutting, holing or severing treatments.

402+, for applying superposed diverse coatings wherein the second coating does not specifically modify the first coating.

444, for post-treatment without a claimed step of applying a coating.

**332** This subclass is indented under subclass 331. Processes in which the coating is treated to overcome or prevent odor.

(1) Note. This subclass provides for a process which includes applying perfume to a coated base.

SEE OR SEARCH CLASS:

422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, subclass 5 for process of deodorizing other than coating.

585, Chemistry of Hydrocarbon Compounds, subclasses 823+ for sorption removal from a hydrocarbon of a chemically undetermined odorant.

**333** This subclass is indented under subclass 331. Processes in which a treating agent, such as a solvent, reactant, hardened or catalyst for one coating is applied as part of a contiguous film forming coating so that plural coatings are formed.

(1) Note. The mere cooperative effect produced by two coatings, such as better corrosion resistance, etc., is not considered treatment for the purposes of this subclass. One of the film forming coatings has to cause a change to take place in the other film forming coating for placement in this subclass.

(2) Note. The temperature of one coating affecting another coating is not considered enough for placement in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

301+, for applying an agent to a base before coating it wherein the agent does not form a permanent coating.

336+, for applying a solvent which does not form a film.

337+, for applying a chemical agent which does not form a film.

402, for applying coatings in which one coating does not include a treating agent for another coating.

**334** This subclass is indented under subclass 331. Processes wherein the coating is contacted by an oil or by a wax to treat the coating.

(1) Note. The oil usually floats on top of a molten metal coating bath and the base is withdrawn through the oil. The base also contacts the oil when being dipped into the bath, but the purpose of the oil is for post-treatment and not pretreatment.

(2) Note. The oil or wax must be used to treat the coating and not intended to be a second coating.

SEE OR SEARCH THIS CLASS, SUBCLASS:

416, for applying plural diverse coatings wherein one coating contains wax.

417+, for applying plural diverse coatings wherein one coating contains oil.

**335** This subclass is indented under subclass 331. Processes wherein a solvent in vapor form is employed to treat the coating.

(1) Note. Utilizing a solvent vapor zone above a coating bath is provided for here.

**336** This subclass is indented under subclass 331. Processes which includes applying a chemical agent capable of dissolving or being absorbed into the applied coating.

(1) Note. For classification here the solvent must be employed to treat the whole coating and not merely to clean it or dissolve out only a constituent.

SEE OR SEARCH THIS CLASS, SUBCLASS:

335, for treating a coating with a solvent vapor.

352+, for utilizing a liquid solvent to extract only a constituent of a coating or to clean a coating.

372.2+, for heating or drying a coating which included a solvent when it was applied.

SEE OR SEARCH CLASS:

156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclass 83 for swelling of a lamina.

264, Plastic and Nonmetallic Article Shaping or Treating: Processes, particularly subclasses 341 and 343 for processes of solvent polishing or swelling shaped or solid articles.

**337** This subclass is indented under subclass 331. Processes in which a coating is treated with a chemical agent to modify the coating.

(1) Note. Chemical agents which themselves form a permanent coating are not considered treating agents.

(2) Note. Utilizing a specific atmosphere to prevent a coating from undergoing a change; e.g., reducing to prevent oxidation, is not considered treating.

(3) Note. This subclass provides for applying a first material and thereafter applying a second material which reacts with the first material to form a coating.

SEE OR SEARCH THIS CLASS, SUBCLASS:

246, for forming a foraminous product by jelling or coagulating the coating.

248.1+, for treating a coating with a gas wherein part of the gas becomes part of the final coating.

332, where the treatment functions to deodorize the coating.

333, where the treating agent is applied with a film forming material to form plural coatings.

336, for solvent, swelling or washing treatment of a coating.

377, for process of heating or drying a coating in a modified atmosphere.

**338** This subclass is indented under subclass 337. Processes wherein the coating is a protein or protein derivative.

**339** This subclass is indented under subclass 337. Processes wherein the coating is a carbohydrate material derived from the structural matter of plant life.

**340** This subclass is indented under subclass 337. Processes wherein the coating contains (1) a material of the resinous, rubber or hardenable

oil type or (2) a substance which precedes the formation of a material as set forth in (1).

(1) Note. Linseed, tung, and other drying oils are considered hardenable, for example.

(2) Note. Paint is assumed to contain latex rubber or linseed oil unless otherwise specified.

(3) Note. Shellac and varnish are examples of natural resins.

**341** This subclass is indented under subclass 340. Processes wherein the treating agent is based on inorganic material.

(1) Note. Attention is directed to the definition of Class 260, Chemistry of Carbon Compounds, for the distinction between the term "organic" and "inorganic".

**342** This subclass is indented under subclass 340. Processes wherein the base is either (1) formed by a textile operation or (2) a carbohydrate material derived from the structural matter of plant life.

(1) Note. Textile operations include, for example, weaving, knitting, braiding, twisting, needling, etc.

**343** This subclass is indented under subclass 337. Processes wherein the coating being treated is based on inorganic material.

(1) Note. Attention is directed to the definition of Class 260, Chemistry of Carbon Compounds, for the distinction between the term "organic" and "inorganic".

**344** This subclass is indented under subclass 343. Processes wherein the inorganic coating comprises a silicon containing compound.

**345** This subclass is indented under subclass 331. Processes wherein excess coating material is recirculated to the place of application or where the excess coating material is regenerated.

SEE OR SEARCH THIS CLASS, SUBCLASS:

331, where the excess coating material is recovered or removed, but recirculation or regeneration of the coating material is not defined.

346+, for removal of excess coating material by moving the coated base where neither recirculation nor regeneration is set forth.

355+, for removal of excess coating material with a solid member where recirculation or regeneration is not set forth.

SEE OR SEARCH CLASS:

118, Coating Apparatus, subclasses 61 and 600+ for coating apparatus with means to treat the coating material.

**346** This subclass is indented under subclass 331. Processes wherein the coated work or article is moved in a certain position or direction, or is given a particular motion (i.e., vibrated, rotated, etc.), to distribute the applied coatings, remove excess coating or otherwise treat the coated product.

(1) Note. This subclass provides for rotation of the base wherein the force of gravity acts to spread the coating material. However if the base is rotated fast enough so that centrifugal force distributes the coating material the process is in subclasses 240+ above.

SEE OR SEARCH THIS CLASS, SUBCLASS:

232, for processes where a hollow article is rotated to remove excess coating material.

240, for treatment of a coating by means of centrifugal force.

331, for processes wherein a coated article is positioned in a rack to drain, but is not moved in a specified manner.

335, for application of a coating by rumbling or tumbling.

600, for use of sonic or ultrasonic vibration.

SEE OR SEARCH CLASS:

118, Coating Apparatus, subclasses 56+, for apparatus for manipulating work

after coating to distribute or remove excess coating.

**347** This subclass is indented under subclass 346. Processes wherein a coating containing metal in elemental form is treated.

SEE OR SEARCH THIS CLASS, SUBCLASS:
241, for treatment of a metal coated article by centrifugal force.

**348** This subclass is indented under subclass 331. Processes wherein the coating is treated with a gas jet or blast so that the force of the gas modifies the coating.

(1) Note. This subclass does not include processes wherein the coated article is treated by or in an atmosphere or gas which does not apply a physical force to the coated article. Merely drying with a jet of air is not provided for here. Such processes are classified according to the process employed.

SEE OR SEARCH THIS CLASS, SUBCLASS:
223, for flame contact after coating.
377+, for drying by gas movement where the physical force of the gas is not relied on to directly treat the coating.

SEE OR SEARCH CLASS:
118, Coating Apparatus, subclasses 62 and 63 for coating apparatus including means to treat the coated work by gas blast.

**349** This subclass is indented under subclass 348. Processes wherein a coating which contains metal in elemental form is treated.

**350** This subclass is indented under subclass 331. Processes which include utilizing vacuum or reduced pressure during the post-treatment.

SEE OR SEARCH THIS CLASS, SUBCLASS:
238, for utilizing a vacuum or reduced pressure in a process of coating a hollow article.
294, for utilizing a vacuum or reduced pressure prior to or during a coating process.

SEE OR SEARCH CLASS:
118, Coating Apparatus, subclass 50 for coating apparatus having a vacuum chamber.

**351** This subclass is indented under subclass 350. Processes wherein the base material is derived from the trunks or branches of trees or bushes.

(1) Note. Wood particles or fibers which have been chemically changed; e.g., regenerated cellulose etc., or water layed to form a paper, are not considered to be wood.

**352** This subclass is indented under subclass 331. Processes which include extracting a constituent of the applied coating material with a liquid or cleaning the coating.

(1) Note. Washing which is set forth as being merely to cool or heat the coating is excluded from this subclass and is provided for in subclasses 372.2+ or 374.1+, respectively.

SEE OR SEARCH THIS CLASS, SUBCLASS:
337+, for a process which includes applying a chemical agent to a coated base wherein said agent reacts with an undesired part of the coating to facilitate its removal.
355+, for processes wherein a solid treating member or material acts to remove excess coating material, but does not absorb solvent.
372.2+, for washing a coating merely to heat it.
374.1+, for washing a coating merely to cool it.

SEE OR SEARCH CLASS:
118, Coating Apparatus, subclass 109 for coating apparatus including an absorbent or porous mass or pad member acting on the coating after application.

**353** This subclass is indented under subclass 352. Processes which include utilizing relatively pure water in the post-treatment.

(1) Note. In a process which sets forth that the coating is washed, without disclosing what it is washed with, it is assumed the washing agent is water.

(2) Note. An aqueous solution of something used to wash the coating is not provided for in this subclass.

**354** This subclass is indented under subclass 353. Processes wherein the coating is dryed after it has been treated with water.

**355** This subclass is indented under subclass 331. Processes wherein the post-treatment is performed by contacting the coating with a solid member or solid material.

(1) Note. This subclass and indented subclasses do not include the use of a solid treating member submerged in coating material in which the base is immersed or through which it passes.

(2) Note. The coating may be buffed, smoothed, wiped, or polished, etc.

(3) Note. This subclass and indented subclasses provides for removing excess coating material with a solid member or solid material.

SEE OR SEARCH THIS CLASS, SUBCLASS:
60, for post-treatment of a coated welding rod with a solid treating member.

SEE OR SEARCH CLASS:
118, Coating Apparatus, subclasses 100+ for coating apparatus including a solid member or material acting on the coating after application.

**356** This subclass is indented under subclass 355. Processes wherein the solid treating member is a die, blade or sharp edged tool.

(1) Note. This subclass will take coating processes in which the coating material is applied directly ahead of a knife or blade, that is “knife coating”.

(2) Note. For classification here the edge of the blade must be utilized to treat the coating. If a thin curved member is employed to smooth the coating by contacting the coating with a curved surface of the member classification is not here even if the curved member is considered a blade.

SEE OR SEARCH THIS CLASS, SUBCLASS:
289, for processes including cutting, holing or severing.

SEE OR SEARCH CLASS:
118, Coating Apparatus, subclass 125 for coating apparatus including die passage.

**357** This subclass is indented under subclass 356. Processes wherein a coating containing metal in elemental form is treated.

**358** This subclass is indented under subclass 356. Processes wherein the coating is based on an organic material.

(1) Note. Attention is directed to the definition of Class 260, Chemistry of Carbon Compounds, for the scope of the term “organic”.

**359** This subclass is indented under subclass 355. Processes wherein the solid treating member is generally circular in cross section and designed to rotate about an internal axis.

(1) Note. This subclass includes rotary wipers, but not rotary brushes. For rotary brushes see subclass 368 below.

SEE OR SEARCH THIS CLASS, SUBCLASS:
139, for applying a coating and rolling it to make a road surface.
242, for coating processes including rumbling or tumbling.
428.01 through 428.21, for processes of coating by roller application of coating material.

SEE OR SEARCH CLASS:
118, Coating Apparatus, subclasses 110+ for coating apparatus including a rotary member acting on the coating after application.

**360** This subclass is indented under subclass 359. Processes wherein a coating containing metal in elemental form is treated.

**361** This subclass is indented under subclass 359. Processes wherein the base is a water laid fibrous sheet.

(1) Note. This subclass provides for calendering coated paper, etc.

SEE OR SEARCH CLASS:
162, Paper Making and Fiber Liberation, subclass 136 for treatment of coated paper.

**362** This subclass is indented under subclass 361. Processes wherein the coated paper is set while in contact with a casting surface such as a cylinder or drum.

**363** This subclass is indented under subclass 361. Processes wherein the paper base is coated with a wax or oil containing coating.

(1) Note. Materials such as heavy hydrocarbon, tars, etc., having properties similar to wax or oil are included in this subclass.

**364** This subclass is indented under subclass 361. Processes wherein the coating being treated contains casein or starch.

**365** This subclass is indented under subclass 359. Processes wherein the coating is treated by the action of a pair of cylindrical members, which each rotates about a longitudinal axis through itself, while passing therebetween.

**366** This subclass is indented under subclass 365. Processes which include heating the coating before, after, or during treatment with the roller, drum, or cylinder.

SEE OR SEARCH THIS CLASS, SUBCLASS:
194, for hot rolling a coating of particles to form a smooth coating.

**367** This subclass is indented under subclass 355. Processes wherein a free metal coating is treated.

SEE OR SEARCH THIS CLASS, SUBCLASS:
357, and 360, for treatment with certain solid treating members.

**368** This subclass is indented under subclass 355. Processes wherein the solid treating member comprises bristles secured to a support.

(1) Note. Rotary brushes are included in this subclass.

**369** This subclass is indented under subclass 355. Processes wherein the solid treating member applies pressure to the coating.

SEE OR SEARCH THIS CLASS, SUBCLASS:
238, for processes wherein pressure is used in coating a hollow or cylindrical article.
331, for processes wherein hydraulic or gaseous pressure is employed to post-treat a coating.
355, for processes wherein wiping, smoothing, polishing, sanding etc., alone is defined even though some pressure is inherent.
356, for processes wherein pressure is applied by a die.
359+, especially 361+, for processes wherein pressure is applied by rollers.

SEE OR SEARCH CLASS:
100, Presses, subclasses 35+ for methods of pressing not elsewhere classified.

**370** This subclass is indented under subclass 369. Processes wherein heat and pressure are employed together.

SEE OR SEARCH THIS CLASS, SUBCLASS:
366, for a process wherein a heated roller is utilized to post-treat the coating.

SEE OR SEARCH CLASS:
118, Coating Apparatus, subclass 60 and 101 for coating apparatus including heated treating members.

**371** This subclass is indented under subclass 355. Processes in which the substrate is based on an organic material.

(1) Note. Attention is directed to the definition of Class 260, Chemistry of Carbon Compounds, for the scope of the term "organic".

**372.2 Heating or drying (e.g., polymerizing, vulcanizing, curing, etc.):**
This subclass is indented under subclass 331. Processes wherein the temperature of the coating is raised above ambient or the moisture content of the coating is reduced.

SEE OR SEARCH THIS CLASS, SUBCLASS:
224, for contacting a coating with flame.
226+, for heat decomposition of a coating.
246, for coagulating a microporous coating.
366, and 370, for pressure and heat treating a coating.
591, for dielectric heating.
592, for resistance heating.
595, for infrared or radiant heating.

SEE OR SEARCH CLASS:
148, Metal Treatment, appropriate subclasses for processes of heat treating a metal to modify or maintain the internal physical structure (i.e., microstructure) or chemical property of the metal combined with a coating operation. See the Class 427 definition, References to Other Classes, and the Class 148 definition, Lines With Other Clsases, Chemcial Coating, Cleaning, tching, etc." for further clarification.

**373** This subclass is indented under subclass 372.2. Processes wherein the coating is caused to foam or wherein bubbles or cells are formed in the coating during heating or drying.

SEE OR SEARCH THIS CLASS, SUBCLASS:
244, and 245+, for the formation of microporous coatings.

SEE OR SEARCH CLASS:
156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclasses 77+ for pore forming or foaming a lamina in situ.
521, Synthetic Resins or Natural Rubbers, subclasses 51+ for pore-forming, per se, in a synthetic resin or natural rubber composition.

**374.1 And cooling:**
This subclass is indented under subclass 372.2. Processes wherein a positive cooling step is set forth in addition to the heating or drying.

(1) Note. This subclass excludes processes in which cooling is merely inherent and no cooling step is defined (e.g., allowing to cool, permitting to cool to room temperature, etc.).

SEE OR SEARCH CLASS:
118, Coating Apparatus, subclass 69 for coating apparatus including cooling means.
156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclass 80 for surface bonding with refrigeration or freezing.

**374.2 Heating after cooling:**
This subclass is indented under subclass 374.1. Processes wherein a heating step takes place after the positive cooling step.

**374.3 Without intervening coating step:**
This subclass is indented under subclass 374.2. Processes wherein a coating is not applied between the positive cooling step and the subsequent heating step.

**374.4 Fused or molten coating cooled:**
This subclass is indented under subclass 374.1. Processes wherein the coating which is cooled is molten or heat fused.

**374.5 Liquid or solid cooling medium:**
This subclass is indented under subclass 374.4. Processes wherein heat is transferred from the coating through a medium which is in solid or liquid form.

**374.6 Vacuum, vapor, or gas other than air utilized:**
This subclass is indented under subclass 374.4. Processes wherein the cooling takes place in a vacuum or the cooling medium is a gas other than air.

**374.7 Vitreous or glazed coating:**
This subclass is indented under subclass 374.4. Processes wherein the coating is glass or glasslike.

SEE OR SEARCH THIS CLASS, SUBCLASS:
193, for forming a vitreous coating by applying solid vitrifiable particles to a base and treating the particles to form a glass or glasslike coating.

**375** This subclass is indented under subclass 372.2. Processes wherein the coating is fused or softened by heating.

SEE OR SEARCH THIS CLASS, SUBCLASS:
189+, for the fusion of coatings applied as particles.

**376.1 Inorganic coating:**
This subclass is indented under subclass 375. Processes wherein the coating is based on inorganic material.

(1) Note. Attention is directed to the definitions of Class 260, Chemistry of Carbon Compounds, for the distinction between the term “organic” and “inorganic”.

SEE OR SEARCH THIS CLASS, SUBCLASS:
189+, for fusion of inorganic solid particles which have been applied to a base to form a coating.

**376.2 Metal oxide- or silicon-containing coating (e.g., glazed, vitreous enamel, etc.):**
This subclass is indented under subclass 376.1. Processes wherein the inorganic coating contains silicon or a metal oxide.

SEE OR SEARCH THIS CLASS, SUBCLASS:
190, for fusion of solid metallic compound particles which have been applied to a base to form a coating.

**376.3 Metal-containing coating (e.g., cermet, etc.):**
This subclass is indented under subclass 376.2. Processes wherein the coating material also contains metal in elemental form.

**376.4 Metal base:**
This subclass is indented under subclass 376.2. Processes wherein the base comprises metal in elemental form.

**376.5 Ferrous base:**
This subclass is indented under subclass 376.4. Processes wherein the base comprises ferrous metal.

**376.6 Metal-containing coating:**
This subclass is indented under subclass 376.1. Processes wherein the coating contains metal in elemental form.

SEE OR SEARCH THIS CLASS, SUBCLASS:
191+, for fusion of solid metal particles which have been applied to a base to form a coating.

**376.7 Coating consists of metal:**
This subclass is indented under subclass 376.6. Processes wherein the coating material contains nothing except the metal in elemental form.

**376.8 Metal base:**
This subclass is indented under subclass 376.7. Processes wherein the base comprises metal in elemental form.

**377** This subclass is indented under subclass 372.2. Processes wherein the atmosphere in which the coating is heat treated or dried is modified physically as by movement or includes a chemical composition or gas mixture other than the ambient air.

