tion into the infrared or ultraviolet from the visible portion of the spectrum.

(1) Note. IR (0.7 micrometers to 1000 micrometers wavelength) according to Van Nostrand's Encyclopedia, 7th Edition

Meters: 7×10^{-7} m to .001 m
Centimeters: 7×10^{-5} cm to .1 cm
Millimeters: 7×10^{-4} mm to 1 mm
Micrometers: .7 micrometers to 1000 micrometers
Nanometers: 700 nm to 10^{6} nm
Angstroms: 7000 A to 10^{7} A

UV (100 Angstroms to 4000 Angstroms wavelength) according to Van Nostrand's Encyclopedia, 7th Edition

Meters: 10^{-8} m to 4×10^{-7} m
Centimeters: 10^{-6} cm to 4×10^{-5} cm
Millimeters: 10^{-5} mm to 4×10^{-4} mm
Micrometers: .01 micrometers to .4 micrometers
Nanometers: 10 nm to 400 nm
Angstroms: 100 A to 4000 A
Metric Conversion Units:
Centimeters = 10^{-2} meters
Millimeters = 10^{-3} meters
Micrometers = 10^{-6} meters
Nanometers = 10^{-9} meters
Angstroms = 10^{-10} meters

(2) Note. Holographic systems and modulators of Class 359 and fibers or waveguides of Class 385 that operate in the IR or UV portion of the spectrum are excluded from this and the indented subclasses.

(3) Note. This subclass and those indented thereunder are limited to elements which operate as optical elements in the infrared and ultraviolet portion of the spectrum but a detector to convert IR/UV energy to visible light is classified in Class 250.

(4) Note. "Heat Filters" are considered infrared filters.

SEE OR SEARCH THIS CLASS, SUBCLASS:

358, for IR or UV fluid filter or fluid mirror.
634, for wavelength selective beam splitting or combining surface (e.g., dichroic mirror).
859, for concave and convex mirrors in series for successive reflections in mirrors.
885+, for absorption filters.

SEE OR SEARCH CLASS:

89, Ordnance, subclass 41.06 for light reception traning mechanism.
165, Heat Exchange, subclasses 279+ for temperature or pressure automatic control (Thermal-IR).
219, Electric Heating, subclass 203 for combined vehicle or vehicle component windshield or window heating device.
250, Radiant Energy, subclass 216 for optical or pre-optical photocell system, subclass 226 for color filter or spectroscope optical or pre-photocell system, subclasses 330+ for infrared-to-visible imaging, subclass 333 image tube type imaging wherein the output screen is used to visualize an intensified image or the IR image is converted to electrical signals to control the display device, subclass 336.1 for IR energy responsive electric signalling, subclasses 338.1+ for infrared responsive invisible radiant energy responsive electric signalling, subclass 351 for periodic scanning of an IR beam, subclass 365 for UV light source, subclass 372 for UV light responsive means, subclass 493.1 for radiant energy generation and sources, subclass 504 for ultraviolet or infrared source radiation modifying member, and subclasses 505.1+ for radiation controlling elements exclusive of infrared, visible and ultraviolet optical elements.
252, Compositions, subclass 587 for infrared light transmission modifying com-

positions, and subclasses 588+ for ultraviolet transmission modifying compositions.

283, Printed Matter, subclass 88 for IR filter with electromagnetic radiation having revealable concealed information, fraud preventer or detector, use preventer or detector, or identifier, subclass 89 for UV filter with electromagnetic radiation having revealable concealed information, fraud preventer or detector, use preventer or detector, or identifier, and subclass 90 for polarized IR filter with electromagnetic radiation having revealable concealed information, fraud preventer or detector, use preventer or detector, or identifier.

313, Electric Lamp and Discharge Devices, subclass 112 for polarizer or special ray transmission with optical device or special ray transmission envelope.

348, Television, subclasses 164+ for IR television.

351, Optics: Eye Examining, Vision Testing and Correcting, subclasses 44+ for antiglare or shading spectacles and eyeglasses, and subclasses 159.6 for through 159.65 light filtering opthalmic lens or blanks.

352, Optics: Motion Pictures, subclass 202 for projection light sources with cooling means.

353, Optics: Image Projectors, subclass 55 for an image projector having a heat filter.

356, Optics: Measuring and Testing, subclass 51 for IR and UV.

374, Thermal Measuring and Testing, subclass 124 for thermally emitted radiation with scanning or temperature distribution display.

424, Drug, Bio-Affecting and Body Treating Compositions, subclasses 59+ for a sun or radiation screening or suntanning composition intended for topical application to a living body.

427, Coating Processes, subclass 160 for a coating with X-ray, Ultrasonic, or Infrared properties, subclasses 162+ for coating processes, per se, wherein the product is an optical element.

607, Surgery: Light, Thermal, and Electrical Application, subclass 1 for light, thermal, and electrically applied surgery.

351 Having folded optical path:

This subclass is indented under subclass 350. Subject matter including an element which modifies the path of incident light so as to cause the light to repeatedly traverse the same or overlapping volumes of space.

(1) Note. The system generally includes plural reflectors to sequentially reverse the direction of the optical axis.

SEE OR SEARCH THIS CLASS, SUBCLASS:

489.08, through 489.13, for birefringent element beam deflection or splitting for polarization without modulation or external input.

352 Having polarizing element:

This subclass is indented under subclass 350. Subject matter having an element which restricts the direction of vibration of radiant energy.

(1) Note. The restriction may have a time variation.

(2) Note. The polarized radiant energy may be visible light accompanying the infrared or ultraviolet radiation.

SEE OR SEARCH THIS CLASS, SUBCLASS:

359, for an IR/UV multilayer filter or multilayer reflector.

360, for an IR/UV multilayer filter or multilayer reflector having a metal layer.

372+, for plural optical axis microscope.

419+, for plural optical axis telescope.

483, for a visible light polarizer absent any infrared or ultraviolet characteristic.