(1) Note. Utilizing air to which humidity has been added or removed is included in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:
350+, for post-treating a coating in a vacuum at a reduced pressure.

**378** This subclass is indented under subclass 377. Processes wherein the atmosphere moves in a defined manner.

SEE OR SEARCH THIS CLASS, SUBCLASS:
348+, for mechanically treating a coating by the force of a blast of gas or air.

**379** This subclass is indented under subclass 372.2. Processes which include a plurality of heating or drying steps.

(1) Note. This subclass provides for a process which includes a single heating step and a single different drying step.

**380** This subclass is indented under subclass 379. Processes wherein the coating being treated contains free metal or a metallic compound.

**381** This subclass is indented under subclass 379. Processes wherein the base is either (a) formed by a textile operation or (b) a carbohydrate material derived from the structural matter of plant life.

(1) Note. Textile operations includes, for example, weaving, knitting, braiding, twisting, needling, etc.

**382** This subclass is indented under subclass 381. Processes wherein the base is either a carbohydrate material derived from the structural matter of plant life or a water laid fibrous material.

**383.1 Metal coating:**
This subclass is indented under subclass 372.2. Processes wherein a coating containing metal in elemental form is treated.

SEE OR SEARCH THIS CLASS, SUBCLASS:
191, for processes wherein metal particles are fused to form a coating.
224, for processes wherein a metal coating is treated by flame contact.
229, for processes wherein a nonmetallic coating is decomposed by heat to form a metal coating.

**383.3 Inorganic base:**
This subclass is indented under subclass 383.1. Processes wherein the base comprises inorganic material.

**383.5 Fused oxide-containing base (e.g., ceramic, glass, etc.):**
This subclass is indented under subclass 383.3. Processes wherein the base contains fused oxide material.

**383.7 Metal base:**
This subclass is indented under subclass 383.3. Processes wherein the base contains metal in elemental form.

SEE OR SEARCH CLASS:
148, Metal Treatment, appropriate subclasses for processes of heat treating a metal to modify or maintain the internal physical structure (i.e., microstructure) or chemical property of metal combined with a coating operation. Since a diffusion may be involved in a coating operation involving metal and diffusion involves the microstructure of metal, per se, coating operations (i.e., other than reactive coating operations) go as original in Class 427 if the specified diffusion occurs during the coating step. However, a heat treatment step of the solid metal, independent of the

coating step which causes diffusion to affect the micro structure of the metal goes as original to Class 148.

**384** This subclass is indented under subclass 372.2. Processes wherein the coating is based on organic materials.

(1) Note. Attention is directed to the definition of Class 260, Chemistry of Carbon Compounds, for the scope of the term, "organic".

**385.5 Resin, resin precursor, rubber, or hardenable oil-containing coating:**
This subclass is indented under subclass 384. Processes wherein the coating contains (a) a material of the resinous, rubber, or hardenable oil type, or (b) a substance which precedes the formation of a material as set forth in (a).

(1) Note. Linseed, tung, and other drying oils are considered hardenable, for example.

(2) Note. Paint is assumed to contain latex rubber or linseed oil unless otherwise specified.

(3) Note. Shellac and varnish are examples of natural resins.

(4) Note. Polymeric compounds are considered resins for the purposes of this subclass.

**386** This subclass is indented under subclass 385.5. Processes wherein the coating contains a polyepoxide or epoxy resin.

**387** This subclass is indented under subclass 385.5. Processes wherein the coating includes a silicon containing compound.

**388.1 Metal base:**
This subclass is indented under subclass 385.5. Processes wherein the base comprises metal in elemental form.

**388.2 Cross-linked or infusible coating:**
This subclass is indented under subclass 388.1. Processes wherein the applied coating, after post-treatment, is in a cross-linked or infusible state.

(1) Note. This subclass provides for applying a coating and treating it to cause it to become thermoset.

**388.3 Aldehyde-containing precursor:**
This subclass is indented under subclass 388.2. Processes wherein the coating material applied contains or liberates an aldehyde.

(1) Note. Urea formaldehyde and phenol formaldehyde are examples of resultant coatings formed by heating the applied coating material.

**388.4 Water-containing coating (i.e., aqueous dispersion, emulsion, or solution):**
This subclass is indented under subclass 388.1. Processes wherein the coating material contains water.

**388.5 Nonaqueous dispersion:**
This subclass is indented under subclass 388.1. Processes wherein the coating material is a nonaqueous dispersion.

**389** This subclass is indented under subclass 385.5. Processes wherein the base contains protein.

(1) Note. Included herein are materials such as wool, leather, fur, hide, silk, etc.

**389.7 Glass base:**
This subclass is indented under subclass 385.5. Processes wherein the base comprises glass.

(1) Note. Attention is directed to the definition of Class 65, Glass Manufacturing, for a comprehensive definition of the term "glass".

**389.8 Fiberglass base:**
This subclass is indented under subclass 389.7. Processes wherein the glass base is in fiber or textile form.

**389.9 Textile or cellulose base:**
This subclass is indented under subclass 385.5. Processes wherein the base is either (a) formed by a textile operation, or (b) a carbohydrate material derived from the structural matter of plant life.

(1) Note. Textile operations include, for example, weaving, knitting, braiding, twisting, needling, etc.

**391** This subclass is indented under subclass 389.9. Processes wherein the substrate is a water laid fibrous material.

**392** This subclass is indented under subclass 389.9. Processes wherein the base is a cellulose material which has not been chemically modified.

(1) Note. Included herein are materials such as cotton and wood fibers, etc.

**393** This subclass is indented under subclass 392. Processes wherein the base material is derived from the trunks or branches of trees or bushes.

(1) Note. Wood particles or fibers which have been chemically changed, e.g., regenerated cellulose etc., or water layed to form a paper, are not considered to be wood.

**393.1 Antistatic properties increased:**
This subclass is indented under subclass 389.9. Processes wherein the applied coating increases the antistatic properties of the treated base.

**393.2 Wrinkle resistance or crease holding properties increased:**
This subclass is indented under subclass 389.9. Processes wherein the flame resistant property of the base is increased.

**393.3 Flame resistance increased:**
This subclass is indented under subclass 389.9. Processes wherein the flame resistant property of the base is increased.

**393.4 Antisoiling or water repellency increased:**
This subclass is indented under subclass 389.9. Processes wherein the property of the base to resist soiling or to repel water is increased.

**393.5 Resin, rubber, or elastomer base:**
This subclass is indented under subclass 385.5. Processes wherein the base comprises resin, rubber, or elastomer.

**393.6 Asbestos, ceramic, concrete, or masonry base:**
This subclass is indented under subclass 385.5. Processes wherein the base comprises asbestos, ceramic, concrete, or a masonry material.

**394** This subclass is indented under subclass 384. Processes wherein the base is either (1) formed by a textile operation or (2) a carbohydrate material derived from the structural matter of plant life.

(1) Note. Textile operations includes, for example, weaving, knitting, braiding, twisting, needling, etc.

SEE OR SEARCH THIS CLASS, SUBCLASS:
389.9+, for coating a textile or cellulosic base with a resin or rubber containing coating.

**395** This subclass is indented under subclass 394. Processes wherein the base is a water laid fibrous material.

**396** This subclass is indented under subclass 394. Processes wherein the base is a cellulose material which has not been chemically modified.

(1) Note. Included herein are materials such as cotton and wood fibers, etc.

**397** This subclass is indented under subclass 396. Processes wherein the base material is derived from the trunks or branches of trees or bushes.

(1) Note. Wood particles or fibers which have been chemically changed; e.g., regenerated cellulose etc., or water layed to form a paper, are not considered to be wood.

**397.7 Inorganic silicon-containing coating:**
This subclass is indented under subclass 372.2. Processes wherein the resultant coating comprises inorganic silicon.

SEE OR SEARCH THIS CLASS, SUBCLASS:
384+, especially subclass 387, for processes in which the resultant coating comprises organic silicon.

**397.8 Alkali silicate:**
This subclass is indented under subclass 397.7. Processes wherein the resultant coating is an alkali silicate.

(1) Note. The coating before treatment may contain an organic silicate, such as alkyl silicate, but for classification here such must be present merely as a precursor for the ultimate inorganic silicate.

**398.1 Cooling:**
This subclass is indented under subclass 331. Processes wherein a positive step is set forth.

(1) Note. This subclass excludes processes in which cooling is merely inherent and no positive cooling step is defined; e.g., allowing to cool, permitting to cool to room temperature, etc., are not provided for here.

SEE OR SEARCH THIS CLASS, SUBCLASS:
374.1, for cooling and heating or drying.

**398.2 Utilizing solid member contacting base or coating (e.g., cooling roller, etc.):**
This subclass is indented under subclass 398.1. Processes wherein the cooling is accomplished by use of a solid member contacting the base or the coating.

(1) Note. For classification here the temperature of the solid member does the treating rather than the pressure, friction, buffing, wiping, etc.

(2) Note. The solid cooling member may contact the base on the side opposite the coating.

SEE OR SEARCH THIS CLASS, SUBCLASS:
355+, for contacting a coating with a solid member wherein the solid characteristics of the member treat the coating such as in buffing, smoothing, wiping, polishing, etc.

**398.3 Liquid utilized (e.g., quenching, spraying, etc.):**
This subclass is indented under subclass 398.1. Processes wherein the cooling treatment is accomplished by means of a liquid medium.

**398.4 Vacuum, vapor, or gas other than air utilized:**
This subclass is indented under subclass 398.1. Processes wherein the cooling is accomplished in a vacuum or other nonatmospheric environment, or with a gas or vapor other than air.

SEE OR SEARCH THIS CLASS, SUBCLASS:
294, for processes which include treating the base with a vacuum prior to or during coating.

**398.5 Movement of atmosphere:**
This subclass is indented under subclass 398.1. Processes wherein the atmosphere is moved in a defined manner to cool the coating.

**399** This subclass is indented under the class definition. Processes wherein a nonmetal base reacts with an applied material to form a coating of the reaction product.

SEE OR SEARCH THIS CLASS, SUBCLASS:
226+, for heat decomposition of a base.
227, processes wherein a coating is formed by carbonizing or charring a base.
248.1+, for reacting a gas with a nonmetallic base for form a coating.
301+, processes including a reaction between a coating and a preapplied chemical agent.
333, processes including a reaction between two coatings.
337+, processes including a reaction between a coating and a subsequently applied chemical agent.

SEE OR SEARCH CLASS:
8, Bleaching and Dyeing; Fluid Treatment and Chemical Modification of Textiles and Fibers, subclasses 115.51+ for the treatment of textiles and paper wherein the textile or paper base supplies a part or all of the coating and subclasses 94.1+ for the treat-

ment of hides, skin, feathers, and animal tissues, wherein the base supplies a part or all of the coating.

148, Metal Treatment, particularly subclasses 240+, for applying a material to a metal base wherein the material and metal base react to form a coating of the reaction product.

**400** This subclass is indented under subclass 399. Processes wherein the base which supplies part of the coating contains a resinous or rubber type material.

(1) Note. This subclass provides for a process of graft polymerization if is clear that only a portion of the base is polymerized to form a coating on the part of the base which is not polymerized.

SEE OR SEARCH CLASS:

520, Synthetic Resins or Natural Rubbers, particularly Class 525 for processes of graft or graft-type polymerization wherein there is no clear disclosure that the resultant product is composed of distinct layers.

**401** This subclass is indented under the class definition. Processes combined with a step which is, per se, (1) not provided for in this class and which (2) performs a function other than that utilized to perfect the coating.

(1) Note. A process wherein dye or pigment is mixed with coating material before application to the base is not considered a combined operation for this subclass, but is provided for in other subclasses of this class according to other features of the process. Class 8 provides for the combination of coating and dyeing.

SEE OR SEARCH THIS CLASS, SUBCLASS:

8+, for coating and measuring, testing, or indicating.

171+, for coating and stretching or tensioning.

177, for coating and winding, balling, rolling, or coiling.

289+, for coating and cutting, holing, or severing.

299+, for coating and pretreating the base.

331, for coating and post-treatment of the coating or coating material.

457+, for coating and direct application of electrical, magnetic, or wave energy.

SEE OR SEARCH CLASS:

8, Bleaching and Dyeing; Fluid Treatment and Chemical Modification of Textiles and Fibers, for coating combined with dyeing.

**402** This subclass is indented under the class definition. Processes which include applying a plurality of dissimilar coating materials in superposed relationship on a base or applying diverse coating material to the coating on a previously coated base.

(1) Note. Coatings which contain essentially the same ingredients, but in different proportions are considered to be different coating materials.

(2) Note. Impregnation is considered coating even where a distinct surface coat is not formed.

(3) Note. Processes for applying several coats or layers of the same material are not provided for here and are classified in appropriate subclasses elsewhere in this class.

(4) Note. Processes of applying a different coating to a previously coated article are classified in this and the indented subclasses as processes of applying different coatings.

SEE OR SEARCH THIS CLASS, SUBCLASS:

131, for applying a plurality of coatings where at least one has magnetic properties.

152, for applying plural coats to form a transfer or copy sheet.

154, for application of a removable protective coating which may be applied with or without a subsequently applied coating.

196, 201 and 202+, for applying plural coats where at least one is particles or fibers.

214, for applying plural coats or particles.

258+, for applying plural coats where at least one is nonuniform.
301+, for pre-applying a reaction promoter or hardener and subsequently applying coating material.
333, and 337+, coating plus subsequently applying an agent to treat the coating.

SEE OR SEARCH CLASS:
148, Metal Treatment, subclasses 240+, for coating a metal base with plural coatings where the metal base supplies a constituent to one of the coatings.
205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, subclasses 183+, 188+, 191+, and 198+ for applying plural coatings wherein at least one is applied by an electrolytic method.
428, Stock Material or Miscellaneous Articles, subclass 547 for a metallic composite having metal particles and differentially porous components, and subclasses 621+ for a metallic composite having an additional nonmetal component.

**403** This subclass is indented under subclass 402. Processes wherein at least one of the coatings contains settable inorganic cementlike material.

**404** This subclass is indented under subclass 402. Processes wherein at least one coating contains metal in elemental form.

**405** This subclass is indented under subclass 404. Processes wherein the base is metal in elemental form.

**406** This subclass is indented under subclass 405. Processes wherein zinc is the elemental metal in the coating.

SEE OR SEARCH CLASS:
428, Stock Material or Miscellaneous Articles, subclass 658 for a metallic composite in which a component has a zinc base.

**407.1 Synthetic resin coating:**
This subclass is indented under subclass 402. Processes wherein at least one of the coatings contains a synthetic resin.

(1) Note. For the scope of expression "synthetic resin", see the definition of subclass 520, Synthetic Resins or Natural Rubbers, and the notes thereto.

**407.2 Glass base:**
This subclass is indented under subclass 407.1. Processes wherein the base comprises glass.

(1) Note. Attention is directed to the definitions of Class 65, Glass Manufacturing, for a comprehensive definition of the term "glass".

**407.3 Fiberglass base:**
This subclass is indented under subclass 407.2. Processes wherein the glass base is in fiber or textile form.

**408** This subclass is indented under subclass 407.1. Processes wherein the base material is derived from the trunks or branches of bushes.

(1) Note. Wood particles or fibers which have been chemically changed, e.g., regenerated cellulose etc., or water layed to form a paper, are not considered to be wood.

**409** This subclass is indented under subclass 407.1. Processes wherein the base is metal in elemental form.

**410** This subclass is indented under subclass 409. Processes wherein at least one coating comprises an epoxy resin or a polyepoxide.

**411** This subclass is indented under subclass 407.1. Processes wherein the substrate is a water laid fibrous material.

**412** This subclass is indented under subclass 407.1. Processes wherein the base is either the tanned skin of an animal or a body comprising an assembly of interengaged fibers or filaments.

**412.1 Nonfibrous organic base:**
This subclass is indented under subclass 407.1. Processes wherein the base comprises organic material in nonfibrous form.

**412.2 Cellulose derivative base:**
This subclass is indented under subclass 412.1. Processes wherein the base is a cellulosic derivative.

**412.3 Polyolefin base:**
This subclass is indented under subclass 412.1. Processes wherein the base comprises a polyolefin.

(1) Note. This subclass provides for coating polyethylene, etc.

**412.4 Halogen-containing resin base:**
This subclass is indented under subclass 412.1. Processes wherein the base comprises halogen-containing resin.

**412.5 Polyester or alkyd resin base:**
This subclass is indented under subclass 412.1. Processes wherein the base comprises polyester or alkyd resin.

**413** This subclass is indented under subclass 402. Processes wherein at least one of the coatings contains natural rubber or a derivative thereof such as, for example, halogenated rubber.

SEE OR SEARCH THIS CLASS, SUBCLASS:
407.1+, for coatings containing synthetic rubber.

**414** This subclass is indented under subclass 402. Processes wherein at least one of the coatings contains a protein or derivative thereof.

**415** This subclass is indented under subclass 402. Processes wherein at least one coating contains a carbohydrate material derived from the structural matter of plant life or a derivative of such carbohydrate material.

(1) Note. Coatings containing a cellulose ester or ether or regenerated cellulose, etc., are provided for here.

**416** This subclass is indented under subclass 402. Processes wherein at least one coating contains a wax.

(1) Note. Included herein are any material generally referred to in the art as wax whether natural or synthetic.

**417** This subclass is indented under subclass 402. Processes wherein at least one coating contains natural resin, oil, or fat.

(1) Note. Shellac and varnish are considered to contain natural resins unless it is set forth they are made from synthetic resins.

(2) Note. Paints are assumed to contain oil unless described as being latex paint.

**418** This subclass is indented under subclass 417. Processes wherein at least one coating contains a metallic compound.

**419.1 Metallic compound-containing coating:**
This subclass is indented under subclass 402. Processes wherein at least one coating contains a metallic compound.

SEE OR SEARCH THIS CLASS, SUBCLASS:
403+, for applying plural coatings wherein at least one coating contains a settable inorganic cement-like material which contains a metallic compound.
418, for applying plural coatings wherein at least one coating contains resin, oil, or fat and at least one coating contains a metallic compound.

**419.2 Oxide-containing coating:**
This subclass is indented under subclass 419.1. Processes wherein at least one coating contains a metallic oxide.

**419.3 Superposed diverse oxide coatings:**
This subclass is indented under subclass 419.2. Processes which include applying a plurality of diverse metallic oxide coating materials in superposed relationship on a base, or applying a diverse metallic oxide coating material to a metallic oxide coating which has previously been coated on a base.

**419.4 Vitreous coating:**
This subclass is indented under subclass 419.3. Processes wherein at least one of the metallic oxide-containing coatings comprises glasslike material.

(1) Note. This subclass provides for coating a cellulose acetate film, etc.

**419.5 Organic coating:**
This subclass is indented under subclass 419.2. Processes wherein at least one of the coatings comprises organic material.

(1) Note. Attention is directed to the definitions of Class 260, Chemistry of Carbon Compounds, for the scope of the term "organic".

**419.6 Vitreous coating:**
This subclass is indented under subclass 419.2. Processes wherein the metallic oxide-containing coating comprises glasslike material.

**419.7 Boride, carbide, nitride, phosphide, silicide, or sulfide-containing coating:**
This subclass is indented under subclass 419.1. Processes wherein the metallic compound consists of metal combined with boron, carbon, nitrogen, phosphorus, silicon, or sulfur to form a binary compound.

(1) Note. The coating material may contain additional ingredients but the metallic compound must consist of only metal and one other element.

**419.8 Organometallic or metal salt of organic compound-containing coating:**
This subclass is indented under subclass 419.1. Processes wherein at least one of the coatings contains an organometallic compound or a metal salt of an organic compound.

**420** This subclass is indented under the class definition. Processes wherein the base is moved through a film or curtain of free falling coating material.

**421.1 SPRAYING:**
This subclass is indented under the class definition. Process in which the coating material is projected by mechanical force toward the base (i.e., substrate).

SEE OR SEARCH THIS CLASS, SUBCLASS:

78, for vapor deposition or spraying to produce an electron emissive or suppressive electrical product (excluding electrode for arc).

96.7, for coating a substrate using a mist or aerosol to produce an integrated or printed circuit or circuit board.

110, for coating a transparent base by spraying to produce an electrical product.

168, for coating a transparent glass base by spraying to produce an optical element.

180 through 206, for applying (e.g., spraying, etc.) solid particles on a base.

233, and 236, for coating the interior of a hollow article by spraying.

240, and 241, for a coating process utilizing centrifugal force.

428.18, and 428.19, for a coating process utilizing a roller applicator in which coating material is supplied by force toward the roller applicator, but the coating material is not projected by mechanical force toward the base (i.e., not involving spraying of the base).

446 through 456, for coating a substrate by spray coating utilizing flame or plasma heat (e.g., flame spraying, etc.).

458 through 486, for coating a substrate utilizing an electrostatic charge, field, or force.

498, and 499, for coating a substrate by immersion, partial immersion, spraying, or spin coating utilizing high energy electromagnetic radiation or high energy particles and polymerization of a coating using direct application of electrical, magnetic, wave, or particulate energy.

SEE OR SEARCH CLASS:

239, Fluid Sprinkling, Spraying, and Diffusing, subclasses 1 through 13 for a sprinkling, spraying, or diffusing process having an intended purpose other than coating.

516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 1 through 8.1 for continuous gas or vapor phase colloid systems (e.g., smoke, fog, aerosol, cloud, mist) or agents for such systems or processes of making or stabilizing such systems or agents, in general.

**422** This subclass is indented under subclass 421.1. Processes wherein the temperature of the coating material is raised to above ambient prior to application.

SEE OR SEARCH THIS CLASS, SUBCLASS:

561+, for irradiating the coating material before application to the base.

**424** This subclass is indented under subclass 421.1. Processes wherein the base is mechanically moved while being sprayed with coating material.

**425** This subclass is indented under subclass 424. Processes wherein the base is rotated about an axis through itself or is inverted, while coating material is sprayed onto it.

SEE OR SEARCH THIS CLASS, SUBCLASS:

233, for a process of rotating a hollow article while spraying its interior.

**426** This subclass is indented under subclass 421.1. Processes in which plural materials are supplied from separate sources and are combined to make up a coating composition while being conveyed from their sources toward the base, said combining taking place (1) prior to discharge from a projecting apparatus or (2) after leaving the apparatus, but prior to contacting the base.

(1) Note. At least two of the materials combined must constitute ingredients of the coating composition. This subclass does not include combining a coating composition with a liquid or gas which is intended to function solely as a conveyor for the material to the work.

SEE OR SEARCH THIS CLASS, SUBCLASS:

196, for applying solid particles and a binder to a base simultaneously, but from different sources.

402, for applying superposed diverse coatings and read the notes and search notes thereto.

**427** This subclass is indented under subclass 421.1. Processes wherein the coating is based on the inorganic material.

(1) Note. Attention is directed to the definition of Class 260, Chemistry of Carbon Compounds, for the distinction between the term “organic” and “inorganic”.

SEE OR SEARCH THIS CLASS, SUBCLASS:

422+, for applying a molten metal or other heated coating.

**427.1 Using nozzle or projector supported or guided by base (i.e., work, workpiece, etc.) during coating:**

This subclass is indented under subclass 421.1. Process in which coating material is distributed toward the base (i.e., work,workpiece,etc.) by a nozzle or projector supported or guided by the base (i.e., work,workpiece,etc.) during coating.

(1) Note. This subclass is intended to include coating of a base by using a spray nozzle or projector mounted on a mobile support carriage which follows a contour of the base during coating to maintain spacing between the spray nozzle or projector and the base, but without requiring movement of the base. When coating a large or heavy contoured base, this method of guiding the spray nozzle or projector to match the contoured shape of the base (without moving the base) during coating would be expected

to result in a more uniform coating on the base.

SEE OR SEARCH THIS CLASS, SUBCLASS:

424, and 425, for spray coating of a moving base.

427.3, for other spray coating of a base using a moving nozzle or projector.

**427.2 With programmed control or using mechanized nozzle or projector (e.g., robotic sprayer, etc.):**

This subclass is indented under subclass 421.1.

Process in which a nozzle or projector used to distribute coating material toward the base is operated (1) by one or more machine elements or (2) in a predetermined manner regulated by stored instructions or data (e.g., robotic sprayer, etc.).

SEE OR SEARCH THIS CLASS, SUBCLASS:

8 through 10 , for coating a base with measuring, testing, or indicating some variable condition of the coating.

**427.3 Moving nozzle or projector:**

This subclass is indented under subclass 421.1.

Process in which a nozzle or projector used to distribute coating material toward the base is moved during coating.

SEE OR SEARCH THIS CLASS, SUBCLASS:

424, and 425, for spray coating a moving base.

427.1, for spray coating a base (i.e., work,workpiece,etc.) using a nozzle or projector supported or guided by the base during coating.

**427.4 Polymer containing coating material:**

This subclass is indented under subclass 421.1.

Process in which a deposited coating or coating material contains a compound made up of repeating units (i.e., monomers) chemically bound together.

(1) Note. This subclass is intended to have a broad interpretation, including both inorganic (e.g., sulfur molecules, mica, etc.) and organic polymers (e.g., polyethylene, silicone rubber, etc.) derived from natural or manmade sources. Therefore, deposition of a coating which contains any amount of synthetic resin is proper in this subclass and the subclasses indented hereunder.

SEE OR SEARCH THIS CLASS, SUBCLASS:

97.5, and 99.4, for coating a base with a polymer containing coating or coating material combined with posttreatment of the coating or coating material to produce an integrated or printed circuit or circuit board.

302, and 303, for coating a base using a resin, rubber, or hardenable oil containing coating combined with preapplication of a reactant or reaction promoter or hardener (e.g., catalyst, etc.) as pretreatment of the base.

340 through 342, for coating a base using a resin, resin precursor, rubber, or hardenable oil containing coating or coating material combined with posttreatment of the coating or coating material by applying a chemical agent thereto.

487 through 522, for coating a base combined with polymerization of a coating utilizing direct application of electrical, magnetic, wave, or particulate energy (i.e., including cross-linking, curing, and hardening of organics).

**427.5 Metal base:**

This subclass is indented under subclass 427.4.

Process in which the base is metal.

(1) Note. This subclass is only intended to provide for coating of an elemental metal base. A process of coating a base which merely contains a metal compound or a mixture of metal and nonmetal components is not proper in this subclass.

**427.6 Organic compound containing base:**

This subclass is indented under subclass 427.4.

Process in which the base contains an organic compound.

SEE OR SEARCH THIS CLASS, SUBCLASS:

427.7, for spray coating a base containing an organic compound with a coating material which does not contain a polymer.

**427.7 Organic compound containing base:**

This subclass is indented under subclass 421.1. Process in which the base contains an organic compound.

SEE OR SEARCH THIS CLASS, SUBCLASS:

427.6, for spray coating a base containing an organic compound with a coating material which contains a polymer.

**428.01 ROLLER APPLICATOR UTILIZED (E.G., PADDING, ETC.):**

This subclass is indented under the class definition. Process in which coating material is applied to the base from the curved outer surface of a cylindrical applicator while the applicator is rotating about an internal axis.

(1) Note. Padding coating material onto a base is presumed to involve using a roller unless stated otherwise and is provided for in this subclass and the subclasses indented hereunder.

SEE OR SEARCH THIS CLASS, SUBCLASS:

139, for coating pavement or the earth (e.g., roadmaking, etc.) by rolling an asphalt, bitumen, oil, or tar containing coating thereon.

194, for a process of applying and uniting solid particles or fibers on a base to form a continuous coating with nondiscernible particles which includes utilizing a roller (e.g., heated roller used to fuse or soften solid particles applied as coating, etc.).

211, for a process of coating a base by application of a coating to opposite sides of a sheet, web, or strip (excluding processes where all coating is by immersion) utilizing a roller applicator.

256 through 288, for nonuniform coating of a base.

359 through 366, for a coating process wherein a roller, drum, or cylinder is utilized as a solid treating member to contact and treat a coating or coating material after it has been applied to a base.

429, for other coating of a base utilizing a brush or absorbent applicator.

430.1 through 443.2, for an immersion coating process wherein a roller may be submerged in a coating bath in which the base is immersed.

**428.02 Single roller applies plural layers of same coating material to base:**

This subclass is indented under subclass 428.01. Process in which two or more layers of the same coating material are applied to a base by a single roller.

(1) Note. The plural layers must be of the same coating material since coatings which are only similar (i.e., containing essentially the same ingredients, but in different proportions) are considered to be different coating materials. Such a process of applying a superposed diverse coating is provided for in above subclasses. See the See or Search This Class, Subclass notes below for references to selected other subclasses in this class.

SEE OR SEARCH THIS CLASS, SUBCLASS:

331 through 398.5, for a process of coating a base combined with posttreatment of a coating or coating material to change a chemical or physical characteristic thereof (excluding merely applying another layer thereto without changing a characteristic of a previous layer).

402 through 419.8, for a process of applying a superposed diverse coating or coating a coated base even if all layers of coating material are similar (i.e., containing the same components but differing only in proportion).

428.08, for a process of coating a base utilizing plural roller applicators in which a roller having a resilient (e.g., rubber, etc.) surface is used.

**428.03 Roller composed of three or more layers used:**
This subclass is indented under subclass 428.01. Process which includes using a roller made up of three or more layers.

(1) Note. This subclass is intended to provide for a coating process in which a roller composed of three or more layers is used in the process. The roller having three or more layers does not have to be used to directly apply coating material to a base.

SEE OR SEARCH THIS CLASS, SUBCLASS:
428.05, for a process of coating a base utilizing a roller composed of fewer than three layers and having a fibrous or porous surface.
428.07 through 428.1, for a process of coating a base utilizing a roller composed of fewer than three layers and having a nonfibrous and nonporous resilient surface.

**428.04 Tapered roller used:**
This subclass is indented under subclass 428.01. Process in which a roller having a tapered shape or profile is used.

(1) Note. This subclass is intended to provide for a coating process in which a tapered roller (i.e., having a diminishing diameter along the axis thereof) is used in the process. The tapered roller does not have to be used to directly apply coating material to a base. Also, the taper may be discontinuous or variable along the roller axis.

**428.05 Fibrous or porous surface roller used:**
This subclass is indented under subclass 428.01. Process in which a roller having a fibrous or porous surface is used.

(1) Note. This subclass is intended to provide for a coating process in which a roller having a fibrous or porous surface (e.g., cloth, textile, fabric, flock, cellular foam, bristles, etc.) is used in the process. The fibrous or porous surface roller does not have to be used to directly apply coating material to a base.

SEE OR SEARCH THIS CLASS, SUBCLASS:
428.03, for a process of coating a base utilizing a roller composed of three or more layers.
428.07 through 428.1, for a process of coating a base utilizing a roller composed of fewer than three layers and having a nonfibrous and nonporous resilient (e.g., rubber, etc.) surface.

**428.06 Grooved or textured surface roller used:**
This subclass is indented under subclass 428.01. Process in which a roller having a grooved or textured surface is used.

(1) Note. This subclass is intended to provide for a coating process which results in formation of a uniformly coated or impregnated base. See the See or Search This Class, Subclass note below for a reference to selected other subclasses in this class.

SEE OR SEARCH THIS CLASS, SUBCLASS:
256 through 288, for nonuniform coating of a base.

**428.07 Resilient (e.g., rubber, etc.) surface roller used:**
This subclass is indented under subclass 428.01. Process in which a roller having a resilient (e.g., rubber, etc.) surface is used.

**428.08 Plural roller applicators used:**
This subclass is indented under subclass 428.07. Process in which two or more roller applicators are used.

(1) Note. This subclass is intended to provide for a coating process which uses plural roller applicators in any configuration (e.g., to support and coat a moving cylindrical substrate, etc.).

SEE OR SEARCH THIS CLASS, SUBCLASS:
331 through 398.5, for a process of coating a base combined with posttreatment of a coating or coating material

to change a chemical or physical characteristic thereof (excluding merely applying another layer thereto without changing a characteristic of a previous layer).

402 through 419.8, for a process of applying a superposed diverse coating or coating a coated base even if all layers of coating material are similar (i.e., containing the same components but differing only in proportion).

428.02, for a process of coating a base utilizing a single roller applicator to apply plural layers of the same coating material to a base.

**428.09 Opposed, counter, or reverse surface movement at contact between roller applicator and base:**

This subclass is indented under subclass 428.07. Process in which the roller applicator moves in an opposed, counter, or reverse direction with respect to that of a base at the point of contact therebetween.

(1) Note. This subclass is intended to include slip or rubbing motion at the point of contact (i.e., nip) between surfaces of the roller applicator and the base during coating.

SEE OR SEARCH THIS CLASS, SUBCLASS:

428.11, and 428.12, for a coating process involving opposed, counter, or reverse movement at contact between the roller applicator and the base but without using a resilient (e.g., rubber, etc.) surface roller.

**428.1 Including using roller backup support for base:**

This subclass is indented under subclass 428.07. Process which includes use of an additional roller as backup to support the base.

(1) Note. The roller applicator and additional backup roller are usually positioned adjacent to each other on either side of the base to hold the base in moving contact with both rollers while inhibiting unwanted displacement of the base by the roller applicator. Additional rollers may also be used during coating as long as the two required by this definition are positioned and used as described above.

SEE OR SEARCH THIS CLASS, SUBCLASS:

428.17, for a process of coating a base utilizing a roller applicator including using a roller backup support for the base and a doctor or roller for distributing coating material on the roller applicator but without using a resilient (e.g., rubber, etc.) surface roller.

428.21, for a process of coating a base utilizing a roller applicator including using a roller backup support for the base but without using a doctor or roller for distributing coating material on the roller applicator and without using a resilient (e.g., rubber, etc.) surface roller.

**428.11 Opposed, counter, or reverse surface movement at contact between roller applicator and base:**

This subclass is indented under subclass 428.01. Process in which the roller applicator moves in an opposed, counter, or reverse direction with respect to that of a base at the point of contact therebetween.

SEE OR SEARCH THIS CLASS, SUBCLASS:

428.09, for a coating process involving opposed, counter, or reverse movement at contact between the roller applicator and the base and using a resilient (e.g., rubber, etc.) roller.

**428.12 And using transfer roller to feed coating material to roller applicator:**

This subclass is indented under subclass 428.11. Process which includes use of an additional roller adjacent to the roller applicator which transfers coating material from a supply to the roller applicator.

(1) Note. This subclass is intended to include use of a battery of rollers to transfer coating material from a supply bath over plural transfer rollers onto the roller applicator and then onto the base. This arrangement allows transfer of coating material from a supply bath up a

vertical incline and onto the base at a location above the supply bath.

SEE OR SEARCH THIS CLASS, SUBCLASS:

428.15, for a process of coating a base utilizing a roller applicator supplied with coating material by a transfer roller and using a doctor or roller for distributing coating material on the roller applicator but without opposed, counter, or reverse surface movement at contact between the roller applicator and the base.

428.2, for a process of coating a base utilizing a roller applicator in direct contact with a coating material supply bath but without opposed, counter, or reverse surface movement at contact between the roller applicator and the base and without using a doctor or roller for distributing coating material on the roller applicator.

**428.13 And roller end dams used:**

This subclass is indented under subclass 428.01. Process which includes use of barriers to inhibit flow of coating material from ends of a roller.

(1) Note. End dams help to result in a more uniform coating on the base by restraining bulking, dripping, or splattering of coating material at ends of a roller (e.g., to prevent excess deposition of coating on the base at points of contact with the edges of the roller applicator, etc.).

**428.14 And doctor or roller used to distribute coating material on roller applicator:**

This subclass is indented under subclass 428.01. Process which includes use of a doctor or roller to spread coating material on the roller applicator.

(1) Note. This subclass and the subclasses indented hereunder are intended to provide for use of a solid member (e.g., doctor blade, doctor roller, etc.) to control distribution (e.g., thickness, uniformity, etc.) of coating material on the roller applicator prior to contact with the base. The intended result is usually to form a more uniform coating on the base.

**428.15 And using transfer roller to feed coating material to roller applicator:**

This subclass is indented under subclass 428.14. Process which includes use of an additional roller adjacent to the roller applicator which transfers coating material from a supply to the roller applicator.

(1) Note. This subclass is intended to provide for use of a battery of rollers to transfer coating material from a supply bath over plural transfer rollers onto the roller applicator and then onto the base. This arrangement allows transfer of coating material from a supply bath up a vertical incline and onto the base at a location above the supply bath.

SEE OR SEARCH THIS CLASS, SUBCLASS:

428.12, for a process of coating a base utilizing a roller applicator supplied with coating material by a transfer roller with opposed, counter, or reverse surface movement at contact between the roller applicator and the base.

428.2, for a process of coating a base utilizing a roller applicator in direct contact with a coating material supply bath but without opposed, counter, or reverse surface movement at contact between the roller applicator and the base and without using a doctor or roller for distributing coating material on the roller applicator.

**428.16 And guiding base to follow surface curvature of roller applicator:**

This subclass is indented under subclass 428.14. Process which includes directing the base to follow the surface curvature of the roller applicator.

(1) Note. This subclass is intended to provide for use of sliding or rolling contact of two or more backup-style members to bend a flexible base to follow an obvious portion of curvature of the roller applicator (e.g., to increase the surface contact between the roller applicator and the base during coating, etc.).

**428.17 Including using roller backup support for base:**
This subclass is indented under subclass 428.14. Process which includes use of an additional roller as backup to support the base.

(1) Note. The roller applicator and additional backup roller are usually positioned adjacent to each other on either side of the base to hold the base in moving contact with both rollers while inhibiting unwanted displacement of the base by the roller applicator. Additional rollers may also be used during coating as long as the two required by this definition are positioned and used as described above.

SEE OR SEARCH THIS CLASS, SUBCLASS:
428.1, for a process of coating a base utilizing a roller applicator and a roller backup support for the base, including using a resilient (e.g., rubber, etc.) surface roller with or without a doctor or roller for distributing coating material on the roller applicator.
428.21, for a process of coating a base utilizing a roller applicator and a roller backup support for the base but without using a doctor or roller for distributing coating material on the roller applicator and without including a resilient (e.g., rubber, etc.) surface roller.

**428.18 Including using force to supply coating material to roller applicator:**
This subclass is indented under subclass 428.01. Process which includes use of force to supply the coating material to the roller applicator.

(1) Note. This subclass and the subclass indented hereunder are intended to include application of force to project or distribute the coating material toward the roller applicator prior to contact with the base (e.g., spraying the roller applicator without directly spraying the base, etc.). See the See or Search This Class, Subclass note shown below for a process of coating a base by forced projection of coating material toward the base (i.e., spraying).

SEE OR SEARCH THIS CLASS, SUBCLASS:
421.1 through 427.7, for a process of spraying a base in which coating material is projected by mechanical force toward the base.

**428.19 Through nozzle or projector:**
This subclass is indented under subclass 428.18. Process in which the coating material is forced through a nozzle or projector.

SEE OR SEARCH THIS CLASS, SUBCLASS:
421.1 through 427.7, for a process of coating a base in which coating material is projected by mechanical force toward the base.

**428.2 Direct contact of roller applicator with coating material supply bath used:**
This subclass is indented under subclass 428.01. Process in which the roller applicator is brought into direct contact with a coating material supply bath.

(1) Note. This subclass is intended to include partial immersion of the roller applicator in a coating material supply bath for direct contact supply of coating material to the roller applicator before coating the base by the roller applicator.