486, for light polarization without modulation or external energy by grid or dipoles.

487, for polarization without modulation by reflection or refraction.

490+, for polarization without modulation by dichroic medium, which transmits light of one color and reflects light of

the complementary color with little light absorbed.

494+, for polarization without modulation by a birefringent element, which divides a ray or beam of energy into two polarized rays or beams separated by 90 degrees (known as ordinary and extraordinary).

SEE OR SEARCH CLASS:

283, Printed Matter, subclass 88 for IR filter with electromagnetic radiation having revealable concealed information, fraud preventer or detector, use preventer or detector, or identifier.

313, Electric Lamp and Discharge Devices, subclass 112 for polarizer or special ray transmission (e.g., filter) with an electric discharge device.

353 Including alternative optical path or optical element (e.g., day-night, hi-low magnification):

This subclass is indented under subclass 350. Subject matter which has an element allowing a variable radiation path or which alternatively places an optical element into or out of a fixed optical path, thereby producing plural distinct radiation processing configurations.

(1) Note. One or more configurations may be limited to visible light.

SEE OR SEARCH THIS CLASS, SUBCLASS:

421, for telescope compound lens selectable magnification.

672+, for lens with selective magnification by exchanging or adding lens components.

708, for aspherical lens.

744, for afocal Galilean telescope lens.

354 Including continuously variable magnification or focal length (zoom lens, adjustable lens):

This subclass is indented under subclass 350. Subject matter wherein the focal point or image magnification of an imaging device or element is continuously or intermittantly changed as desired.

(1) Note. This includes various selected positions of different optical elements to fit the user selected application.

(2) Note. This incudes IR/UV variable elements adjacent to or part of the zoom lens.

(3) Note. This also includes FLIR (Forward Looking Infrared systems).

SEE OR SEARCH THIS CLASS, SUBCLASS:

421, for telescope selectable magnification in a compound lens for the visible portion of the spectrum.

422, for telescope variable magnification in a compound lens for the visible portion of the spectrum.

676+, for zoom lens in the visible portion of the spectrum.

744, for an afocal lens (e.g., Galilean Telescope).

355 Lens, lens system or component:

This subclass is indented under subclass 350. Subject matter including a refractive imaging element or a serially arranged group thereof having a significant property in the infrared or ultraviolet area of the electromagnetic spectrum.

(1) Note. Compound lens systems are a plurality of lenses or lens groups arranged in series coaxially along an optical axis, such lenses or lens groups being so spaced along the axis that the second focal plane of the entrant lens of the series lies at or near the first focal plane of the next succeeding lens or lens group of the series whereby the light entrant lens is capable of producing from light rays passing therethrough from an object external to the plurality of lenses an image of that object, which image is viewed or relayed by the said succeeding lens or lens group.

(2) Note. Lens systems designate either a single transparent mass of refractive material having opposed refracting surfaces or a plurality of such masses arranged in series along an optical axis

with their opposed refracting surfaces disposed transversely of such axis, the said opposed surfaces being so shaped and spaced that the mass or plurality of masses are capable of producing from light rays passing therethrough from an object external to the mass or masses a single image of that object, which image is also external to the mass or masses of material.

(3) Note. The term "component" as applied to a lens designates either a single transparent mass of refractive material having two opposed refracting surfaces or a grouped plurality of such masses arranged in series along the optical axis of the lens with their adjacent refracting surfaces either in full over-all contact or in spaced parallel relation with the spacing being of such small magnitude that it does not enter into the lens computations, the two refracting surfaces of the single mass and the two axially extreme refracting surfaces of the plurality of masses having at least a portion thereof axially air spaced from all other adjacent refracting surfaces that may be present in the lens. The axial dimension of the air spacing between either the opposed surfaces of the single mass or the axially extreme surfaces of the grouped plurality of masses and the other adjacent refracting surfaces that may be present in the lens must be of sufficient magnitude to enter into the lens computations in order to limit the axial extent of the lens component.

SEE OR SEARCH THIS CLASS, SUBCLASS:

356, for an infrared lens.
357, for an infrared lens having four or more components.
642+, for lenses in the visible portion of the spectrum.
722+, for lenses which are selective in the visible spectrum by transmitting or blocking certain wavelengths.

SEE OR SEARCH CLASS:

427, Coating Processes, subclass 160 for a coating having X-ray, ultraviolet, or infrared properties.

356 Infrared lens:

This subclass is indented under subclass 355. Subject matter having significant properties in the infrared area of the electromagnetic spectrum.

357 Having four or more components:

This subclass is indented under subclass 356. Subject matter which includes four or more components which have significant properties in the infrared area of the electromagnetic spectrum.

SEE OR SEARCH THIS CLASS, SUBCLASS:

754+, for multiple component lenses, in general.

358 Fluid filter or fluid mirror:

This subclass is indented under subclass 350. Subject matter including filters or mirrors having a liquid or gas which is specially adapted as by composition to transmit or absorb infrared or ultraviolet radiation.

SEE OR SEARCH THIS CLASS, SUBCLASS:

665+, for fluid lenses.
832, for fluid filled prisms.
845, for fluid cooled mirrors.
886, for fluid absorption filters which operate in the visible portion of the spectrum.

SEE OR SEARCH CLASS:

250, Radiant Energy, subclass 226 for color filter or spectroscope optical or pre-photocell system.
252, Compositions, subclasses 582+ for light transmission modifying compositions and subclass 588 for those compositions used for ultraviolet light transmission modifying.

359 Multilayer filter or multilayer reflector:

This subclass is indented under subclass 350. Subject matter having a substrate and one or more superimposed coatings or laminae and which as a whole is designed to have significant absorbent or redirective properties in the infrared or ultraviolet portion of the spectrum.

(1) Note. Interference filters wherein the multiple reflected beams of various different frequencies will automatically interfere with one another upon reflection are classified in this subclass if significant IR/UV is specified.