SEE OR SEARCH THIS CLASS, SUBCLASS:
428.12, for a process of coating a base utilizing a roller applicator combined with a transfer roller to feed coating material to the roller applicator and involving opposed, counter, or reverse surface movement at contact between the roller applicator and the base.
428.15, for a process of coating a base utilizing a roller applicator combined with a transfer roller to feed coating material to the roller applicator and using a doctor or roller to distribute coating material on the roller applicator.

**428.21 Including using roller backup support for base:**
This subclass is indented under subclass 428.01. Process which includes use of an additional roller as backup to support the base.

(1) Note. The roller applicator and additional backup roller are usually positioned adjacent to each other on either side of the base to hold the base in moving contact with both rollers while inhibiting unwanted displacement of the base by the roller applicator. Additional rollers may also be used during coating as long as the two required by this definition are positioned and used as described above.

SEE OR SEARCH THIS CLASS, SUBCLASS:
428.1, for a process of coating a base utilizing a roller applicator, a roller backup support for the base, and including a resilient (e.g., rubber, etc.) surface roller with or without using a doctor or roller for distributing coating material on the roller applicator.
428.17, for a process of coating a base utilizing a roller applicator, a roller backup support for the base, and a doctor or roller for distributing coating material on the roller applicator but without including a resilient (e.g., rubber, etc.) surface roller.

**429** This subclass is indented under the class definition. Processes wherein the coating member comprises (1) bristles secured to a support or (2) a member capable of soaking up coating material.

(1) Note. Absorbent applicators include wicks, webs, sponges, etc.

SEE OR SEARCH THIS CLASS, SUBCLASS:
260, for applying a nonuniform coating with a brush or absorbent applicator.
368, for a coating process which includes brushing the coating after it has been applied to the base.

**430.1 IMMERSION OR PARTIAL IMMERSION:**
This subclass is indented under the class definition. Processes wherein the coating is applied by submerging at least a portion of the base in a pool of coating material.

(1) Note. Reference to the use of a "bath" coating process is considered immersion.

SEE OR SEARCH THIS CLASS, SUBCLASS:
169, for coating a glass base by immersion to produce an optical element.
185, for coating an article with particles by immersing it in a fluidized bed of particles.

**431** This subclass is indented under subclass 430.1. Processes wherein the coating bath contains molten metal or a fused metallic compound.

SEE OR SEARCH CLASS:
428, Stock Material or Miscellaneous Articles, subclass 939 for a metallic composite made by a process of this subclass.

**432** This subclass is indented under subclass 431. Processes wherein an inert gas or a nonoxidizing atmosphere is employed adjacent the coating bath.

**433** This subclass is indented under subclass 431. Processes wherein the coating contains lead, zinc, or tin in elemental form.

SEE OR SEARCH CLASS:
428, Stock Material or Miscellaneous Articles, subclasses 643+, 645, 646, and 658+ for metallic composites in which a component has a tin, lead, or zinc base.

**434.2 Running lengths:**
This subclass is indented under subclass 430.1. Processes wherein the base is a piece of material handled at points intermediate its ends whereby the length is immaterial to the manner of handling.

**434.3 Coating applied at surface of bath only:**
This subclass is indented under subclass 434.2. Processes wherein only the surface of the bath is utilized to coat the base.

(1) Note. This subclass provides for floating the base on the surface of the coating material to be applied, etc.

**434.4 Base treated by solid member in bath (e.g., scraped, squeezed, etc.):**
This subclass is indented under subclass 434.2. Processes wherein the base being coated is contacted and actively treated by a solid member while immersed or partially immersed in the coating bath.

(1) Note. For classification here the base must specifically be treated (e.g., squeezed, scraped, etc.) and not merely conveyed by a contacting member.

SEE OR SEARCH THIS CLASS, SUBCLASS:
335+, for processes wherein the treating member contacts the coated base after removal from the immersion bath.

**434.5 Coating material moved (e.g., agitated, circulated, etc.):**
This subclass is indented under subclass 434.2. Processes wherein the coating material is caused to move in a defined manner during the coating operation.

SEE OR SEARCH THIS CLASS, SUBCLASS:
345, for treatment of the coating material after it leaves the coating bath.

**434.6 Cord, thread, yarn, wire, or rod:**
This subclass is indented under subclass 434.2. Processes wherein the running length is in the form of a wire, rod, filament, cord, or strand.

**434.7 Extending through bath-containing wall:**
This subclass is indented under subclass 434.6. Processes wherein the running length being coated enters the immersion bath directly through an opening in a wall of the container, which opening is below the surface of the bath.

**435** This subclass is indented under subclass 430.1. Processes wherein the base is metal in elemental form.

**436** This subclass is indented under subclass 435. Processes wherein a coating which contains metal in elemental form is applied.

SEE OR SEARCH CLASS:
428, Stock Material or Miscellaneous Articles, subclasses 615+ for a metallic composite defined in terms of the compositions of its components.

**437** This subclass is indented under subclass 436. Processes which include utilizing a reducing agent which is a chemical compound.

(1) Note. Usually the bath contains a metallic compound which is reduced to deposit a metal coating on the immersed base.

SEE OR SEARCH THIS CLASS, SUBCLASS:
96.9, for a process of coating both sides of a substrate to make an integrated or printed circuit or circuit board (excluding processes where all coating is by immersion)(e.g., electroless plating of one side of a circuit board followed by spraying both sides, etc.).
97.9 through 98.1, for substrate hole wall coating by immersion metal plating from solution with pretreatment of the substrate to produce an integrated or printed circuit or circuit board.
99.5, for other immersion metal plating to produce an integrated or printed circuit or circuit board.
304+, for an electroless deposition process which includes pretreating the base.

SEE OR SEARCH CLASS:
428, Stock Material or Miscellaneous Articles, subclass 936 for a metallic composite made by a process of this subclass.

**438** This subclass is indented under subclass 437. Processes wherein the coating is free nickel.

**439** This subclass is indented under subclass 430.1. Processes wherein the base is a carbohydrate material derived from the structural matter of plant life.

**440** This subclass is indented under subclass 439. Processes wherein the base material is derived from the trunks or branches of trees or bushes.

(1) Note. Wood particles or fibers which have been chemically changed, e.g., regenerated cellulose etc., or water layed to form a paper, are not considered to be wood.

SEE OR SEARCH THIS CLASS, SUBCLASS:

291, for injecting coating material into wood wherein a hole is made in the wood base.

**441** This subclass is indented under subclass 440. Processes wherein the coating contains creosote, wax, oil, asphalt, pitch, tar, or bitumen.

(1) Note. Included herein are any heavy oil or tar like material with properties similar to those materials specifically set out.

**442** This subclass is indented under subclass 439. Processes wherein the coating contains creosote, wax, oil, asphalt, pitch, tar, or bitumen.

(1) Note. Included herein are any heavy oil or tar like material with properties similar to those materials specifically set out.

**443** This subclass is indented under subclass 430.1. Processes wherein the coating contains creosote, wax, oil, asphalt, pitch, tar, or bitumen.

(1) Note. Included herein are any heavy oil or tar like material with properties similar to those materials specifically set out.

**443.1 Chemical compound reducing agent utilized (i.e., electroless deposition):**
This subclass is indented under subclass 430.1. Processes which includes utilizing a reducing agent which is a chemical compound.

(1) Note. Usually the bath contains a metallic compound which is reduced to deposit a metal coating on the immersed base.

SEE OR SEARCH THIS CLASS, SUBCLASS:

96.9, for a process of coating both sides of a substrate to make an integrated or printed circuit or circuit board (excluding processes where all coating is by immersion) (e.g., electroless plating of one side of a circuit board followed by spraying both sides, etc.).

97.9, and 98.1, for substrate hole wall coating by immersion metal plating from solution with pretreatment of the substrate to produce an integrated or printed circuit or circuit board.

99.5, for other immersion metal plating to produce an integrated or printed circuit or circuit board.

304+, for an electroless deposition process which includes pretreating the base.

437, for an electroless deposition process wherein the base comprises free metal.

**443.2 Inorganic base:**
This subclass is indented under subclass 430.1. Processes wherein the base comprises inorganic material.

SEE OR SEARCH THIS CLASS, SUBCLASS:

435+, for similar processes wherein the base comprises free metal.

**444** This subclass is indented under the class definition. Processes for treating a base in preparation for coating it or treating an applied coating, wherein a coating step is not claimed and wherein the process is not provided for in another class.

SEE OR SEARCH CLASS:

8, Bleaching and Dyeing; Fluid Treatment and Chemical Modification of Textiles and Fibers, subclasses 137+, and see the notes thereto for certain cleaning process.

510, Cleaning Compositions for Solid Surfaces, Auxiliary Compositions Therefor, or Processes of Preparing the Compositions, for mere methods of use of such compositions claimed

along with the cleaning composition, per se.

**445** This subclass is indented under the class definition. Processes not provided for in any other subclass.

(1) Note. Patents which contain claims to significant coating processes for this class, are placed in the appropriate subclasses above based on total disclosure if the claimed disclosure is not provided for in one of the above subclasses.

**446 SPRAY COATING UTILIZING FLAME OR PLASMA HEAT (E.G., FLAME SPRAYING, ETC.):**
This subclass is indented under the class definition. Processes wherein (1) a gaseous flame is used to heat and project a coating material toward a substrate or (2) a coating material is converted to or engulfed by a highly ionized gas composed of ions, electrons and neutral particles in which the positive ions and negative electrons are roughly equal in number, and projected on to a substrate

(1) Note. Torch spraying is considered a form of flame spraying and is included in this and indented subclasses.

(2) Note. Electric arc metal spraying is properly classified in this and indented subclasses.

(3) Note. Explosive or detonation spray vaporization, wherein the vaporized coating is applied in the form of a spray is properly classified in this and indented subclasses.

(4) Note. Thermal spraying is properly classified in this and indented subclasses.

SEE OR SEARCH THIS CLASS, SUBCLASS:
596, for coating processes utilizing laser heat transfer, which are often referred to as explosive vaporization.

SEE OR SEARCH CLASS:
204, Chemistry: Electrical and Wave Energy, subclass 192.38 for vacuum arc discharge coating, utilizing processes for the deposition of a coating onto a substrate within a vacuum environment by the action of an arc discharge between an anode and a cathode wherein the source material is the cathode, per se, or the source material is on the cathode.
219, Electric Heating, particularly subclasses 73.11, 73.21, and 76.1+ for coating operations that involve a buildup of metal coating on a metal workpiece and wherein an arc between an electrode and the work is utilized.

**447 Organic containing coating:**
This subclass is indented under subclass 446. Processes wherein the coating material applied has organic material in its composition.

(1) Note. Attention is directed to the definition of Class 260, Chemistry of Carbon Compounds, for the distinction between the term “organic” and “inorganic.”

**448 Nonuniform or patterned coating:**
This subclass is indented under subclass 446. Processes wherein the coating is applied (1) to only selected portions of a base (2) in such a manner as to produce uneven, discontinuous or nonuniform thickness or (3) so that it varies from area to area as to physical or chemical properties.

SEE OR SEARCH THIS CLASS, SUBCLASS:
256+, for nonuniform coating processes without the use of electrical, magnetic, electromagnetic, or wave energy.
466+, for nonuniform or patterned coating processes utilizing electrostatic charge, field, or force.
504, for processes to polymerize an applied nonuniform or patterned coating utilizing high energy electromagnetic radiation or high energy particles.
510, for processes to polymerize an applied nonuniform or patterned coating utilizing low energy electromagnetic radiation.
526, for nonuniform or patterned coating processes utilizing ion plating or ion implantation.

552, for nonuniform or patterned coating processes involving pretreating a substrate or posttreating a coated substrate utilizing high energy electromagnetic radiation.

555, for nonuniform or patterned coating processes utilizing laser radiation in a thermal pretreatment of a substrate or a thermal posttreatment of a coated substrate.

SEE OR SEARCH CLASS:

430, Radiation Imagery Chemistry: Process, Composition, or Product Thereof, subclasses 31+ for radiation imagery involving coating using electric or magnetic energy.

**449 Continuous feed solid coating material (e.g., wire, rod, or filament, etc.):**

This subclass is indented under subclass 446. Processes wherein the coating material fed to the flame or plasma is in the form of long, continuous, slender, solid matter.

(1) Note. Generally the coating material is in the form of a wire, rod, or filament.

**450 Inorganic carbon containing coating, not as steel (e.g., carbide, etc.):**

This subclass is indented under subclass 446. Processes wherein the coating material, excluding steel, contains inorganic carbon.

(1) Note. Attention is directed to the definition of Class 260, Chemistry of Carbon Compounds, for the distinction between the term "organic" and "inorganic."

(2) Note. Metal compounds, excluding steel, containing more than 1.7 percent of inorganic carbon are properly classified in this subclass.

(3) Note. Plasma or flame spraying processes utilizing inorganic carbon containing material to form diamondlike films are found here.

SEE OR SEARCH CLASS:

117, Single-Crystal, Oriented-Crystal, and Epitaxy Growth Processes; Non-Coating Apparatus Therefor, subclass 79 for processes for growing therein-defined single-crystal of diamond and subclass 929 for the art collection of carbon single-crystal references. Class 423, subclass 446, is a mandatory search and cross-reference for patents directed to forming a free-standing single-crystal diamond even though properly placed in Class 117 as an original.

423, Chemistry of Inorganic Compounds, subclass 446, for diamonds and methods of making, which does not result in a coated product.

**451 Additionally containing nickel, cobalt, or iron as free metal or alloy:**

This subclass is indented under subclass 450. Processes wherein the inorganic carbon containing coating also contains nickel, cobalt, or iron as an alloy or free metal.

**452 Silicon containing coating:**

This subclass is indented under subclass 446. Processes wherein the coating material applied contains silicon.

**453 Metal oxide containing coating:**

This subclass is indented under subclass 446. Processes wherein the coating material applied contains metal oxide.

(1) Note. For classification purposes in this subclass, ceramic is considered metal oxide.

**454 Superposed diverse or multilayer similar coatings applied:**

This subclass is indented under subclass 453. Processes which include sequentially applying a plurality of dissimilar coating materials in superposed relationship on a substrate or applying a plurality of layers of similar coating materials in superposed relationship on a substrate or previously coated substrate.

**455 Metal or metal alloy coating:**

This subclass is indented under subclass 446. Processes wherein the coating material is composed of pure metal or metal alloy.

(1) Note. Metals and metal alloys containing less than one percent carbon are properly classified in this and indented subclasses.

**456 Aluminum, nickel, cobalt, or iron metal or alloy containing coating:**
This subclass is indented under subclass 455. Processes wherein the metal or metal alloy coating contains aluminum, nickel, cobalt, or iron.

**457 DIRECT APPLICATION OF ELECTRICAL, MAGNETIC, WAVE, OR PARTICULATE ENERGY:**
This subclass is indented under the class definition. Processes wherein a substrate, coated substrate or coating material is treated at any stage in a coating process with electrical, magnetic, particulate, or electromagnetic wave energy or heat produced therefrom.

(1) Note. The energy employed must be applied directly to the substrate, the coated substrate or the coating material as part of the total coating process (including pretreatment or post-treatment).

(2) Note. Where the electrical energy is not applied directly to the base or coating, but is used to generate heat energy that is transferred to the base before, during, or after the coating operation, see other subclasses of this class or other appropriate heating or heat treatment classes.

(3) Note. Utilization of radiant heat or infrared energy to vaporize the coating material in a vapor deposition process is not basis for classification in this and indented subclasses.

(4) Note. The wave energy applied to the work may be light, sonic, supersonic, ultrasonic, gamma rays, infrared rays, X-rays, etc. Particulate energy includes charged particles and atomic emissions, such as alpha rays, beta rays, and neutrons.

(5) Note. The mere sprinkling of particles is not considered coating for these and indented subclasses. There has to be some attractive or adhesive force between the base and the particles that would tend to hold said particles fixed to the base.

(6) Note. This and indented subclasses are proper for processes involving coating utilizing the combination of neutral and charged particles.

SEE OR SEARCH THIS CLASS, SUBCLASS:

1, 2.1+, 4, 5+, 7, 8+, and 11 for subject matter of this and indented subclasses (457+) when also meeting the subclass definitions therein.

8+, for processes wherein the electrical, magnetic, wave, or particulate energy is used for measuring, testing, or indicating.

248.1, for coating processes utilizing molecular beam, also for processes utilizing radiant heat or infrared energy to vaporize the coating material in a vapor deposition process.

SEE OR SEARCH CLASS:

8, Bleaching and Dyeing; Fluid Treatment and Chemical Modification of Textiles and Fibers, subclass 444 for dyeing processes utilizing wave energy; and subclass 103 for bleaching processes involving the use of corona irradiation.

34, Drying and Gas or Vapor Contact With Solids, subclasses 245+ and 266+ for processes involving the use of corona radiation.

99, Foods and Beverages: Apparatus, subclasses 358 and 451 for apparatus for subjecting foods and beverages to wave, radiant, and electrical energy.

117, Single-Crystal, Oriented-Crystal, and Epitaxy Growth Processes; Non-Coating Apparatus Therefor, for processes for growing therein-defined single-crystal of all types of materials, including inorganic or organic, and by all techniques, especially subclasses 84+ for vapor or gas phase epitaxy.

128, Surgery, for electrical or wave energy treatment of the living human body and apparatus specialized therefor.

148, Metal Treatment, for coating a metal base combined with a Class 148 treatment of the base (e.g., annealing, microstructure change, etc.) Class 427 is proper for simultaneous ion implan-

tation and diffusion. However, inclusion of a separate step which by itself would be classifiable in Class 148 is enough to place the combination in Class 148. See subclass 239 for ion implantation with a subsequent Class 148 treatment. If diffusion is involved in a coating operation involving metal, and the diffusion involves the microstructure of the metal (i.e., other than reactive coating operations) the original will be placed in Class 427 if the specified diffusion occurs during the coating step. However, if there is a heat treatment step independent of the coating step, which causes diffusion to affect the microstructure of the metal the original goes to Class 148.

204, Chemistry: Electrical and Wave Energy, subclasses 155+, 157.15+, and 164+ for processes wherein electrical or wave energy is used to effect chemical reaction. Treating a substrate or a coated substrate by electrical discharge, electrostatic charge, field, or force, lacking a coating step of externally supplied coating material is provided for in Class 204, subclasses 164+. However, if there is a coating step present, supplying an external source of coating material (i.e., complete or in part) placement is proper in Class 427 even if there is a post treatment operation involving electrical discharge, electrostatic charge, field, or force. See subclasses 192.1+ for methods specialized for coating or forming objects within a gaseous medium by the action of cathode sputtering. Subclasses 450+ provide for electrophoretic or electro-osmotic processes, in general; and subclasses 471+ provide for electrophoretic or electro-osmotic coating or forming of an object.

205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, subclasses 80+ for electrolytic coating processes and subclasses 183+, 188+, 191+, and 198+ for processes involving plural coating steps, at least one but not all of which is electrolytic. Combinations of preparatory electrolytic processes, other than coating, with processes of coating falling within the scope of Class 427 are classified in Class 427. A patent with a claim to a coating process classifiable in Class 427 and a claim to a coating process classifiable in Class 205 will be placed as an original in Class 427 and cross-referenced to Class 205.

219, Electric Heating, subclasses 600+ for induction, electrostatic, or electromagnetic wave energy for heating, per se, employing this energy.

239, Fluid Sprinkling, Spraying, and Diffusing, subclass 3 for electrostatically charging material in order to obtain a desired spray, wherein the intent is not to coat.

250, Radiant Energy, all noncoating methods and apparatus for using, generating, controlling, or detecting radiant energy, particularly subclasses 492.1+ for methods of irradiation, per se, of a material with ions.

376, Induced Nuclear Reactions: Processes, Systems, and Elements, subclasses 103+ for patents directed to processes involving induced nuclear reactions and structures which implement such processes.

378, X-Ray or Gamma Ray Systems or Devices, subclasses 28+ for xeroradiography.

399, Electrophotography, subclass 57 for liquid control developing, subclasses 58+ for concentration control of developing material, subclasses 168+ for charging, subclasses 246+ for sprayed liquid developing, subclass 248 for immersion, and subclasses 265+ for application of dry developing.

422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, especially subclasses 22+ for processes of disinfecting, deodorizing, preserving, or sterilizing nonfoods; and subclasses 129+, especially subclass 185 for apparatus using corona discharge or radiation for effecting chemical reactions.

430, Radiation Imagery Chemistry: Process, Composition, or Product Thereof, subclasses 31+ for coating processes involving electric or magnetic imagery (e.g. xerography, etc.).

438, Semiconductor Device Manufacturing: Process, for methods of making a semiconductor device or coating a semiconductor substrate.

445, Electric Lamp or Space Discharge Component or Device Manufacturing, subclasses 10 through 14 , for coating electric lamps or electric space discharge devices wherein a combined process is intended to perform multiple processes are classified here (445), when one of the operations is specifically provided for in this class (445).

505, Superconductor Technology: Apparatus, Material, Process, for making or coating superconductors or superconductor material.

522, Synthetic Resins or Natural Rubbers, for processes of preparing or treating a synthetic resin or natural rubber involving a chemical reaction brought about by the application of wave energy.

**458 Electrostatic charge, field, or force utilized:**
This subclass is indented under subclass 457. Processes utilizing static electricity, that is an electrical charge at rest, to effect deposition or orientation of an externally supplied coating material.

(1) Note. Electrostatic energy is a form of electrical energy which has the capability of attracting and holding small particles having an opposite electrical charge.

(2) Note. An electrostatic charge is an electric charge stored in a capacitor or on the surface of an insulated object.

(3) Note. An electrostatic field is the vector force field set up in the vicinity of non-moving electrical charges.

SEE OR SEARCH THIS CLASS, SUBCLASS:

180, for processes of applying particles or fibers to a substrate without the use of an electrostatic force.

SEE OR SEARCH CLASS:

75, Specialized Metallurgical Processes, Compositions for use Therein, Consolidated Metal Powder Compositions, etc., subclass 255 for a loose mixture containing metal particles. Subclass 10.67 for electromagnetic or electrostatic processes.

118, Coating Apparatus, subclasses 620+ for coating apparatus utilizing an electrostatic charge, force, or field.

219, Electric Heating, subclasses 600+ for electrostatic heating, per se. If there is a subsequent step of coating involved the original is classified in Class 427. If there is other subsequent treatment involved the original is classified with the art to which the other subsequent treatment pertains.

239, Fluid Sprinkling, Spraying, and Diffusing, subclass 3 for processes of spraying wherein an electrostatic charge is employed and the intent of the sprinkling, spraying, and diffusing is not to coat.

361, Electricity: Electrical Systems and Devices, subclasses 225+ and 230+ for apparatus used to apply an electrical charge to materials, per se.

399, Electrophotography, subclass 57 for liquid control developing, subclasses 58+ for concentration control of developing material, subclasses 168+ for charging, subclasses 246+ for sprayed liquid developing, subclass 248 for immersion, and subclasses 265+ for application of dry developing.

**459 Fluidized bed utilized:**
This subclass is indented under subclass 458. Processes wherein a bed or mass of solid coating particles is maintained in a state of fluidization by passing a gas in a generally upward direction through the particles which remain in a confined volume and is utilized in the coating of an article or substrate.

**460 Ionization or corona discharge utilized:**
This subclass is indented under subclass 459. Processes wherein (1) the dissociation of an atom or molecule into electrons and ions, which facilitates the passage of current, or (2) the phenomena that occurs when an electric field is sufficiently strong to ionize the gas between electrodes and cause conduction, is used to assist in the deposition of the fluidized coating material.

**461 Heating or fusing applied coating:**
This subclass is indented under subclass 459. Processes wherein the temperature of the applied coating is raised above ambient or the applied coating is liquified or reduced to a plastic state by heating.

**462 Flock or fiber applied:**
This subclass is indented under subclass 458. Processes wherein the coating applied is in the form of finely powdered wool, cotton, or cloth material or relatively short, slender, flexible elements of finite length and having a width and thickness of the same order of magnitude.

SEE OR SEARCH THIS CLASS, SUBCLASS:
206, for applying flock or fiber to a substrate without the use of electrical or wave energy.

**463 Pile or naptype surface formed:**
This subclass is indented under subclass 462. Processes wherein the coating applied to a substrate, web, sheet, layer, or element, results in a bristly, fuzzy, or resilient surface, with extended looped or free ended filamentary material.

**464 Heating, drying, or cooling adhesive surface:**
This subclass is indented under subclass 463. Processes wherein the temperature of an adhesive coating is raised above or lowered below the ambient or the moisture content of the adhesive coating is reduced.

(1) Note. Heating or drying often causes curing or hardening of the coating.

**465 Organic substrate specified (e.g., fabric, etc.):**
This subclass is indented under subclass 463. Processes wherein the designated base or surface onto which the adhesive coating is applied is organic.

(1) Note. Attention is directed to the definition of Class 260, Chemistry of Carbon Compounds, for the distinction between the term “organic” and “inorganic.”

(2) Note. For classification in this subclass the adhesive layer is not considered to be the base.

**466 Nonuniform or patterned coating (e.g., ink jet printing, etc.):**
This subclass is indented under subclass 458. Processes wherein the coating utilizing electrostatic charge, field, or force is (1) applied only to selected portions of a base (2) applied in such a manner as to produce a coating of uneven, discontinuous, or nonuniform thickness, or (3) varied from area to area as to physical or chemical properties.

SEE OR SEARCH THIS CLASS, SUBCLASS:
256+, for nonuniform or patterned coating processes without the use of electrical, magnetic, electromagnetic, or wave energy.
448, for nonuniform or patterned spray coating processes utilizing flame or plasma heat.
504, for processes to polymerize an applied nonuniform or patterned coating utilizing high energy electromagnetic radiation or high energy particles.
510, for processes to polymerize an applied nonuniform or patterned coating utilizing low energy electromagnetic radiation.
526, for nonuniform or patterned coating processes utilizing ion plating or ion implantation.
552, for nonuniform or patterned coating processes involving pretreating a substrate or posttreating a coated substrate utilizing high energy electromagnetic radiation or high energy particles.

555, for nonuniform or patterned coating processes utilizing laser radiation in a thermal pretreatment of a substrate or a thermal posttreatment of a coated substrate.

SEE OR SEARCH CLASS:

399, Electrophotography, subclass 57 for liquid control developing, subclasses 58+ for concentration control of developing material, subclasses 168+ for charging, subclasses 246+ for sprayed liquid developing, subclass 248 for immersion, and subclasses 265+ for application of dry developing.

430, Radiation Imagery Chemistry: Process, Composition, or Product Thereof, subclasses 31+ for coating processes involving electric or magnetic imagery.

**467 Edging or striping:**

This subclass is indented under subclass 466. Processes wherein (1) only the edge or border of a substrate is coated or (2) wherein the coating is applied in long narrow lines.

(1) Note. The stripes are not required to be parallel or straight.

SEE OR SEARCH THIS CLASS, SUBCLASS:

137, for the striping of roads or the earth.

SEE OR SEARCH CLASS:

156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclass 107 for processes for sealing the edges of laminated glass.

**468 Mask or stencil utilized:**

This subclass is indented under subclass 466. Processes in which the substrate treated has applied to portions thereof a coating or layer which masks or shields the portions so coated during further treatment of the exposed portions of the substrate.

(1) Note. The masking coat may be applied to selected areas or the entire substrate may be coated with a maskforming composition and selected portions of the coating, thus formed, removed.

**469 Coating material consists of charged particles (e.g., paint, pigment, dye, etc.):**

This subclass is indented under subclass 466. Processes wherein the nonuniform coating is formed by deposition of charged particles to a substrate by utilization of electrostatic charge, field, or force to form a nonimaged coating on the base.

(1) Note. The charged particles may be loose, free falling or suspended in a fluid for deposition thereof.

SEE OR SEARCH CLASS:

430, Radiation Imagery Chemistry: Process, Composition, or Product Thereof, subclasses 31+ particularly subclasses 117 and 120 for processes of electrostatically coating (1) if radiation is utilized to form an image, or (2) for finishing an image produced by radiation utilizing electrostatic deposition to complete the image.

**470 Superposed diverse or multilayer similar coatings applied:**

This subclass is indented under subclass 458. Processes which include sequentially applying a plurality of dissimilar coating materials in superposed relationship on a substrate or applying a plurality of layers of similar coating materials in superposed relationship on a substrate or previously coated substrate, utilizing electrostatic charge, field, or force.

SEE OR SEARCH THIS CLASS, SUBCLASS:

258, for processes wherein at least one of the superimposed coating layers are nonuniform and need not be applied with the use of electrical or wave energy.

**471 Applying coatings to opposite sides of a substrate (excluding processes where all coating is by immersion):**

This subclass is indented under subclass 458. Processes wherein the coating material is applied to opposing surfaces of a base or substrate.

(1) Note. The opposite sides may be coated with the same or different coating materials.

(2) Note. This subclass does not provide for merely immersing a substrate to coat both sides, but does provide for such an operation combined with additionally coating at least one side of the substrate by another method, such as spraying, etc.

SEE OR SEARCH THIS CLASS, SUBCLASS:

206, for coating both sides of a substrate (web or workpiece) with flock or fiber without the use of electrical or wave energy.

SEE OR SEARCH CLASS:

399, Electrophotography, subclass 57 for liquid control developing, subclasses 58+ for concentration control of developing material, subclasses 168+ for charging, subclasses 246+ for sprayed liquid developing, subclass 248 for immersion, and subclasses 265+ for application of dry developing.

**472 Positioning, orientation, or application of nonsprayed, nonatomized coating material solely by electrostatic charge, field, or force:**
This subclass is indented under subclass 458. Processes wherein a coating material, which may be fluid or discrete particles, is caused to move from a container or support surface to a substrate or have its relative alignment or placement influenced by using electrostatic charge, field, or force as the sole or principal source of energy.

(1) Note. Mechanical projection is a form of spraying and thus excluded.

(2) Note. Atomized refers to breaking up a liquid into a fine spray or fog.

SEE OR SEARCH CLASS:

239, Fluid Sprinkling, Spraying, and Diffusing, subclasses 690+ for sprinkling or spraying material solely by use of electrostatic charge, field, or force with the expressed intent to distribute a material, not to coat.

264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclass 437 for shaping or treating processes in which electrical or wave energy is applied directly to fibers or other particulate material to move, align, or effect deposition of said fibers or particles.

**473 Inorganic substrate:**
This subclass is indented under subclass 472. Processes wherein the substrate or base is inorganic.

(1) Note. Attention is directed to the definition of Class 260, Chemistry of Carbon Compounds, for the distinction between the term “organic” and “inorganic.”

**474 Solid particles applied:**
This subclass is indented under subclass 472. Processes wherein discrete solid particles are applied to a substrate.

SEE OR SEARCH CLASS:

51, Abrasive Tool Making Process, Material, or Composition, for a process of making an abrasive tool by coating. Note that a generic process for coating material, generally (which material may comprise an abrasive tool) is found in Class 427.

**475 Solid particles or atomized liquid applied:**
This subclass is indented under subclass 458. Processes wherein solid particles are sprayed or liquid particles are atomized and sprayed into the vicinity of the substrate and are electrostatically attracted thereto.

(1) Note. The particles may form the coating, or become part of a coating as when applied over a layer of adhesive.

SEE OR SEARCH CLASS:

239, Fluid Sprinkling, Spraying, and Diffusing, subclasses 690+ for claims drawn to processes for utilizing electrostatic spray devices (especially electrogasdynamic generators) to sprinkle, spray, or diffuse fluid mate-

rial wherein the expressed intent is not to coat.

**476 Inside hollow articles:**
This subclass is indented under subclass 475. Processes wherein the coating material is applied to an inner or concave surface of a cavity, bore, depression, or hole in the work.

(1) Note. Materials such as fabrics, foams, felts, etc. are not considered hollow for purposes of this subclass even though they may contain voids.

**477 Articles or substrates sequentially moved past atomizing source:**
This subclass is indented under subclass 475. Processes wherein individually supported objects to be coated are transported past a source of atomized coating material.

**478 Collection of offtarget or fugitive coating material:**
This subclass is indented under subclass 477. Processes wherein means is provided to recover (1) coating material which misses the target substrate or (2) elusive or runaway coating overflow.

**479 Utilizing multiple spray sources (e.g., atomizers):**
This subclass is indented under subclass 477. Processes wherein a substrate is coated by using multiple atomizers or spray sources.

**480 Movable atomizer or spray source (e.g., spray source or atomizer rotates, reciprocates, oscillates, etc.):**
This subclass is indented under subclass 477. Processes wherein the atomizer or spray source has a mobile mounting.

(1) Note. Processes of utilizing mechanically mobile coating projectors capable of moving across the surface of the work to insure uniform deposition of a coating are provided for in this subclass.

**481 Rotatable base or support for substrate:**
This subclass is indented under subclass 477. Processes wherein mechanical means are provided to convey the work (substrate or article) to be coated about a specified axis of rotation in which the path of every point of the moving work is an arc or circle, centered on that axis.

**482 Running or indefinite length substrate:**
This subclass is indented under subclass 475. Processes wherein a base or web to be coated travels longitudinally of itself, the length of which is continuous or uninterrupted.

(1) Note. Processes of coating running length substrates are distinguished from processes which coat the work as discrete units.

**483 Utilizing apparatus to atomize and electrostatically charge liquid coating material (e.g., charging electrode adjacent spray source, etc.):**
This subclass is indented under subclass 475. Processes wherein an electrostatic charge, field, or force is used to assist in causing a liquid material to be reduced to small particles or fine droplets and deposited on a substrate.

(1) Note. In this subclass processes may be found wherein a charging electrode stationed adjacent the spray source or coating projector causes the coating liquid to be charged and reduced to fine liquid particles.

**484 Rotatable atomizer or spray source:**
This subclass is indented under subclass 483. Processes wherein the motion of the atomizer or spray source is in a path in which every point of movement is a circle or circular arc centered on its own axis.

**485 Coating contains organic material:**
This subclass is indented under subclass 475. Processes wherein the coating material applied includes organic material in its composition.

(1) Note. Attention is directed to the definition of Class 260, Chemistry of Carbon Compounds, for the distinction between the term “organic” and “inorganic.”

**486 Inorganic substrate:**
This subclass is indented under subclass 485. Processes wherein the substrate upon which the coating is applied is inorganic.

(1) Note. Attention is directed to the definition of Class 260, Chemistry of Carbon Compounds, for the distinction between the term "organic" and "inorganic."

**487 Polymerization of coating utilizing direct application of electrical, magnetic, wave, or particulate energy (i.e., including crosslinking, curing, and hardening of organics):**
This subclass is indented under subclass 457. Processes wherein polymerization of the applied coating material (i.e., not the substrate) occurs as a result of direct application of electrical, magnetic, particulate, electromagnetic, wave energy or heat produced therefrom and at any stage in the coating process.

(1) Note. The applied energy, most often in the form of heat or light, must be used in the polymerization step.

(2) Note. For the purpose of classification here and in indented subclasses, the following terms will be understood to denote some form of polymerization: a. crosslinking; b. curing; c. hardening of organic; d. addition polymerization; e. condensation polymerization; f. grafting.

(3) Note. A claim drawn to a process of irradiating an applied coating composition with or without a reaction promoter being present, where some form of polymerization reaction takes place is proper for this and indented subclasses.

(4) Note. Processes involving coating utilizing neutral and charged particles is proper for this and indented subclasses.

**488 Plasma initiated polymerization:**
This subclass is indented under subclass 487. Processes wherein polymerization of a coated substrate is induced by utilizing a plasma.

**489 Organosilicon containing coating:**
This subclass is indented under subclass 488. Processes wherein an organic silicon compound is part of the applied coating composition.

(1) Note. Attention is directed to the definition of Class 260, Chemistry of Carbon Compounds, for the distinction between the term "organic" and "inorganic."

**490 Fluorocarbon containing coating:**
This subclass is indented under subclass 488. Processes wherein fluorocarbon compounds are part of the composition of the applied coating material.

**491 Organic substrate:**
This subclass is indented under subclass 488. Processes wherein the composition of the base or substrate is organic.

(1) Note. Attention is directed to the definition of Class 260, Chemistry of Carbon Compounds, for the distinction between the term "organic" and "inorganic."

**492 Multiple applications of identical radiation energy source to polymerize (e.g., pulse, flash lamp, etc.):**
This subclass is indented under subclass 487. Processes wherein the polymerization of the coating is influenced by the duration of intermittently applied identical radiation energy.

(1) Note. For the purpose of classification here and indented subclasses, the term "radiation energy" includes: a. Electromagnetic Radiation (radio wave, microwave, visible, ultraviolet, X rays, gamma ray, actinic) b. Acoustic Radiation (infrasonic, sonic, ultrasonic) c. Particle Radiation (alpha ray (helium atom, 2 protons + 2 neutrons), beta ray (electrons), electron (accelerated beam), neutron). This list is not intended to be exhaustive and is not limited to the above examples.

(2) Note. Processes for using pulsed discharge devices or flash lamps to achieve polymerization of the applied coating may be found here.

**493 Application of plural diverse energy sources to polymerize (e.g., electromagnetic wave**

**plus resistance heat, ultraviolet wave plus infrared wave, etc.):**
This subclass is indented under subclass 487. Processes wherein more than one type of energy source is utilized to influence the polymerization of the applied coating.

(1) Note. The multiple energy applications may be used simultaneously or sequentially.

(2) Note. The following is an example of the type of claimed subject matter which is proper for this subclass. a. A claim drawn to a process of polymerizing a coating by employing (1) a form of radiation and (2) resistance heat or (1) ultraviolet radiation and (2) infrared radiation.

**494 Gloss control (e.g., light scattering, etc.):**
This subclass is indented under subclass 487. Processes wherein the degree of specular reflection (e.g., high, medium, or low gloss, etc.) of the coating is influenced.

**495 Polymerization involving the control of oxygen containing gas as an inhibitor (e.g., air, etc.):**
This subclass is indented under subclass 487. Processes wherein means are provided to (1) alter or regulate the quantity of oxygen containing gas present including exclusion thereof or (2) purposely inhibit the polymerization step by the presence of oxygen containing gas.

(1) Note. Processes utilizing a wax layer or some other barrier to prevent or control the oxygen containing gas from entering the polymerization area are properly classified here.

**496 High energy electromagnetic radiation or high energy particles utilized (e.g., gamma rays, Xrays, atomic particles, i.e., alpha rays, beta rays, electrons, etc.):**
This subclass is indented under subclass 487. Processes wherein the energy used to effect the polymerization of the coating is high energy electromagnetic radiation or high energy particles.

(1) Note. The term "high energy electromagnetic radiation or high energy particles", as employed here and in indented subclasses includes; e.g., Xrays, gamma rays, atomic particles, i.e., alpha particles, beta particles, and high energy electrons. Electromagnetic wave energy measured below wavelengths of 100 Angstroms (10 to the minus 8 meters) will be considered "high energy electromagnetic radiation or high energy particle." This subject matter is often referred to as "high energy ionizing radiation." a. gamma ray (.000 1.40 A); b. Xray (0.1 100 A); c. atomic particle alpha ray; beta ray; d. high energy electrons accelerated (This list is not intended to be exhaustive and is not limited to the above examples.)