(2) Note. Multi-layer absorption would not be interference since waves are not produced which interfere with one another.

(3) Note. Multi-layer absorbing elements are classified in this subclass if significant IR/UV is specified.

(4) Note. Semiconductor elements are classified in this subclass since they are not considered metals for subclass 360.

SEE OR SEARCH THIS CLASS, SUBCLASS:

580, for light interference produced by coating or lamina.
581, for transmissive coating on interference lens.
589, for selective wavelength interference.
590, for selective wavelength interference with another filter.
839, for mirrors with a transmissive property.
884, for mirrors with a selective absorption or transparent overcoating.
885+, for absorptive filters.

SEE OR SEARCH CLASS:

204, Chemistry: Electrical and Wave Energy, subclasses 192.26+ for optical or photoactive specified deposition material glow discharge sputter deposited coating.

360 Having metal layer:

This subclass is indented under subclass 359. Subject matter wherein at least one coating or lamina or the substrate is composed of a metal.

(1) Note. Semiconductor elements are not considered as metal and are included under subclass 359.

(2) Note. Only an elemental metal layer is classified in this subclass. Metal alloys or compositions in a multilayer structure are classified in subclass 359.

SEE OR SEARCH THIS CLASS, SUBCLASS:

722+, for lenses with selective wavelength transmitting or blocking.

SEE OR SEARCH CLASS:

250, Radiant Energy, subclass 226 for color filter or spectroscope optical or pre-photocell system.
351, Optics: Eye Examining, Vision Testing and Correcting, subclass 44 for sunglasses with antiglare or shading.
607, Surgery: Light, Thermal, and Electrical Application, subclass 95 for solar cabinets.

361 Having ultraviolet absorbing or shielding property:

This subclass is indented under subclass 350. Subject matter wherein light in the ultraviolet portion of the spectrum is blocked or otherwise filtered.

SEE OR SEARCH THIS CLASS, SUBCLASS:

359+, for a multilayer ultraviolet filter.

362 COMPOUND LENS SYSTEM:

This subclass is indented under the class definition. Subject matter including a plurality of image formers arranged for forming a series of real images along the optical axis, at least one of the real images being formed between two of the image formers.

(1) Note. The terminal image former may be an “eyepiece” designed to form a real image only in combination with the human eye.

SEE OR SEARCH THIS CLASS, SUBCLASS:

642+, for lenses suitable for use in compound lens systems of this subclass type.

SEE OR SEARCH CLASS:

42, Firearms, subclass 119 for compound lens systems.

356, Optics: Measuring and Testing, subclasses 245+ for optical test instruments containing compound lens systems.

363 With image recorder:
This subclass is indented under subclass 362. Subject matter including a device to record an image of the object being directly viewed, the compound lens system being primarily designed for direct viewing.

SEE OR SEARCH THIS CLASS, SUBCLASS:
372+, for a microscope with plural optical axes, one axis of which may be directed to an image recorder.
403+, for a periscope with plural optical axes, one axis of which may be directed to an image recorder.
419+, for a telescope with plural optical axes, one axis of which may be directed to an image recorder.

SEE OR SEARCH CLASS:
396, Photography, subclass 432 for significant camera structure combined with a diverse compound lens system.

364 With curved reflective imaging element:
This subclass is indented under subclass 362. Subject matter including a curved reflector which contributes to the formation of at least one of the real images.

SEE OR SEARCH THIS CLASS, SUBCLASS:
727+, for lenses that employ both refraction and reflection in forming an image (catadioptric lenses).

SEE OR SEARCH CLASS:
362, Illumination, subclasses 296.01 through 296.1 for reflectors in illumination systems.

365 Two or more in a series:
This subclass is indented under subclass 364. Subject matter including a plurality of curved reflectors contributing to the formation of one or more of the real images.

SEE OR SEARCH THIS CLASS, SUBCLASS:
858+, for image forming reflectors having plural curved surfaces in series.

366 Concave, convex combination:
This subclass is indented under subclass 365. Subject matter wherein the plurality of curved reflectors include at least one concave and at least one convex reflector.

367 Right angle inspector:
This subclass is indented under subclass 362. Subject matter including a compound lens system with an objective deflector to provide viewing at a right angle to the main optical axis.

SEE OR SEARCH THIS CLASS, SUBCLASS:
434+, for a relay system which may be used in a compound lens system of the structure classified in this subclass (367).

368 Microscope:
This subclass is indented under subclass 362. Subject matter wherein the objective of the compound lens system is designed to focus highly divergent light from an object very close to the objective.

(1) Note. Also illuminators, stages, slide carriers, and transparent slides designed specifically for use with that type of compound lens system are classified in subclasses indented under this subclass (368).

369 With viewed screen:
This subclass is indented under subclass 368. Subject matter including structure for displaying a real image on a viewed screen.

(1) Note. The screen may be at an intermediate or terminal image plane and may, for example, comprise a ground glass screen, a front projection screen, a fiber optic output face, etc.

SEE OR SEARCH THIS CLASS, SUBCLASS:
400, for a telescope with a viewed screen.

443+, for a viewing screen.
505, for an extended spacing structure for optical elements including a screen.

SEE OR SEARCH CLASS:
250, Radiant Energy, subclasses 370.08+ for invisible radiant energy responsive signalling, including imaging.
313, Electric Lamp and Discharge Devices, subclasses 364+ for cathode-ray tubes and subclasses 523+ for image intensifier tubes, etc.
315, Electric Lamp and Discharge Devices: Systems, subclasses 1+ for cathode-ray tube circuits, including image intensifiers.
353, Optics: Image Projectors, subclasses 18, 47, 67, 72+, 74+, and 79+ for an image projection and viewing screen in combination.

370 Interference:
This subclass is indented under subclass 368. Subject matter wherein light from the object is combined with light of different phase or diffraction characteristics either from the object or bypassing the object.

SEE OR SEARCH THIS CLASS, SUBCLASS:
1+, for interference microscopes having holographic features or for making holograms.