**497 Vapor deposition utilized:**
This subclass is indented under subclass 496. Processes wherein a coating material is deposited as a gas, mist, smoke, or vapor.

**498 Immersion, partial immersion, spraying, or spin coating utilized (e.g., dipping, etc.):**
This subclass is indented under subclass 496. Processes wherein the article or substrate to be coated is (1) dipped or submerged, either partially or wholly, in the coating material, (2) positioned to have the coating material projected by mechanical means thereon or (3) conveyed about an axis of rotation, thus moving it in an arc or circle which spreads the coating material by centrifugal force.

SEE OR SEARCH CLASS:
148, Metal Treatment, for processes wherein reactive coating occurs on the substrate and not externally thereof. Class 427 provides for coating a metal substrate with a resin composition in an immersion bath, wherein metal ions leaching from the metal substrate enter the immersion medium and react or complex externally of the metal substrate to deposit a coating containing an element from the metal substrate.

**499 Natural cellulose substrate:**
This subclass is indented under subclass 498. Processes wherein the coated article, base, or substrate is composed of natural cellulose, e.g., wood or cellulosic fibers.

(1) Note. Paper is not considered proper for this subclass, as paper is a chemically treated unnatural product.

**500 Coating material includes colorant or pigment:**
This subclass is indented under subclass 496. Processes wherein the applied coating material includes any dye, ink, paint, or coloring matter that inputs or modifies color.

SEE OR SEARCH CLASS:
399, Electrophotography, subclass 54 for color control developing, subclasses 168+ for charging, and subclasses 223+ for plural color developing.

**501 Textile, fiber, or wire coated or impregnated:**
This subclass is indented under subclass 496. Processes wherein the coated or impregnated substrate is (1) formed by a textile operation, (2) a solid or stranded group of slender, flexible rodlike materials of indefinite length or (3) of relatively short, slender, flexible elements of finite length.

**502 Magnetic recording medium formed:**
This subclass is indented under subclass 496. Processes which result in a device or material being produced which is used to store or record information by a magnetic means.

SEE OR SEARCH THIS CLASS, SUBCLASS:
500, for processes forming magnetic recording media utilizing colorant or pigment.
548, for processes forming magnetic recording media which utilize magnetic field or force to treat a substrate prior to coating or to treat a previously coated substrate.
599, for processes forming magnetic recording media which utilize magnetic field or force for the direct application of the coating material.

**503 Organosilicon containing coating material:**
This subclass is indented under subclass 496. Processes wherein the applied coating composition includes an organic silicon compound.

(1) Note. Attention is directed to the definition of Class 260, Chemistry of Carbon Compounds, for the distinction between the term “organic” and “inorganic.”

**504 Nonuniform or patterned coating (e.g., mask, printing, etc.):**
This subclass is indented under subclass 496. Processes wherein the coating (1) is applied only to selected portions of a base (2) is applied in such a manner as to produce a coating of uneven, discontinuous, or nonuniform thickness, or (3) varies from area to area as to physical or chemical properties.

SEE OR SEARCH THIS CLASS, SUBCLASS:
256+, for nonuniform or patterned coating processes without the use of electrical, magnetic, electromagnetic, or wave energy.
448, for nonuniform or patterned spray coating processes utilizing flame or plasma heat.
466, for nonuniform or patterned coating processes utilizing electrostatic charge, field, or force.
500, for nonuniform or patterned coating processes utilizing colorant or pigment.
510, for processes to polymerize an applied nonuniform or patterned coating utilizing low energy electromagnetic radiation.
526, for nonuniform or patterned coating processes utilizing ion plating or ion implantation.
552, for nonuniform or patterned coating processes involving pretreating a substrate or posttreating a coated substrate utilizing high energy electromagnetic radiation or high energy particles.
555, for nonuniform or patterned coating processes utilizing laser radiation in a thermal pretreatment of a substrate or a thermal posttreatment of a coated substrate.

SEE OR SEARCH CLASS:

430, Radiation Imagery Chemistry: Process, Composition, or Product Thereof, subclasses 31+ for coating processes involving electric or magnetic imagery.

**505 Coating is adhesive or intended to be made adhesive (e.g., release sheet or coating, etc.):**
This subclass is indented under subclass 496. Processes which result in an applied coating having adhesive properties for adhering a base to another surface.

(1) Note. The coating material may become adhesive when it is contacted by high energy electromagnetic radiation.

SEE OR SEARCH THIS CLASS, SUBCLASS:

503, for adhesive coating compositions containing organosilicon.

**506 Benzene ring or nitrogen containing coating material:**
This subclass is indented under subclass 496. Processes wherein the applied coating material contains at least one benzene ring or nitrogen.

(1) Note. The term "benzene ring" includes in all cases except where there are explicit limitations to the contrary, substituted benzene rings, including substitution in the form of an additional fused or bridged ring or ring system.

**507 Styrene or carboxamide group containing coating material (e.g., urea, urethane, etc.):**
This subclass is indented under subclass 506. Processes wherein the applied coating material contains styrene or carboxamide group.

**508 Low energy electromagnetic radiation utilized (e.g., UV, visible, IR, microwave, radio wave, actinic, laser, etc.):**
This subclass is indented under subclass 487. Processes wherein the energy used to effect the polymerization of the applied coating is low energy electromagnetic radiation.

(1) Note. The term "low energy electromagnetic radiation" as employed here and indented subclasses includes, e.g., ultraviolet, infrared, visible light, actinic, microwave, and radio waves. Electromagnetic wave energy measured above wavelengths of 100 Angstroms (10 to the minus 8 meters) will be considered low energy electromagnetic radiation. a. ultraviolet (101 4000 A); b. actinic light includes both UV & visible; c. visible (4000 A 7000 A); d. infrared (above 7000 A) e. microwave (1 mm 1 m (includes 2.45 GHz)); f. radio wave (13.56 MHz is permitted frequency); g. laser. This list is not intended to be exhaustive and is not limited to the above examples.

**509 Vapor deposition utilized:**
This subclass is indented under subclass 508. Processes wherein the coating material is deposited as a gas, mist, smoke, or vapor.

**510 Nonuniform or patterned coating (e.g., mask, printing, textured, etc.):**
This subclass is indented under subclass 508. Processes wherein the coating (1) is applied only to selected portions of a base (2) is applied in such a manner as to produce a coating of uneven, discontinuous, or nonuniform thickness or (3) varies from area to area as to physical or chemical properties.

SEE OR SEARCH THIS CLASS, SUBCLASS:

256+, for nonuniform or patterned coating processes without the use of electrical, magnetic, electromagnetic, or wave energy.

448, for nonuniform or patterned spray coating processes utilizing flame or plasma heat.

466, for nonuniform or patterned coating processes utilizing electrostatic charge, field, or force.

504, for processes to polymerize an applied nonuniform or patterned coating utilizing high energy electromagnetic radiation or high energy particles.

526, for nonuniform or patterned coating processes utilizing ion plating or ion implantation.

552, for nonuniform or patterned coating processes involving pretreating a substrate or posttreating a coated sub-

strate utilizing high energy ionizing radiation.

555, for nonuniform or patterned coating processes utilizing laser radiation in a thermal pretreatment of a substrate or a thermal posttreatment of a coated substrate.

SEE OR SEARCH CLASS:

430, Radiation Imagery Chemistry: Process, Composition, or Product Thereof, subclasses 31+ for coating processes involving electric or magnetic imagery.

**511 Printing ink utilized:**

This subclass is indented under subclass 510. Processes wherein a coating composition applied to a substrate, specially designed for use as ink, to be used for producing characters or designs by means of writing, printing, or marking is cured by using low energy electromagnetic radiation.

(1) Note. This class includes processes wherein printing ink is used to print patterns as in circuit designs or floor plans.

SEE OR SEARCH CLASS:

8, Bleaching and Dyeing; Fluid Treatment and Chemical Modification of Textiles and Fibers, subclasses 445+ for textile printing pastes.

206, Special Receptacle or Package, subclass .5 for infusion packages or receptacles containing ink.

401, Coating Implements With Material Supply, subclasses 209+ for the combination of ballpoint pen and ink particularly suitable for such an implement. (e.g., viscous ink).

520, Synthetic Resins or Natural Rubbers, appropriate subclasses, particularly Class 523, subclass 160 for a composition containing a synthetic resin or natural rubber having utility as an ink for glass or for ceramic substrates, subclass 161 for a ballpoint pen ink or a typewriter ink composition or to processes of preparing said composition.

**512 Immersion, partial immersion, spraying, or spin coating utilized (e.g., dipping, etc.):**

This subclass is indented under subclass 508. Processes wherein the article or substrate to be coated is (1) submerged or dipped, either partially or wholly, in the coating material (2) positioned to have the coating material projected by mechanical force thereon or (3) conveyed about an axis of rotation, which axis is external of the article or substrate, thus moving in an arc or circle which spreads coating material by centrifugal force.

SEE OR SEARCH CLASS:

148, Metal Treatment, for processes wherein reactive coating occurs on the substrate and not externally thereof. Class 427 provides for coating a metal substrate with a resin composition in an immersion bath, wherein metal ions leaching from the metal substrate enter the immersion medium and react or complex externally of the metal substrate to deposit a coating containing an element from the metal substrate.

**513 Textile or fiber coated or impregnated:**

This subclass is indented under subclass 508. Processes wherein the coated or impregnated base is (1) formed by a textile operation, (2) a solid or stranded group of slender, flexible rod-like materials of indefinite length or (3) of relatively short, slender, flexible elements of finite length.

**514 Coating material includes colorant or pigment:**

This subclass is indented under subclass 508. Processes wherein the applied coating material includes any dye, ink, paint, or coloring matter that inputs or modifies color.

SEE OR SEARCH THIS CLASS, SUBCLASS:

510, for processes of applying nonuniform or patterned coating utilizing colorant or pigment.

**515 Organosilicon containing coating material:**

This subclass is indented under subclass 508. Processes wherein the coating composition contains an organic silicon compound.

(1) Note. Attention is directed to the definition of Class 260, Chemistry of Carbon Compounds, for the distinction between the term "organic" and "inorganic."

**516 Coating is adhesive or is intended to be made adhesive (e.g., release sheet or coating, etc.):**
This subclass is indented under subclass 508. Processes which result in an applied coating having adhesive properties for adhering a substrate to another surface.

(1) Note. The applied coating material may become adhesive when it is contacted by low energy electromagnetic radiation.

SEE OR SEARCH THIS CLASS, SUBCLASS:
515, for adhesive coating compositions containing organosilicon.

**517 Coating includes specified rate affecting material:**
This subclass is indented under subclass 508. Processes wherein the applied coating composition includes a stipulated material which affects the rate of the polymerization.

(1) Note. A rateaffecting material is a material which either affects the rate of reaction, permits reduced amounts of wave energy, increases or decreases the degree of polymerization, cure, crosslinking, grafting, or inhibits reaction. Included are photo initiators, photosensitizers, activators, accelerators, inhibitors, initiators, retarders, sensitizing auxiliaries, generators, or curing catalysts.

(2) Note. The mere mention or recitation of use of an accelerator or rate affecting material with no specific type designated is not proper for this and indented subclasses.

(3) Note. Search subclass 514 for subject matter containing colorant or pigment.

**518 Inorganic substrate:**
This subclass is indented under subclass 517. Processes wherein the substrate is composed of inorganic material.

(1) Note. Attention is directed to the definition of Class 260, Chemistry of Carbon Compounds, for the distinction between the term "organic" and "inorganic."

**519 Keto or aldehyde containing group is part of the rate affecting coating material (e.g., benzoin, benzophenone, acetaldehyde, etc.):**
This subclass is indented under subclass 517. Processes wherein a keto or aldehyde group is part of the rate affecting coating material.

(1) Note. The following is a list of some keto or aldehyde group containing compounds that are found in this subclass. a. benzophenone, b. acetaldehyde, c. benzoin isobutyl, d. camphor quinone, e. methyl isoamyl ketone. This list is not intended to be exhaustive and is not limited to the above examples.

**520 Benzene ring or nitrogen containing coating material:**
This subclass is indented under subclass 508. Processes wherein the applied coating material contains at least one benzene ring or nitrogen.

(1) Note. The term "benzene ring" includes in all cases except where there are explicit limitations to the contrary, substituted benzene rings, including substitution in the form of an additional fused or bridged ring or ring systems.

**521 Radiation as heat source (e.g., radiant energy, etc.):**
This subclass is indented under subclass 508. Processes wherein the heat energy utilized for polymerization of the applied coating is the result of or is assisted by radiation.

(1) Note. This subclass excludes processes wherein infrared or radiant heat is used to vaporize the coating material in a vapor deposition process.

SEE OR SEARCH CLASS:
430, Radiation Imagery Chemistry: Process, Composition, or Product Thereof, subclasses 31+ for imaging using radiant energy.

**522 Resistance or induction heatinitiated polymerization:**

This subclass is indented under subclass 487. Processes wherein the polymerization step involving the applied coating is effected by using the applied coating or the substrate as the electrical energy conductor as in resistance or inductance heating, such that a current flows there through.

(1) Note. This subclass does not include processes wherein the electric current is passed through a heating filament, coil, susceptor, etc., which is not the substrate.

(2) Note. Induction heating involves subjecting a conductive body to a variable electromagnetic field, usually at a frequency lower than that used for dielectric heating. Internal resistance in the conductive body then causes the conductive body to heat up.

(3) Note. Processes wherein an electrical discharge is caused to pass through a coated substrate to initiate polymerization are found here and indented subclasses.

SEE OR SEARCH THIS CLASS, SUBCLASS:

540, wherein an arc or electrical discharge is produced in resistance heating to pretreat a substrate or posttreat a coated substrate.

SEE OR SEARCH CLASS:

219, Electric Heating, subclasses 73.11, 73.21, and 76.1+ for metal coating buildup with the use of resistance heating. Electric welding, has to have two preforms being joined, wherein coating is ancillary to the joining of the preforms.

**523 Ion plating or implantation:**

This subclass is indented under subclass 457. Processes wherein (1) evaporating a coating material in the presence of an electrical discharge (arc, beam, etc.) in an energetic gaseous medium, which forms or is associated with a cathode polarized by a high negative voltage relative to the source of the coating material, and depositing the coating material onto the substrate, with simultaneous bombardment by ions which cause momentum transfer (sputtering) on the substrate to occur or (2) coating material is introduced into or penetrates the nearsurface region of a substrate by directing an accelerated beam or stream of energetic (charged) ions including the coating material, toward the substrate.

(1) Note. The term “ion plating” is applied to a combination of process steps that include: (a) sputtering of the surface of a substrate due to momentum transfer, and; (b) simultaneously or subsequentially depositing a coating on the substrate from a flux of ionic coating material (i.e., usually considered to be a high energy plasma with a small flux of ions and a much larger number of energetic neutrals).

(2) Note. Ion implantation of the near surface region of a substrate to create a distinguishable layer differing in composition from the substrate will be proper for this Class 427, regardless of whether the implantation of this layer is limited to the microstructure or not.

(3) Note. Ion plating, wherein the target material and the substrate are one and the same is proper for this subclass and indented subclasses.

(4) Note. Processes utilizing ion bombardment or ion treating, that specifies neither implanting, etching, plating, etc., but merely recites some change as in the materials characteristic properties will be classified in this and indented subclasses with the proper crosses in Classes 156 or 204 as needed; however processes utilizing ion bombardment or ion treatment merely to treat a substrate surface, either before or after coating are found below, in this class, in the pretreatment and posttreatment area.

SEE OR SEARCH THIS CLASS, SUBCLASS:

532+, for pretreatment of a substrate or post-treatment of a coated substrate utilizing ion bombardment or ion treating.

SEE OR SEARCH CLASS:

118, Coating Apparatus, subclasses 715+ for ion plating apparatus utilizing means other than sputtering for providing the material to be deposited onto the substrate.

148, Metal Treatment, for microstructural change throughout a metal substrate involving the use of ion implantation to effect this change. Placement of the document in this class (427) is proper only when ion implantation is used to coat with incidental surface impregnation.

204, Chemistry: Electrical and Wave Energy, for coating, forming, or etching by sputtering. Class 427 is not proper for sputter etching, per se, which subject matter is classified in Class 204, however the combination of a 427 coating step combined with a 204 etching operation solely to perfect the coating is proper for this class (427). In Class 204 see subclass 192.11 for ion beam sputter deposition, subclass 192.3 for sputter etching, subclass 192.34 for ion beam sputter etching, and subclass 192.12 for glow discharge sputter deposition (e.g., Cathode sputtering, etc.); see subclass 298.02 for apparatus including target means for providing coating material to be deposited onto the substrate by sputtering said target which additionally includes means for ionizing at least a portion of the coating material and applying a potential to the substrate whereby the substrate is simultaneously subjected to electrostatically aided deposition and sputter etching due to ionic bombardment.

250, Radiant Energy, subclasses 492.1+ for methods of irradiation, per se, of a material with ions.

438, Semiconductor Device Manufacturing: Process, for processes utilizing ion implantation in the manufacture of semiconductor devices, particularly to form a PN junction.

**524 With simultaneous sputter etching of substrate:**

This subclass is indented under subclass 523. Processes wherein the sputter etching of the substrate is executed at the same time the coating is being applied to the substrate, which etching serves only to perfect the coating.

(1) Note. This class (427) is not proper for sputter etching, per se, which subject matter is classified in Class 204, however the combination of a 427 coating step combined with a 204 etching operation solely to perfect the coating is proper for this subclass.

(2) Note. In a Class 204 sputter etching process, the coating material is the target.

**525 Organic material present in substrate, plating, or implanted layer:**

This subclass is indented under subclass 523. Processes wherein (1) the plating or implanted material contains organic matter or (2) the substrate which is plated or implanted contains organic matter.

(1) Note. Attention is directed to the definition of Class 260, Chemistry of Carbon Compounds, for the distinction between the terms “organic” and “inorganic.”

**526 Nonuniform or patterned ion plating or ion implanting (e.g. mask, etc.):**

This subclass is indented under subclass 523. Processes wherein the ion plating or ion implanting (1) is applied only to selected portions of a substrate (2) is applied in such a manner as to produce a coating of uneven, discontinuous, or nonuniform thickness or (3) varies from area to area as to physical or chemical properties.

SEE OR SEARCH THIS CLASS, SUBCLASS:

256+, for nonuniform or patterned coating processes without the use of electrical, magnetic, electromagnetic, or wave energy.

448, for nonuniform or patterned spray coating processes utilizing flame or plasma heat.

466, for nonuniform or patterned coating processes utilizing electrostatic charge, field or force.

504, for processes to polymerize an applied nonuniform coating utilizing high energy electromagnetic radiation or high energy particles.

510, for processes to polymerize an applied nonuniform coating utilizing low energy electromagnetic radiation.

552, for nonuniform or patterned processes involving pretreating a substrate or posttreating a coated substrate utilizing high energy electromagnetic radiation or high energy particles.

555, for nonuniform or patterned coating processes utilizing laser radiation in a thermal pretreatment of a substrate or a thermal posttreatment of a coated substrate.

SEE OR SEARCH CLASS:

430, Radiation Imagery Chemistry: Process, Composition, or Product Thereof, subclasses 31+ for coating processes involving electric or magnetic imagery.

**527 Silicon present in substrate, plating, or implanted layer:**

This subclass is indented under subclass 523. Processes, wherein (1) the plating or implanted material contains silicon or (2) the substrate which is plated or implanted contains silicon.

**528 Metal or metal alloy substrate:**

This subclass is indented under subclass 523. Processes wherein the substrate (base or workpiece) which is plated or implanted is a pure metal or metal alloy.

**529 Inorganic oxide containing plating or implanted material:**

This subclass is indented under subclass 523. Processes wherein the plating material or the resulting implanted material contains inorganic oxide.