371 Using polarized light:
This subclass is indented under subclass 370. Subject matter wherein light with a particular polarization characteristic is present.

SEE OR SEARCH THIS CLASS, SUBCLASS:
386, for illuminators for microscopes other than interference microscopes using polarized light.
483.01, through 494.01, for optics, systems, and elements for polarization of light or using polarized light.

372 With plural optical axes:
This subclass is indented under subclass 368. Subject matter wherein light from an object may follow any of a plurality of substantially different optical axes through the microscope.

(1) Note. The different optical axes may be partly colinear and may be used either simultaneously or alternately.

SEE OR SEARCH THIS CLASS, SUBCLASS:
363, for a compound lens system with an image recorder.
403+, for a periscope with plural optical axes.
419+, for a telescope with plural optical axes.

373 Side-by-side fields:
This subclass is indented under subclass 372. Subject matter wherein at least two of the separate paths provide different images which are adjacent in a common field of view.

374 Plural oculars:
This subclass is indented under subclass 372. Subject matter wherein at least two of the separate paths terminate in separate eyepieces.

375 Binocular:
This subclass is indented under subclass 374. Subject matter wherein at least two of the plural oculars are separated at approximately the interocular distance to provide simultaneous viewing by both eyes of one observer.

SEE OR SEARCH THIS CLASS, SUBCLASS:
404, for a binocular periscope.
407, for a binocular telescope.
480+, for a binocular viewing device in general.

376 Stereoscopic:
This subclass is indented under subclass 375. Subject matter wherein at least two of the binocular eyepieces provide stereoscopic viewing.

SEE OR SEARCH THIS CLASS, SUBCLASS:
462+, for steroscopic viewing systems.

377 With single or parallel objectives:
This subclass is indented under subclass 376. Subject matter including one objective for two stereoscopic views or two objectives with parallel optical axes for two stereoscopic views.

378 For viewing stereo pairs:
This subclass is indented under subclass 377. Subject matter wherein separate objective channels view different object fields, each field being filled by a separate parallax object view for viewing.

(1) Note. The devices of this subclass provide for two separate fields. The stereoscopic property is related to the objects being viewed taken from two slightly different directions of a three-dimensional object. The views usually comprise a pair of transparencies, each transparency being a separate object view.

SEE OR SEARCH THIS CLASS, SUBCLASS:
466+, for stereo-viewing devices.

379 Spacing of optical elements axially adjustable:
This subclass is indented under subclass 368. Subject matter including means for varying the axial separation of the optical elements, for example, for focusing or varying magnification.

(1) Note. Other subclasses in this class indented under subclass 399, Telescope, and titled "Separation of optical elements axially adjustable" or including the word "focusing" may include subject matter related to subject matter in this subclass (379).

SEE OR SEARCH THIS CLASS, SUBCLASS:
506, for an adjustable extended spacing structure for optical elements.

380 Variable magnification:
This subclass is indented under subclass 379. Subject matter wherein varying the axial separation varies the size of an in focus terminal image while the object distance remains constant.

(1) Note. Other subclasses in this class indented under subclass 407, Binocular, and titled "Spacing of optical elements axially adjustable" may include subject matter related to variable magnification.

SEE OR SEARCH THIS CLASS, SUBCLASS:
422, for a telescope with variable magnification.
432, for variable magnification in nonmagnifying compound lens systems.
506, for adjustable extended spacing structure for optical elements.
676+, for a lens having its equivalent focal length variable continuously between limits.

381 Imaging elements movable in and out of optical axis:
This subclass is indented under subclass 368. Subject matter wherein an imaging element is selectively positionable in or out of the optical axis to change the image distance or image size.

SEE OR SEARCH THIS CLASS, SUBCLASS:
421, for a telescope with selective magnification.

382 Entire microscope adjustable along optical axis:
This subclass is indented under subclass 368. Subject matter wherein the microscope translates along the optical axis to vary the distance to an object plane.

SEE OR SEARCH THIS CLASS, SUBCLASS:
392, for devices wherein the stage or slide carrier translates along the optical axis.

SEE OR SEARCH CLASS:
74, Machine Element or Mechanism, subclasses 25+ for a mechanism converting rotary motion to or from reciprocating or oscillatory motion.

383 Focus adjustment:
This subclass is indented under subclass 382. Subject matter wherein the adjustment along the optical axis effects the focus of the compound optical system.

SEE OR SEARCH THIS CLASS, SUBCLASS:
410, for binocular telesopes with adjustable focus.
425+, for telescopes with focusing.

384 With rotatable adjustment:
This subclass is indented under subclass 368. Subject matter including means for swinging the microscope about an axis.

385 Illuminator:
This subclass is indented under subclass 368. Subject matter including (a) structure for illuminating an object being viewed in combination with a microscope or (b) object illuminating structure designed specifically for use with a microscope.

SEE OR SEARCH THIS CLASS, SUBCLASS:
798+, for lenses with viewed object or viewed field illumination.

SEE OR SEARCH CLASS:
362, Illumination, subclasses 257+ and 317+ for an illuminator with a modifier or a light modifier.

386 Using polarized light:
This subclass is indented under subclass 385. Subject matter wherein the illuminating structure provides polarized light.

SEE OR SEARCH THIS CLASS, SUBCLASS:
371, for an interference microscope using polarized light.
483.01, through 494.01, for systems and elements for the polarization of light without modulation.

SEE OR SEARCH CLASS:
362, Illumination, subclass 19 for an illuminator with a polarizer.

387 With annular lighting structure:
This subclass is indented under subclass 385. Subject matter including means for providing an annulus of light surrounding a dark central portion for illuminating the object.

388 With optical switching means:
This subclass is indented under subclass 385. Subject matter including means for changing optical elements in the illuminating beam path to change the type of illumination.

(1) Note. The optical elements may be movable in and out of the illuminating beam path or the illuminating beam may be deflected to pass through different optical elements.