(1) Note. Attention is directed to the definition of Class 260, Chemistry of Carbon Compounds, for the distinction between the terms “organic” and “inorganic”.

**530 Inorganic metal compound present in plating or implanted material (e.g., nitrides, carbides, borides, etc.):**

This subclass is indented under subclass 523. Processes wherein the plating or the resulting implanted material contains inorganic metal compounds.

(1) Note. Coating materials containing inorganic metal nitrides, carbides, and borides are some of the metal compounds found in this subclass.

(2) Note. Processes wherein the implanting material may be a mixture of metals, nitrogen, carbon, or boron which may react in or on a base to form a distinct metal nitride, carbide, or boride layer are found here.

(3) Note. Attention is directed to the definition of Class 260, Chemistry of Carbon Compounds, for the distinction between the terms “organic” and “inorganic.”

**531 Metal or metal alloy as plating or implanted material:**

This subclass is indented under subclass 523. Processes wherein the plating or implanting material is pure metal or metal alloy.

**532 Pretreatment of substrate or posttreatment of coated substrate:**

This subclass is indented under subclass 457. Processes wherein (1) prior to a coating a substrate is chemically or physically modified or (2) after a coating is applied there is modification of the chemical or physical characteristics of the coated substrate utilizing electrical, magnetic, electromagnetic, or wave energy.

SEE OR SEARCH CLASS:

65, Glass Manufacturing, for processes involving coating glass plus subsequent treatment thereof (e.g., including patents claiming the step of coating a glass substrate and reacting the coating with a constituent of the glass substrate).

**533 Ionized gas utilized (e.g., electrically powered source, corona discharge, plasma, glow discharge, etc.):**
This subclass is indented under subclass 532. Processes wherein an energetic (charged) gaseous medium is utilized in the pretreatment of a substrate or the posttreatment of a substrate.

(1) Note. Alpha rays (particles) are identical to the helium atom, and for classification purposes will not be considered as an ionized gas since, they are not in a naturally occurring ionization state under any normal earth conditions, except in nuclear processes.

**534 Cleaning or removing part of substrate (e.g., etching with plasma, glow discharge, etc.):**
This subclass is indented under subclass 533. Processes wherein, prior to the coating, etching influenced by electrical, magnetic, electromagnetic, or wave energy, is utilized to clean or remove part of the substrate.

(1) Note. Plasma, glow discharge, and electron beam etching are some of the processes used to clean that are found here.

(2) Note. In processes involving plural coating steps wherein electrical, magnetic, electromagnetic, or wave energy etching is used to clean a previously deposited coating with the intent to perfect a subsequent deposited coating will be considered proper for this class (427).

SEE OR SEARCH CLASS:
216, Etching a Substrate: Processes, especially subclasses 63+ for posttreatment etching utilizing high energy techniques. Pretreatment etching of a substrate utilizing electric, electromagnetic, magnetic, or wave energy is proper for Class 427.

**535 Plasma (e.g., cold plasma, corona, glow discharge, etc.):**
This subclass is indented under subclass 533. Processes wherein an ionized gas used is a plasma, having a concentration of negatively and positively charged carriers which are approximately equal.

(1) Note. A plasma consists of a wholly or partially ionized gas composed of ions, electrons, and neutral particles.

**536 Organic substrate:**
This subclass is indented under subclass 535. Processes wherein the composition of the base is organic.

(1) Note. Attention is directed to the definition of Class 260, Chemistry of Carbon Compounds, for the distinction between the term “organic” and “inorganic.”

**537 Metal containing coating:**
This subclass is indented under subclass 536. Processes wherein the coating material contains a pure metal or metal alloy.

**538 Textile or fiber coated or impregnated:**
This subclass is indented under subclass 536. Processes wherein the coated or impregnated substrate is (1) formed by a textile operation or (2) in the form of relatively short, slender, flexible elements of finite length (3) a solid or stranded group of slender, flexible rodlike material of indefinite length.

**539 Oxygen containing atmosphere:**
This subclass is indented under subclass 535. Processes wherein plasma treatment of the base is conducted in a gaseous surrounding or environment which includes oxygen.

**540 Arc or electrical discharge:**
This subclass is indented under subclass 532. Processes wherein a luminous discharge of electricity, through a gas or vapor is applied directly to the substrate, which may be in the form of an electrode.

(1) Note. The arc discharge is a type of electrical conduction in gases characterized by high current density and low potential drop. It is closely related to the glow discharge, but has a much lower potential drop in the cathode region, as well as a greater current density. No sustained plasma is formed.

SEE OR SEARCH THIS CLASS, SUBCLASS:
446, for the use of an arc to plasma spray.

SEE OR SEARCH CLASS:

219, Electric Heating, subclasses 73.11, 73.21, and 76.14 for coating operations that involve a buildup of a metal coating on a metal workpiece and wherein an arc between an electrode and the work is utilized.

**541 Drying:**

This subclass is indented under subclass 532. Processes wherein the electrical, magnetic, electromagnetic or wave energy is used to effect the extraction or the elimination of moisture or liquids from the substrate or coating.

SEE OR SEARCH CLASS:

34, Drying and Gas or Vapor Contact With Solids, subclasses 266+, 418, 419+, and 519+ for processes utilizing radiant energy to dry, per se. Combinations of coating processes and drying operations are proper however for Class 427.

**542 Infrared or radiant heating:**

This subclass is indented under subclass 541. Processes wherein the drying is directly influenced by electromagnetic waves longer than those of visible light and shorter than those of radio waves or by infrared radiation; e.g., black body radiation, from a body not hot enough to emit visible radiation.

(1) Note. This subclass provides for coating processes utilizing radiant heat only when "radiant heat" is specifically set forth.

(2) Note. This subclass excludes processes wherein the infrared energy or radiant heat is utilized to vaporize the coating material in a vapor deposition process.

(3) Note. Radiant rays pass through gases without warming them appreciably, but the rays increase the sensible temperature of a solid or liquid upon which they impinge.

SEE OR SEARCH THIS CLASS, SUBCLASS:

248.1, for coating processes utilizing vaporized coating materials in vapor deposition processes.

**543 Induction or dielectric heating:**

This subclass is indented under subclass 532. Processes which utilize induction or dielectric heating in treating a substrate before it is coated or treating a coated substrate.

(1) Note. Induction heating involves subjecting a conductive body to a variable electromagnetic field, usually at a frequency lower than that used for dielectric heating. Internal resistance in the conductive body then cause the conductive body to heat up

(2) Note. Dielectric heating involves the method of raising the temperature of a nominally insulating material by sandwiching it between two plates to which an rf voltage is applied. The material acts as a dielectric and its internal resistance causes it to heat up.

**544 Organic coating containing material:**

This subclass is indented under subclass 543. Processes wherein a posttreated substrate has organic material in its coating composition.

(1) Note. Attention is directed to the definition of Class 260, Chemistry of Carbon Compounds, for the distinction between the term "organic" and "inorganic."

**545 Resistance heating:**

This subclass is indented under subclass 532. Processes wherein an electrical current is passed through a substrate before it is coated or an electrical current is passed through a coated substrate to produce heat by means of internal resistance.

(1) Note. This subclass does not include processes wherein the electric current is passed through a heating filament, coil, susceptor, etc., which is not the substrate.

SEE OR SEARCH THIS CLASS, SUBCLASS:
540, wherein an arc or electrical discharge is produced in resistance heating.

SEE OR SEARCH CLASS:
219, Electric Heating, subclasses 73.11, 73.21, and 76.1+ for metal coating buildup with the use of resistance heating. Electric welding has to have two preforms being joined, wherein coating is ancillary to the joining of the preforms.

**546 Metal or metal alloy containing coating:**
This subclass is indented under subclass 545. Processes wherein the coating material contains a pure metal or metal alloy.

**547 Magnetic field or force utilized:**
This subclass is indented under subclass 532. Processes wherein a magnetic field or force is used to treat a substrate before it is coated or to treat a coated substrate.

SEE OR SEARCH THIS CLASS, SUBCLASS:
543, for the use of a magnetic field or force to produce induction heating.

**548 Magnetic recording medium or device formed:**
This subclass is indented under subclass 547. Processes wherein a device or tape is produced to store information by a magnetic means.

(1) Note. For this and indented subclasses it is understood that magnetic recording media usually contain magnetizable particles, hence need not be subsequently crossed to the pertaining subclass of equal or lesser indentation below.

SEE OR SEARCH THIS CLASS, SUBCLASS:
128, for methods of forming magnetic devices in general, not provided for above.
502, for magnetic recording medium formed using high energy ionizing radiation.

SEE OR SEARCH CLASS:
520, Synthetic Resins or Natural Rubbers, appropriate subclasses, particularly Class 523, subclass 181 for a composition for magnetic purposes, but which is devoid of magnetic material or to processes or preparing said compositions.

**549 Running length substrate:**
This subclass is indented under subclass 548. Processes wherein the magnetic medium to be coated travels longitudinally of itself, the length of which is continuous or uninterrupted.

**550 Magnetizable powder, flakes, or particles utilized:**
This subclass is indented under subclass 547. Processes wherein the coating material containing powder, flakes, or particles are influenced by the magnetic field or force during the pretreatment of a substrate or the posttreatment of a coated substrate.

**551 High energy electromagnetic radiation or high energy particles utilized (e.g., gamma ray, Xray, atomic particle, i.e., alpha ray, beta ray, high energy electron, etc.):**
This subclass is indented under subclass 532. Processes wherein the substrate prior to coating or the coated substrate is treated with high energy electromagnetic radiation or high energy particles.

(1) Note. The term “high energy electromagnetic radiation or high energy particles,” as employed here and in indented subclasses includes; e.g., Xrays, gamma rays, atomic particles; i.e., alpha particles, beta particles, and high energy electrons. Electromagnetic wave energy measured below wavelengths of 100 Angstroms (10 to the minus 8 meters) will be considered “high energy electromagnetic radiation or high energy particle.” This subject matter is often referred to as “high energy ionizing radiation.” a. gamma ray ( .000 1.40 A); b. Xray (0.1 100 A); c. atomic particle alpha ray; beta ray; d. high energy electrons accelerated. This list is not intended to be exhaustive and is not limited to the above examples.

(2) Note. Alpha rays are helium, and for classification purposes will not be considered as an ionized gas since, except in nuclear processes, they are not a naturally occurring ionization state under any normal earth conditions.

**552 Nonuniform or patterned coating:**
This subclass is indented under subclass 551. Processes wherein the coating utilized in the pretreatment of a substrate or the posttreatment of a coated substrate (1) is applied only to selected portions of a substrate, (2) is applied in such a manner as to produce a coating of uneven, discontinuous, or nonuniform thickness or (3) varies from area to area as to physical or chemical properties.

SEE OR SEARCH THIS CLASS, SUBCLASS:
256+, for nonuniform or patterned coating processes without the use of electrical, magnetic, electromagnetic, or wave energy.
448, nonuniform or patterned spray coating processes utilizing flame or plasma heat.
466, for nonuniform or patterned coating processes utilizing electrostatic charge, field, or force.
504, for processes to polymerize an applied nonuniform or patterned coating utilizing high energy electromagnetic radiation or high energy particles.
510, for processes to polymerize an applied nonuniform or patterned coating utilizing low energy electromagnetic radiation.
526, for nonuniform or patterned coating processes utilizing ion plating or implantation.
555, for nonuniform or patterned coating processes utilizing laser radiation in a thermal pretreatment or a thermal posttreatment of a coated substrate.

SEE OR SEARCH CLASS:
430, Radiation Imagery Chemistry: Process, Composition, or Product Thereof, subclasses 31+ for coating processes involving electric or magnetic imagery.

**553 Low energy electromagnetic radiation (e.g., microwave, radio wave, IR, UV, visible, actinic, laser, etc.):**
This subclass is indented under subclass 532. Processes wherein the substrate prior to coating or the coated substrate is treated with low energy electromagnetic radiation.

(1) Note. The term "low energy electromagnetic radiation" as employed here and indented subclasses includes, e.g., ultraviolet, infrared, visible light, actinic, microwave, and radio waves. Electromagnetic wave energy measured above wavelengths of 100 Angstroms(10 to the minus 8 meters) will be considered low energy electromagnetic radiation. a. ultraviolet (101 4000 A); b. actinic light includes both UV & visible; c. visible (4000 A 7000 A); d. infrared (above 7000 A); e. microwave (1mm 1m (includes 2.45 GHz)); f. radio wave 13.56 MHz is permitted frequency; g. laser. This list is not intended to be exhaustive and is not limited to the above examples.

**554 Laser:**
This subclass is indented under subclass 553. Processes wherein a narrow beam of coherent light (light amplification by simulated emissions of radiation) is utilized to treat the substrate or coated substrate.

SEE OR SEARCH CLASS:
219, Electric Heating, subclasses 121.11+ for processes utilizing electric heat energy, per se, wherein the heat source is an electron beam, plasma, arc, laser, etc. Documents should be placed in Class 427 as originals if a coating operation is claimed in combination with an electric heating step to treat a substrate before or after coating.

**555 Nonuniform or patterned coating:**
This subclass is indented under subclass 554. Processes wherein the coating utilized in the pretreatment of a substrate or the posttreatment of a coated substrate (1) is applied only to selected portions of a base, (2) is applied in such a manner as to produce a coating of

uneven, discontinuous, or nonuniform thickness or (3) varies from area to area as to physical or chemical properties.

SEE OR SEARCH THIS CLASS, SUBCLASS:

256+, for nonuniform or patterned coating processes without the use of electrical, magnetic, electromagnetic, or wave energy.

448, nonuniform or patterned spray coating processes utilizing flame or plasma heat.

466, for nonuniform or patterned coating processes utilizing electrostatic charge, field, or force.

504, for processes to polymerize an applied nonuniform or patterned plasma coating utilizing high energy electromagnetic radiation or high energy particles.

510, for processes to polymerize an applied nonuniform or patterned coating utilizing low energy electromagnetic radiation.

526, for nonuniform or patterned coating processes utilizing ion plating or implantation.

SEE OR SEARCH CLASS:

430, Radiation Imagery Chemistry: Process, Composition, or Product Thereof, subclasses 31+ for coating processes involving radiation imagery.

**556 Metal or metal alloy substrate:**
This subclass is indented under subclass 555. Processes wherein the nonuniform coating is applied to a pure metal or metal alloy substrate.

**557 Thermal processes (e.g., radiant heat, infrared, etc.):**
This subclass is indented under subclass 553. Processes wherein the energy utilized to treat a substrate prior to coating or a coated substrate is heat producing wave energy.

**558 Ultraviolet light:**
This subclass is indented under subclass 557. Processes wherein the wave energy utilized to produce the heat which treats the substrate or the coated substrate is ultraviolet light.

**559 Fusing, curing, or annealing (e.g., ceramics, etc.):**
This subclass is indented under subclass 557. Processes wherein wave energy is utilized to produce heat which will fuse, cure, or anneal the coating in a posttreatment process.

(1) Note. Annealing of metals is not classified here. Search the appropriate metal working and metal treating classes.

**560 Sonic or ultrasonic (e.g., cleaning or removing material from substrate, etc.):**
This subclass is indented under subclass 532. Processes wherein sonic or ultrasonic energy is utilized to pretreat a substrate or to posttreat a coated substrate.

(1) Note. Ultrasonic has a frequency above sonic; i.e., frequencies above 16,000 hertz and below radio waves.

**561 Pretreatment of coating supply or source outside of primary deposition zone or off site:**
This subclass is indented under subclass 457. Processes wherein a coating material supply which is offsite or outside of the primary deposition region, zone, or chamber is treated with electrical, magnetic, electromagnetic, or wave energy and subsequently directed or reflected to the substrate to which it is applied.

(1) Note. Included herein are processes of producing a vapor for use in vapor deposition processes.

(2) Note. Processes utilizing plural chambers, shutters, shields, or noncontiguous masks and some guides or separators are used to direct the pretreated coating supply found in this subclass.

**562 Electric discharge (e.g., corona, glow discharge, etc.):**
This subclass is indented under subclass 561. Processes wherein an electric discharge is used to treat the coating material before it is applied.

(1) Note. The arc discharge is a type of electrical conduction in gases characterized by high current density and low potential drop. It is closely related to the

glow discharge, but has a much lower potential drop in the cathode region, as well as a greater current density.

**563 Silicon containing coating material:**
This subclass is indented under subclass 562. Processes wherein coating material applied to the substrate contains silicon.

SEE OR SEARCH CLASS:
438, Semiconductor Device Manufacturing: Process, particularly subclasses 788+ and 792+ for deposition of silicon oxide or silicon nitride, respectively, on a semiconductor substrate utilizing electromagnetic or wave energy.

**564 Metal, metal alloy, or metal oxide containing coating material:**
Processes under 562 wherein the coating material supply contains a pure metal, metal alloy, or metal oxide.

**565 Sonic or ultrasonic (e.g., vibratory energy, etc.):**
This subclass is indented under subclass 561. Processes wherein sonic or ultrasonic wave energy is used to cause a continuously reversing change in the magnitude of waves (vibrations) to treat the coating material supply.

**566 Electron irradiation (e.g., ebeam evaporation, etc.):**
This subclass is indented under subclass 561. Processes wherein the direct application of electrons is employed to treat the coating material supply.

**567 Silicon or metal oxide coating (e.g., glass, etc.):**
This subclass is indented under subclass 566. Processes wherein the coating material contains metal oxide or silicon.

**568 Silicon containing coating supply or source:**
This subclass is indented under subclass 561. Processes wherein the coating supply or source contains silicon.

**569 Plasma (e.g., corona, glow discharge, cold plasma, etc.):**
This subclass is indented under subclass 457. Processes wherein a wholly or partially ionized gas, which has an activating source, is responsible for the deposition of the coating material.

(1) Note. A plasma consists of a wholly or partially ionized gas composed of ions, electrons, and neutral particles. The concentration of negatively and positively charged carriers are approximately equal.

(2) Note. Processes utilizing corona, glow discharge, and cold plasma are found here, when utilized to cause disassociation or ionization of the vaporous reactants allowing a coating material (reaction product) to deposit on a substrate.

(3) Note. In a cold plasma the temperature of the electrons is high wherein the temperature of the ions is relatively low, possibly room temperature.

**570 Utilizing plasma with other nonionizing energy sources:**
This subclass is indented under subclass 569. Processes which utilize (1) a plasma and (2) a secondary energy source at any stage in the plasma coating process for any reason, other than initiating or generating the plasma.

(1) Note. This subclass includes subject matter with dual activation (reaction energized sites) wherein one of the energy sources must be plasma (e.g., plasma plus infrared heat energy, etc.).

(2) Note. Lacking an indication to the contrary, it will be assumed that a disclosed energy source is the plasma initiating source, unless it is specified that the energy source is utilized for a purpose other than initiating the plasma.

**571 With magnetic enhancement:**
This subclass is indented under subclass 570. Processes wherein a plasma utilized having an activating energy source is confined or shaped by a magnetic field or force.

**572 Light as energy source:**
This subclass is indented under subclass 570. Processes wherein the secondary energy used in conjunction with a plasma is electromagnetic wave energy.

**573 With heated substrate:**
This subclass is indented under subclass 570. Processes wherein a substrate is heated using electrical or electromagnetic wave energy, including indirect heat as in the form of a susceptor.

**574 Silicon containing coating:**
This subclass is indented under subclass 570. Processes wherein the coating material contains silicon.

**575 Generated by microwave (i.e., 1mm to 1m):**
This subclass is indented under subclass 569. Processes wherein microwave energy is utilized to activate or initiate the plasma.

(1) Note. The wavelength of microwave is measured as 1mm to 1m and its FCC allowed frequency is 2.45 GHz.

(2) Note. Microwave is a term applied to electromagnetic waves which occupy a region in the electromagnetic spectrum which is bounded by radio waves on the side of longer wavelengths and by infrared waves on the side of shorter wavelengths.