389 With illuminating and viewing paths coaxial at the image field:
This subclass is indented under subclass 385. Subject matter wherein the illuminating light is transmitted through a space occupied by the image field.

(1) Note. A partially transmitting beam splitter is commonly used in devices in this subclass (389).

SEE OR SEARCH THIS CLASS, SUBCLASS:
799, for a lens with a coaxial illuminating beam.

390 With illuminator support:
This subclass is indented under subclass 385. Subject matter including (a) means for maintaining the illuminator in a fixed position or (b) means for limiting the movement of the illuminator.

SEE OR SEARCH CLASS:
362, Illumination, subclasses 382+ for an illuminator with a support.

391 Stage or slide carrier:
This subclass is indented under subclass 368. Subject matter including (a) structure for supporting an object to be viewed or tools to be placed in the field of view in combination with a microscope or (b) structure for supporting an object or tools designed specifically for use with a microscope.

SEE OR SEARCH THIS CLASS, SUBCLASS:
801, and 804+, for lenses with a viewed object support.

SEE OR SEARCH CLASS:
248, Supports, for supports generally.

392 Adjustable along optical axis:
This subclass is indented under subclass 391. Subject matter wherein the stage or slide carrier translates along the optical axis to vary its distance from the microscope.

SEE OR SEARCH THIS CLASS, SUBCLASS:
382+, for devices wherein the microscope translates along the optical axis.

SEE OR SEARCH CLASS:
74, Machine Element or Mechanism, subclasses 25+ for a mechanism converting rotary motion to or from reciprocating or oscillatory motion.
108, Horizontally Supported Planar Surfaces, subclasses 144.11+ for a vertically adjustable platform.

393 With plural transverse movements:
This subclass is indented under subclass 391. Subject matter wherein the stage or slide carrier is movable in a plurality of directions perpendicular to the optical axis of the microscope.

SEE OR SEARCH CLASS:
74, Machine Element or Mechanism, subclass 471 for X-Y control devices.
108, Horizontally Supported Planar Surfaces, subclasses 137+ for a horizontally adjustable platform.

394 With turntable:
This subclass is indented under subclass 391. Subject matter wherein the stage or slide carrier is rotatable about the optical axis or an axis parallel to the optical axis of the microscope.

395 With temperature control:
This subclass is indented under subclass 391. Subject matter including means to vary or keep constant the temperature at the location of the stage or slide carrier.

SEE OR SEARCH THIS CLASS, SUBCLASS:
396, for devices including a transparent slide which may include temperature control means.

396 Transparent slide:
This subclass is indented under subclass 368. Subject matter including (a) a transparent mass, usually a glass plate, for supporting an object to be viewed in combination with a microscope or (b) a transparent mass, usually a glass plate, designed specifically for supporting an object to be viewed by a microscope.

SEE OR SEARCH CLASS:
356, Optics: Measuring and Testing, subclasses 244+ for sample or specimen holders.

397 Reference lines or grids:
This subclass is indented under subclass 396. Subject matter including indicia on the transparent slide.

398 Specimen cavity or chamber:
This subclass is indented under subclass 396. Subject matter including a container for holding, isolating, or limiting the flow of an object.

SEE OR SEARCH CLASS:
356, Optics: Measuring and Testing, subclass 246 for fluid sample containers.

399 Telescope:
This subclass is indented under subclass 362. Subject matter wherein the compound lens system is designed for viewing distant objects.

400 With viewed screen:
This subclass is indented under subclass 399. Subject matter including a semi-transparent or opaque structure for displaying one of the series of real images.

(1) Note. The screen may be at an interminate or terminal image plane and may, for example, comprise a ground glass screen, a front projection screen, a fiber optic output face, etc.

SEE OR SEARCH THIS CLASS, SUBCLASS:

369, for a microscope with a viewed screen.

443+, for a viewing screen.

505, for an extended spacing structure for optical elements including a screen.

SEE OR SEARCH CLASS:

250, Radiant Energy, subclass 213 for circuits having image intensifier or non-visible to visible imaging vacuum tubes.

313, Electric Lamp and Discharge Devices, subclass 524 for a telescope (or any optical system) combined with an image intensifier.

353, Optics: Image Projectors, subclasses 18, 47, 67, 72+, 74+, and 79+ for an image projector and viewing screen in combination.

401 With image anti-rotation:

This subclass is indented under subclass 399. Subject matter wherein the telescope maintains an erect terminal image as at least part of the telescope is turned to rotate an intermediate image.

SEE OR SEARCH THIS CLASS, SUBCLASS:

554+, for an image stabilization system including image anti-rotation.

402 Periscope:

This subclass is indented under subclass 399. Subject matter wherein the entrance optical axis and the exit optical axis of the telescope are parallel and offset and perpendicular to the main axis of the telescope.

SEE OR SEARCH THIS CLASS, SUBCLASS:

401, for a periscope with image anti-rotation.

403 With plural optical axes:

This subclass is indented under subclass 402. Subject matter wherein light from an object may follow any of a plurality of substantially different optical axes through the periscope.

(1) Note. The different optical axes may be partly colinear and may be used either simultaneously or alternately.

SEE OR SEARCH THIS CLASS, SUBCLASS:

372+, for a microscope with plural optical axes.

419+, for a telescope with plural optical axes.

404 Binocular:

This subclass is indented under subclass 403. Subject matter wherein at least two of the substantially different axes provide separate views to separate eyepieces for binocular viewing.

SEE OR SEARCH THIS CLASS, SUBCLASS:

375+, for a binocular microscope.

407+, for a binocular telescope.

480+, for a binocular viewing device in general that does not use a compound lens system.

405 With mechanical adjustment:

This subclass is indented under subclass 402. Subject matter wherein all or a portion of the periscope relative to another structure is moved.

SEE OR SEARCH THIS CLASS, SUBCLASS:

429+, for a telescope with line of sight adjustment.

406 Extensible structure:

This subclass is indented under subclass 405. Subject matter wherein the extension or elevation of the periscope is changed, usually by the use of telescoping structures.

407 Binocular:

This subclass is indented under subclass 399. Subject matter wherein at least two exit optical axes are spaced at approximately the interocular distance to provide simultaneous viewing by both eyes of one observer.

(1) Note. This is the type of device used by fans at a ball game to see distant players.

SEE OR SEARCH THIS CLASS, SUBCLASS:

375+, for a binocular microscope.
404, for a binocular periscope.
480+, for a binocular viewing device in general that does not use a compound lens system.

408 Foldable or collapsible:

This subclass is indented under subclass 407. Subject matter wherein the binocular telescope is hinged or provided with telescoping or bellows sections to provide a more compact unit when not in use or prior to assembly.

SEE OR SEARCH THIS CLASS, SUBCLASS:

474, for a collapsible stereoscope.
817, for a lens with a foldable or collapsible support.

409 Body supported or with handle:

This subclass is indented under subclass 407. Subject matter wherein the binocular telescopes are combined with (a) an elongated structure for providing a handhold or (b) a structure for engaging a portion of the body or apparel for support.

410 With focusing means:

This subclass is indented under subclass 409. Subject matter wherein the supported binocular telescope includes means for bringing an object at varying distances into focus.

(1) Note. Other subclasses in this class indented under subclass 412 with adjustable interocular distance and titled "Spacing of optical elements axially adjustable" may include subject matter related to focusing.

SEE OR SEARCH THIS CLASS, SUBCLASS:

379+, for a microscope with the spacing of optical elements axially adjustable.
425+, for a telescope with focusing or relatively sliding barrels.
506, for an adjustable extended spacing structure for optical elements.

411 With adjustable interocular distance:

This subclass is indented under subclass 409. Subject matter wherein the supported binocular telescopes are connected by means which vary and maintain lateral spacing of the two binocular optical axes.

412 With adjustable interocular distance:

This subclass is indented under subclass 407. Subject matter wherein the binocular telescopes are connected by means which vary and maintain lateral spacing of the two binocular optical axes.

413 Oculars swing about central axis:

This subclass is indented under subclass 412. Subject matter wherein the lateral spacing is changed by swinging the binocular telescopes about a common axis.

414 Spacing of optical elements axially adjustable:

This subclass is indented under subclass 413. Subject matter wherein the axial separation of optical elements, usually lenses, prisms, or mirrors, may be varied, usually for focusing or varying magnification.

(1) Note. Other subclasses in this class indented under subclass 362, Compound lens system, and titled "Separation of elements axially adjustable", "Variable magnification" or including the word "focusing" may include subject matter related to subject matter in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

506, for an adjustable extended spacing structure for optical elements.

415 Oculars rotate about separate axes:

This subclass is indented under subclass 412. Subject matter wherein the lateral spacing is varied by rotating the binocular telescopes about different axes displaced from their optical axes.

416 Spacing of optical elements axially adjustable:

This subclass is indented under subclass 415. Subject matter wherein the axial separation of optical elements, usually lenses, prisms, or

mirrors, may be varied, usually for focusing or varying magnification.

(1) Note. Other subclasses in this class indented under subclass 362, Compound lens system, and titled "Separation of optical elements axially adjustable", "Variable magnification" or including the word "focusing" may include subject matter related to subject matter in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:
506, for an adjustable extended spacing structure for optical elements.

417 Spacing of optical elements axially adjustable:
This subclass is indented under subclass 412. Subject matter wherein the axial separation of optical elements, usually lenses, prisms, or mirrors, may be varied, usually for focusing or varying magnification.

(1) Note. Other subclasses in this class indented under subclass 362, Compound lens system, and titled "Separation of optical elements axially adjustable", "Variable magnification", or including the word "focusing" may include subject matter related to subject matter in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:
506, for an adjustable extended spacing structure for optical elements.

418 Spacing of optical elements axially adjustable:
This subclass is indented under subclass 407. Subject matter wherein the axial separation of optical elements, usually lenses, prisms, or mirrors, may be varied, usually for focusing or varying magnification.

(1) Note. Other subclasses in this class indented under subclass 362, Compound lens system, and titled "Separation of optical elements axially adjustable", "Variable magnification" or including the word "focusing" may include subject matter related to subject matter in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:
506, for an adjustable extended spacing structure for optical elements.

419 With plural optical axes:
This subclass is indented under subclass 399. Subject matter wherein light from an object may follow any of a plurality of substantially different paths through the telescope.

(1) Note. The different optical axes may be partly colinear and may be used either simultaneously or alternately.

SEE OR SEARCH THIS CLASS, SUBCLASS:
372, for a microscope with plural optical axes.
403, for a periscope with plural optical axes.

420 Plural magnification in same viewing field:
This subclass is indented under subclass 419. Subject matter wherein telescope images of different magnification are simultaneously viewable in a common field of view.

421 Selectable magnification:
This subclass is indented under subclass 399. Subject matter wherein the telescope includes means for step variations of the image size while the object distance remains constant.

SEE OR SEARCH THIS CLASS, SUBCLASS:
381, for a microscope with an imaging element movable in and out of the optical axis.

422 Variable magnification:
This subclass is indented under subclass 399. Subject matter wherein the telescope continuously varies the size of the image while the object distance remains constant.

(1) Note. Other subclasses in this class indented under subclass 407, Binocular, and titled "Separation of optical elements axially adjustable" may include

subject matter related to variable magnification.

SEE OR SEARCH THIS CLASS, SUBCLASS:
- 380, for a microscope with variable magnification.
- 432, for a compound lens system with variable magnification.
- 506, for adjustable extended spacing structure for optical elements.
- 676+, for a lens having its equivalent focal length variable continously between limits.

423 With relay:
This subclass is indented under subclass 399. Subject matter wherein the telescope includes at least one lens system which forms a real image of a real image.