**576 Metal, metal alloy, or metal oxide coating:**
This subclass is indented under subclass 569. Processes wherein the coating material applied contains a pure metal, metal alloy, or metal oxide.

**577 Inorganic carbon containing coating material, not as steel (e.g., carbide, etc.):**
This subclass is indented under subclass 569. Processes wherein the coating material, excluding steel, contains inorganic carbon.

(1) Note. Attention is directed to the definition of Class 260, Chemistry of Carbon Compounds, for the distinction between the terms “organic” and “inorganic.”

(2) Note. Metal compounds, excluding steel, containing more than 1.7 percent of inorganic carbon are properly classified in this subclass.

**578 Silicon containing coating material:**
This subclass is indented under subclass 569. Processes wherein a coating material applied contains silicon.

**579 Silicon oxides or nitrides:**
This subclass is indented under subclass 578. Processes wherein the silicon utilized in the coating material is silicon oxide or silicon nitride.

SEE OR SEARCH THIS CLASS, SUBCLASS:
577, for coating material containing silicon carbide.

SEE OR SEARCH CLASS:
438, Semiconductor Device Manufacturing: Process, particularly subclasses 788+ and 792+ for deposition of silicon oxide or silicon nitride, respectively, on a semiconductor substrate utilizing electromagnetic or wave energy.

**580 Electrical discharge (e.g., arcs, sparks, etc.):**
This subclass is indented under subclass 457. Processes wherein the deposition of the coating material involves the use a luminous discharge of electricity, through a gas or vapor, between two electrodes of which one may be the substrate.

(1) Note. An arc discharge is a type of electrical conduction in gases characterized by high current density and low potential drop. It is closely related to the glow discharge, but has a much lower potential drop in the cathode region, as well as a greater current density, wherein no sustained plasma is formed.

SEE OR SEARCH THIS CLASS, SUBCLASS:
446, for the use of an arc to coat with plasma spray.
562, for the use of an arc to pretreat the coating supply or source.

SEE OR SEARCH CLASS:

219, Electric Heating, subclasses 73.11, 73.21, and 76.1+ for coating operations that involve a buildup of metal coating on a metal workpiece and wherein an arc between and electrode and the work is utilized.

**581 Chemical deposition from liquid contiguous with substrate via electron beam or light (e.g., photochemical liquid deposition, etc.):**
This subclass is indented under subclass 457. Processes wherein the deposition of a liquid coating is driven by either light energy or an electron beam. The liquid coating material must be contiguous with the substrate during the energy application.

**582 Photoinitiated chemical vapor deposition (i.e., photo CVD):**
This subclass is indented under subclass 457. Processes wherein a chemical vapor reaction driven by the absorption of light occurs and a reaction product is deposited on a substrate.

(1) Note. In processes involving photo initiated chemical vapor deposition, the wave length or the specific energy level of a photon are generally identified.

**583 Silicon containing coating:**
This subclass is indented under subclass 582. Processes wherein an applied coating contains silicon.

**584 Metal, metal alloy, or metal oxide coating:**
This subclass is indented under subclass 582. Processes wherein an applied coating material contains pure metal, metal alloy, or metal oxide.

**585 Chemical vapor deposition (e.g., electron beam or heating using IR, inductance, resistance, etc.):**
This subclass is indented under subclass 457. Processes wherein a vapor phase precursor decomposes either in a gas or on a substrate, which reaction is effected by electromagnetic, electrical, magnetic, or wave energy which results in a coated substrate.

(1) Note. Thermal chemical vapor deposition processes using infrared heating to effect or assist in effecting the chemical reaction are found here.

(2) Note. This subclass excludes processes wherein an infrared energy is utilized merely to vaporize the coating material, e.g., where no chemical reaction takes place, in a vapor deposition process.

(3) Note. Indirect heat transfer to a substrate as via convection is excluded from this and indented subclasses as a heat energy source.

SEE OR SEARCH THIS CLASS, SUBCLASS:

69, and 70, for producing an electrical product by vapor deposition coating of a fluorescent or phosphorescent base which may include utilization of radiant heat.

78, for a process of vapor deposition which may include utilization of radiant heat to make an electrical product which is electron emissive or suppressive (excluding electrode for arc).

96.7, for a process of using a mist or aerosol for coating a substrate which may include utilization of radiant heat to produce an integrated or printed circuit or circuit board.

96.8, for a process of coating vapor or gas phase material (other than a mist or aerosol) onto a substrate which may include utilization of radiant heat to produce an integrated or printed circuit or circuit board.

124, for a process of metal coating by vapor deposition or utilizing vacuum which may include utilization of radiant heat to make an electrical product, in general.

166, and 167, for a process of making an optical element by vapor deposition onto a transparent glass base which may include utilization of radiant heat.

248.1 through 255.7, for other processes of coating by vapor, gas, or smoke which may include utilization of radiant heat.

497, 509, 582-584, and 593, for other vapor deposition processes involving direct application of electrical, mag-

netic, wave, or particulate energy to a substrate, coated substrate, or coating material.

SEE OR SEARCH CLASS:

117, Single-Crystal, Oriented-Crystal, and Epitaxy Growth Processes; Non-Coating Apparatus Therefor, appropriate subclasses for a process for growing therein-defined single crystal of all types of materials, including inorganic or organic, and by all techniques, especially subclasses 84 through 109 for vapor or gas phase epitaxy.

**586 Pyrolytic use of laser or focused light (e.g., IR, UV lasers to heat, etc.):**

This subclass is indented under subclass 585. Processes in which a chemical vapor deposition process utilizes heat generated by laser (UV, IR, or focused beam) radiation to drive the chemical reaction.

**587 Resistance or induction heating:**

Processes under 585 wherein resistance or induction heat is employed to effect the coating.

(1) Note. Induction heating involves subjecting a conductive body to a variable electromagnetic field, usually at a frequency lower than that used for dielectric heating. Internal resistance in the conductive body then cause the conductive body to heat up.

(2) Note. Resistance heating involves passing an electric current through a conductive body to produce heat by means of internal resistance.

(3) Note. This subclass does not include processes wherein the electric current is passed through a heating filament, coil, susceptor, etc., which is not the substrate.

SEE OR SEARCH THIS CLASS, SUBCLASS:

540, wherein an arc or electrical discharge is produced in resistance heating.

SEE OR SEARCH CLASS:

219, Electric Heating, subclasses 73.11, 73.21, and 76.1+ for metal coating buildup with the use of resistance heating. Electric welding, has to have two preforms being joined, wherein coating is ancillary to the joining of the preforms.

**588 Silicon or semiconductor material containing coating:**

This subclass is indented under subclass 587. Processes wherein coating matter applied to a substrate contains silicon or semiconductor material.

SEE OR SEARCH CLASS:

438, Semiconductor Device Manufacturing: Process, particularly subclasses 788+ and 792+ for deposition of silicon oxide or silicon nitride, respectively, on a semiconductor substrate utilizing electromagnetic or wave energy.

**589 Silicon carbide:**

This subclass is indented under subclass 588. Processes wherein the silicon utilized in the coating is silicon carbide.

**590 Boron, nitrogen, or inorganic carbon containing coating:**

This subclass is indented under subclass 587. Processes wherein the coating material contains boron, nitrogen, or inorganic carbon included in its composition.

(1) Note. Attention is directed to the definition of Class 260, Chemistry of Carbon Compounds, for the distinction between the terms “organic” and “inorganic.”

**591 Induction or dielectric heating:**

This subclass is indented under subclass 457. Processes which utilize induction or dielectric heating.

(1) Note. Induction heating involves subjecting a conductive body to a variable electromagnetic field, usually at a frequency lower than that used for dielectric heating. Internal resistance in the

conductive body then cause the conductive body to heat up.

(2) Note. Dielectric heating involves the method of raising the temperature of a nominally insulating material by sandwiching it between two plates to which an rf voltage is applied. The material acts as a dielectric and its internal resistance causes it to heat up.

**592 Resistance heating:**
This subclass is indented under subclass 457. Processes wherein an electrical current is passed through the coating material or substrate to produce heat by means of internal resistance.

(1) Note. This subclass does not include processes wherein the electric current is passed through a heating filament, coil, susceptor, etc., which is not the substrate or the coating material.

(2) Note. This subclass excludes indirect heat transfer to the substrate or coating material as via convection heat.

SEE OR SEARCH THIS CLASS, SUBCLASS:
248.1, for processes involving direct heating of an evaporation pot, boat, or crucible containing coating material using resistance energy with the intent to vaporize said coating for application to a substrate.
540, wherein an arc or electrical discharge is produced in resistance heating to effect coating.
580, wherein an arc or electrical discharge is produced in resistance heating to effect coating.

SEE OR SEARCH CLASS:
219, Electric Heating, subclasses 73.11, 73.21, and 76.1+ for metal coating buildup with the use of resistance heating. Electric welding has to have two preforms being joined, wherein coating is ancillary to the joining of the preforms.

**593 Vapor deposition employing resistance heating of substrate or coating material:**
This subclass is indented under subclass 592. Processes wherein a substrate is resistively heated and a coating material is applied as a vapor or gas, or a source material for vapor deposition is resistively heated.

(1) Note. Processes utilizing consumable electrodes to apply coating as vapor or gas, by resistance electrical energy are proper for this and indented subclasses.

(2) Note. Explosive or detonation vaporization for deposition, via resistance heating is properly classified here.

(3) Note. Processes wherein a rod, wire, or filament is wholly or partially vaporized and deposited on a substrate is proper for this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:
446, for explosive or detonation flame or plasma spray vaporization.
587, wherein a chemical vapor reaction occurs.

**594 Immersion or partial immersion:**
This subclass is indented under subclass 592. Processes wherein the coating is applied by submerging at least part of the base in a pool or bath of coating material.

(1) Note. Reference to the use of a “bath” coating process is considered immersion and proper for this subclass.

(2) Note. Fluidized bed processes will not be considered immersion for this subclass. Processes utilizing fluidized beds of solid particles or powder using resistance heating is found in this class, subclass 592.

**595 Electromagnetic or particulate radiation utilized (e.g., IR, UV, Xray, gamma ray, actinic, microwave, radio wave, atomic particle; i.e., alpha ray, beta ray, electron, etc.):**
This subclass is indented under subclass 457. Processes wherein the deposition of the coating material is assisted by electromagnetic or par-

ticular radiation, the propagation of energy through space or material.

(1) Note. For the purpose of classification here and in indented subclasses, the term "electromagnetic or particulate radiation" includes the following: a.Electromagnetic Radiation; (radio wave, microwave, visible, ultraviolet, X rays, gamma ray, actinic) b. Particulate Radiation (alpha ray (2 protons + 2 neutrons); beta ray (electrons), electron (accelerated beam) neutron)

This list is not intended to be exhaustive and is not limited to the above examples.

**596 Laser or electron beam (e.g., heat source, etc.):**
This subclass is indented under subclass 595. Processes wherein laser or electron beam is utilized as a heat source to assist in the deposition of the coating material.

(1) Note. Processes wherein a narrow beam of coherent light (light amplification by simulated emissions of radiation) is utilized to assist in the deposition of the coating material are found here.

(2) Note. Processes wherein a narrow stream of electrons moving in the same direction under the influence of an electric or magnetic field is utilized as a heat source to assist in the deposition of the coating are found here.

**597 Metal or metal alloy containing coating material applied:**
This subclass is indented under subclass 596. Processes wherein the coating material applied contains a pure metal or a metal alloy.

**598 Magnetic field or force utilized:**
This subclass is indented under subclass 457. Processes wherein a magnetic field or force is used to treat or coat or assist in the treatment or coating of a substrate or coated substrate.

SEE OR SEARCH THIS CLASS, SUBCLASS:
543, for the use of a magnetic field or force to produce induction heating.
547, for the use of magnetic field or force to pretreat or posttreat the substrate.

**599 Magnetic recording medium or device formed:**
This subclass is indented under subclass 598. Processes wherein a device or tape is produced to store information by magnetic means.

SEE OR SEARCH THIS CLASS, SUBCLASS:
128, for methods of forming magnetic devices in general, not provided for above.
502, for magnetic recording medium formed using high energy ionizing radiation.
548, for the formation of a magnetic medium which utilizes magnetic field or force to pretreat or posttreat the substrate.

**600 Sonic or ultrasonic:**
This subclass is indented under subclass 457. Processes wherein the wave energy used to cause deposition of the applied coating is sonic or ultrasonic.

(1) Note. Ultrasonic waves vibrate at frequencies beyond the hearing power of human beings (above 16,000 hertz). Sonic frequencies are vibrations which can be heard by the human ear (from about 15 hertz to approximately 20,000 hertz).

**601 Immersion bath utilized:**
This subclass is indented under subclass 600. Processes wherein the coating is applied by wholly or partially submerging the base in a coating material and simultaneously applying sonic or ultrasonic energy to the base or the coating material supply.

CROSS-REFERENCE ART COLLECTIONS

**900 CHEMICAL VAPOR INFILTRATION (i.e., CVI):**
This subclass is indented under the class definition. Process in which chemical reactants in vapor phase penetrate a porous substrate wherein a vapor phase reaction subsequently occurs to form a coating that deposits in said substrate.

**901 LIQUID SOURCE CHEMICAL VAPOR DEPOSITION (i.e., LSCVD) OR AEROSOL CHEMICAL VAPOR DEPOSITION (i.e., ACVD):**
This subclass is indented under the class definition. Process which includes vaporizing a liquid material within a chemical vapor deposition chamber or reactor, wherein the vaporized liquid (per se or in aerosol form) contacts a heated substrate to thermally decompose, thereby forming a coating (film, layer, etc.) on the substrate surface.

(1) Note. This subclass is proper for heat decomposition of liquid, vapor, or gas to form a coating on a base

SEE OR SEARCH THIS CLASS, SUBCLASS:
226, for using heat to decompose an existing coating on a base.

**902 DIAMOND-LIKE CARBON COATING (i.e., DLC):**
This subclass is indented under the class definition. Process wherein the resulting coating consists primarily of metastable amorphous carbon which contains both hybridized tetragonal sp3 and trigonal sp2 bonds.

(1) Note. The diamond-like carbon may contain, in addition to the primary amorphous phase, very small crystals ranging in diameter from 2nm to 20nm.

**903 FULLERENE TYPE BASE OR COATING:**
This subclass is indented under the class definition. Process wherein the coating or base consists of carbon (generally carbon with 20 to 1000 atoms) having pentagonal or hexagonal faces.

**904 Utilizing low energy electromagnetic radiation (e.g., microwave, radio wave, IR, UV, visible, actinic, laser, etc.):**
This subclass is indented under subclass 902. Process wherein low energy electromagnetic radiation is used during any stage of the coating operation to deposit a diamond-like coating.

(1) Note. The term low energy electromagnetic radiation, as employed here, includes, e.g., ultraviolet, infrared, visible light, actinic, microwave, and radio waves. Electromagnetic wave energy measured above wavelengths of 100 Angstroms (10 to the minus 8 meters) will be considered low energy electromagnetic radiation.

**905 Utilizing ion plating or ion implantation:**
This subclass is indented under subclass 902. Process wherein ion plating or ion implantation is used during any stage of the coating operation to deposit a diamond-like coating.

(1) Note. Ion plating or implantation is considered to be a process of (a) evaporating coating material in the presence of an electrical discharge (arc, beam, etc.) in an energetic gaseous medium, which forms or is associated with a cathode polarized by a high negative voltage relative to the source of the coating material, and depositing the coating material onto the substrate, with simultaneous bombardment by ions which cause momentum transfer (sputtering) on the substrate to occur or (b) coating material is introduced into or penetrates the near-surface region of a substrate by directing an accelerated beam or stream of energetic (charged) ions including the coating material, toward the substrate.

(2) Note. The term ion plating is applied to a combination of process steps that include: (a) sputtering of the surface of a substrate due to momentum transfer, and (b) simultaneously or subsequentially depositing a coating on the substrate from a flux of ionic coating material (i.e., usually considered to be a high energy plasma with a small flux of ions and a much larger number of energetic neutrals).

(3) Note. Ion implantation of the near surface region of a substrate to create a distinguishable layer differing in composition from the substrate will be proper for this class, regardless of whether the implantation of this layer is limited to the microstructure or not.

(4) Note. Ion plating, wherein the target material and the substrate are one and the same is proper for this subclass and indented subclasses.

(5) Note. Processes utilizing ion bombardment or ion treating that specifies neither implanting, etching, plating, etc., but merely recites some change as in the materials characteristic properties will be classified in this subclass.

**906 Utilizing plasma (e.g., corona, glow discharge, cold plasma, etc.):**
This subclass is indented under subclass 902. Process wherein plasma is used during any stage of the coating operation to deposit a diamond-like coating.

(1) Note. A plasma consists of a wholly or partially ionized gas composed of ions, electrons, and neutral particles. The concentrations of negatively and positively charged carriers are approximately equal.

(2) Note. Processes utilizing corona, glow discharge, and cold plasma are found here, when utilized to cause disassociation or ionization of the vaporous reactants allowing a coating material (reaction product) to deposit on a substrate.

(3) Note. In a cold plasma the temperature of the electrons is high whereas the temperature of the ions is relatively low, possibly room temperature.

FOREIGN ART COLLECTIONS

The definitions of the Foreign Patent/NPL Art Collections below correspond to the definitions of the abolished subclasses from which these collections were formed. See the Foreign Patent/NPL Art Collection schedule for specific correspondences. [Note: the titles and definitions for indented art collections include all the details of the one(s) that are hierarchically superior.]

**FOR 100 Carbon on carbide coating (427/249):**
Foreign art collections including processes that result in a carbon or carbide coated base.

**FOR 101 Base includes inorganic silicon or metal containing compound (e.g., glass, ceramic, brick, etc.) (427/255):**
Foreign art collections including processes wherein the base includes an inorganic silicon containing com or an inorganic metal containing com.

**FOR 102 Mixture of vapors or gases utilized:**
Foreign art collections including processes wherein a mix of gases or vapors is contacted with the base to form a coating.

**FOR 103 The resultant coating is a mixture or a com formed from the mixture utilized:**
Foreign art collections including processes wherein the resultant coating after application to the base comprises (a) a mixture of coating components from different sources or (b) a compound formed from components supplied by different sources.

**FOR 104 The mixture utilized contains oxygen:**
Foreign art collections including processes wherein at least one of the gases in the mixture of gases or vapors includes oxygen.

**FOR 105 Integrated circuit, printed circuit, or circuit board:**
Foreign art collection including processes for coating producing an integrated circuit, printed circuit, or circuit board (i.e., circuits in which conductive wire has been replaced by a conductive coating or a combination of interconnected circuit elements produced by coating).

**FOR 106 Coating hole walls:**
Foreign art collection including processes wherein a coating is applied to the sides of a hole in a circuit board.

(1) Note. Such coatings are generally for the purpose of providing a conductive path from one side of a circuit board to the other.

**FOR 107 Immersion metal plating from solution (e.g., electroless plating, etc.):**
Foreign art collection including processes wherein a metal coating is applied by immersing the base in a metal salt solution.

**FOR 108 Vapor deposition:**
Foreign art collection including processes wherein the coating is produced on a base by adsorption or condensation of, or reaction with, a vapor or gas.

**FOR 109 SPRAYING:**
Foreign art collection including processes wherein the coating material is projected by mechanical force toward the base.

**FOR 110 ROLLER APPLICATOR UTILIZED (E.G., PADDING, ETC.):**
Foreign art collection including processes wherein coating material is applied to the base from the curved outer surface of a cylindrical applicator while said applicator is rotating about an internal axis.

(1) Note. Padding coating material onto a base is assumed to involve using a roller and is provided for in this subclass.

END