SEE OR SEARCH THIS CLASS, SUBCLASS:
- 402+, for a periscope including a relay.
- 422, for a variable magnification telescope including a relay.
- 434, for a compound lens system with a relay.

424 With reticle:
This subclass is indented under subclass 423. Subject matter wherein a cross-hair or emblem is present at a real image plane of the telescope.

SEE OR SEARCH THIS CLASS, SUBCLASS:
- 422, for a variable magnification telescope including a relay and a reticle.
- 427, for focusing or relatively sliding barrels with a reticle.
- 428, for a telescope with a reticle.
- 505, for an extended spacing structure for optical elements with a reticle.

425 Focusing or relatively sliding barrels:
This subclass is indented under subclass 399. Subject matter wherein the telescope includes (a) a device for forming an in focus image of an object of varying distances or (b) tubes supporting optical elements movable axially into and out of one another.

(1) Note. Other subclasses in this class indented under subclass 362, Compound lens system, and titled "Separation of optical elements axially adjustable" may include subject matter related to subject matter in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:
- 410, for a binocular telescope that is body supported or with a handle and includes focusing means.
- 506, for an adjustable extended spacing structure for optical elements.

426 Internal focusing:
This subclass is indented under subclass 425. Subject matter wherein the entrance and exit lenses remain a fixed distance apart while the telescope is focused.

427 With reticle:
This subclass is indented under subclass 425. Subject matter wherein a cross-hair or emblem is present at a real image plane of the telescope.

SEE OR SEARCH THIS CLASS, SUBCLASS:
- 422, for a variable magnification telescope including a relay and a reticle.
- 424, for a telescope with a relay and a reticle.
- 428, for a telescope with a reticle.
- 505, for an extended spacing structure for optical elements with a reticle.

428 With reticle:
This subclass is indented under subclass 399. Subject matter wherein a cross-hair or emblem is present at a real image plane of the telescope.

SEE OR SEARCH THIS CLASS, SUBCLASS:
- 422, for a variable magnification telescope including a relay and a reticle.
- 424, for a telescope with a relay and a reticle.
- 427, for a telescope with focusing or relatively sliding barrels and with a reticle.
- 505, for an extended spacing structure for optical elements with a reticle.

429 With line of sight adjustment:
This subclass is indented under subclass 399. Subject matter wherein the telescope includes adjusting the direction of view and maintaining the adjustment.

SEE OR SEARCH THIS CLASS, SUBCLASS:
401, for a telescope with image anti-rotation.
405, for a periscope with mechanical adjustment.

SEE OR SEARCH CLASS:
248, Supports, subclasses 127+ for stands in general.

430 Equatorial mount:
This subclass is indented under subclass 429. Subject matter wherein the telescope includes structure to establish an axis (polar axis) parallel to the earth's rotational axis about which the telescope viewing axis rotates (right ascension) at a selected angle (declination) between the polar axis and the viewing axis.

431 With prism or U-shaped optical path:
This subclass is indented under subclass 399. Subject matter wherein the telescope includes two right angle deflections in series to reverse the optical path.

SEE OR SEARCH THIS CLASS, SUBCLASS:
413, for adjustable binoculars including a prism or a U-shaped optical path.

432 Variable magnification:
This subclass is indented under subclass 362. Subject matter wherein the compound lens system continuously varies the size of a terminal image while the object distance remains constant.

(1) Note. Other subclasses in this class indented under subclass 407, Binocular, and titled "Spacing of optical elements axially adjustable" may include subject matter related to variable magnification.

SEE OR SEARCH THIS CLASS, SUBCLASS:
380, for variable magnification in microscopes.
422, for variable magnification in telescopes.

433 With tilted lens or tilted image plane:
This subclass is indented under subclass 362. Subject matter wherein the compound lens system includes (a) at least one lens whose optical axis is oblique to the optical axis of the system or (b) is designed to produce at least one image plane tilted with respect to the optical axis of the system.

434 With relay:
This subclass is indented under subclass 362. Subject matter wherein the compound lens system includes at least one lens system that forms a real image of a real image.

SEE OR SEARCH THIS CLASS, SUBCLASS:
423+, for a telescope with a relay.

435 Repetitious lens structure:
This subclass is indented under subclass 434. Subject matter wherein the compound lens system includes (a) a plurality of identical relays in series or side by side or (b) at least one relay comprised of identical elements or elements symmetrically reversed about a center point.

436 SCALE OR INDICIA READING:
This subclass is indented under the class definition. Subject matter including optical structure for facilitating the reading of a scale, with or without a pointer or indicator, having spaced lines or other indicia thereon; or for facilitating reading a vernier type indicator where lines from two different scales are matched.

(1) Note. The scale may be on a weighing instrument, slide rule, compass or speed indicator, etc.; and classification is here unless sufficient scale supporting structure is recited to classify with the particular art such as Class 33, Geometrical Instruments; Class 73, Measuring and Testing; Class 177, Weighing Scales; and Class 235, Registers.

SEE OR SEARCH CLASS:

116, Signals and Indicators, subclasses 327+ for signal pointers and indicating arms.

177, Weighing Scales, subclass 234 for self-positioning scales with magnified indication of spring deformation.

356, Optics: Measuring and Testing, subclass 242.1 for thread counters and similar subject matter where a relationship between the counter and the fabric is recited such as a viewing aperture or support for the counter on the fabric or a fabric support, subclasses 247+ for optical reticles and crosshairs and subclasses 373 and 397 for distance measuring devices which have a scale or optical grid displaced relative to a remote fiducial mark.

362, Illumination, subclasses 23.01 through 23.22 for dial illuminators.

437 Polarizer:

This subclass is indented under subclass 436. Subject matter including a polarizing element.

(1) Note. A polarizing element causes incident light polarization as defined in the class definition.

SEE OR SEARCH THIS CLASS, SUBCLASS:

483.01, through 494.01, for specific polarizing elements in polarization without modulation.

438 Prism:

This subclass is indented under subclass 436. Subject matter including a prism which may reflect or refract light for better viewing the scale or indicia.

(1) Note. See subclass 831 for the definition of a prism.

SEE OR SEARCH THIS CLASS, SUBCLASS:

831+, for specific prism elements.

439 Mirror:

This subclass is indented under subclass 436. Subject matter including a mirror to reflect light from the scale or indicia to the viewer.

(1) Note. See subclass 838 for the definition of a mirror.

SEE OR SEARCH THIS CLASS, SUBCLASS:

838+, for mirrors, per se.

440 Lens:

This subclass is indented under subclass 436. Subject matter including a lens.

(1) Note. See subclass 642 for the definition of a lens.

(2) Note. The lens is usually employed to magnify the image of the scale markings or indicia.

SEE OR SEARCH THIS CLASS, SUBCLASS:

806, for optical reading devices including line markers.

809+, for lenses combined with diverse type art devices in general.

SEE OR SEARCH CLASS:

73, Measuring and Testing, subclass 327 for a reflector or magnifier used for sighting in a liquid level or depth gauge.

441 Movable or adjustable:

This subclass is indented under subclass 440. Subject matter including means for adjusting or moving the lens with respect to the scale or indicia as for positioning or focusing the lens.

SEE OR SEARCH THIS CLASS, SUBCLASS:

642+, for lenses, per se.

442 Along scale or indicia:

This subclass is indented under subclass 441. Subject matter including means to guide a lens along the reading direction of a linear scale or indicia.

(1) Note. The lens may be movable along a nonlinear (e.g., circular) scale as well as a linear scale and the structure must be included which constricts or guides the movement of the lens along the scale or indicia.

(2) Note. An actuator, per se, is not classified in this subclass.

443 PROJECTION SCREEN:

This subclass is indented under the class definition. Subject matter including a sheet or other extending surface or area which is especially adapted to render an image of an object which is projected thereon visible to an observer, usually by diffusing the projected light.

(1) Note. This subclass and those indented thereunder in this class (359) include screens where the size, shape, or refractive index of embedded particles is claimed or screens with elements having geometric curves, with relative refractive indices or parts with claimed patterns, with wave plates, acoustical characteristics or other optical criterion. Such criterion must be more than mere "light diffusing particles" or a "light diffusing surface" to classify a patent in Class 359 as opposed to Class 139 or Class 428. See Class 427, appropriate subclasses for methods of making screens by coating.

(2) Note. The screen may be merely tracing paper or a canvas as in indented subclass 447.

SEE OR SEARCH THIS CLASS, SUBCLASS:

350+, for a viewing screen having infrared or ultraviolet characteristics.

900, for miscellaneous methods of making screens not classified in Class 427, Coating Processes, or Class 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, etc.

SEE OR SEARCH CLASS:

139, Textiles: Weaving, subclasses 383+ for light diffusing woven screens.

160, Flexible or Portable Closure, Partition, or Panel, especially subclasses 19+ and 371+ for framed screens without optical details other than merely "translucent" or something similar.

248, Supports, especially subclasses 158+ for screen supports.

264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclasses 1.1+ for processes directed to forming optical articles capable of producing an optical effect other than mere transparency or planar reflection.

312, Supports: Cabinet Structure, subclasses 21+ for screens supported in a cabinet.

352, Optics: Motion Pictures, subclass 61 for a motion picture projector combined with a screen.

353, Optics: Image Projectors, subclasses 18, 47, 67, 72+, 74+, and 79+ for cabinet which encloses projector and one side of screen or structurally related projector and screen.

427, Coating Processes, subclasses 162+ for coating processes, per se, wherein the product is an optical element.

428, Stock Material or Miscellaneous Articles, especially subclasses 143+ for embedded light diffusing particles or for light diffusing stock material in the form of a single or plural layer web or stock material which may be useful for projection purposes.

444 With sound producer:

This subclass is indented under subclass 443. Subject matter including a loudspeaker or other sound producing means combined with the screen.

SEE OR SEARCH CLASS:

352, Optics: Motion Pictures, subclass 36 for motion picture devices combined with screens and sound producers.

353, Optics: Image Projectors, subclass 18 for an image projector in combination with a sound producer.

381, Electrical Audio Signal Processing Systems and Devices, subclasses 150+ for electrical loudspeakers, per se.

445 Acoustical:

This subclass is indented under subclass 443. Subject matter wherein the screen is especially adapted to transmit or damp sound waves.

SEE OR SEARCH THIS CLASS, SUBCLASS:

444, for acoustical screens combined with means to produce sound.

SEE OR SEARCH CLASS:

181, Acoustics, subclasses 175+ for mufflers and sound filters.

446 Moving during projection:

This subclass is indented under subclass 443. Subject matter including means to rotate or oscillate the screen, usually for the purpose of improving the image seen by viewers or for imparting a three dimensional effect.

SEE OR SEARCH THIS CLASS, SUBCLASS:

520+, for vibrating, oscillating, or rotating signal reflectors.

447 Tracing (e.g., camera lucida, etc.):

This subclass is indented under subclass 443. Subject matter wherein the screen upon which an image is formed is adapted to have an outline of the image traced or sketched thereon.

(1) Note. The instrument, commonly referred to as a camera lucida, usually includes a prism or mirrors and sometimes a lens to cause a virtual image of an object to appear as if projected upon a plane surface so that an outline may be traced.

SEE OR SEARCH THIS CLASS, SUBCLASS:

369, and 400, for a compound lens system combined with a viewing screen.

448, for a lens combined with a viewing screen.

449, for a reflector combined with a viewing screen.

SEE OR SEARCH CLASS:

353, Optics: Image Projectors, subclass 44 and 45 for an image projector having a concentrated source of light to project an image for the purpose of tracing it.

448 With lens (e.g., camera obscura, etc.):

This subclass is indented under subclass 443. Subject matter including a lens combined with the screen, the screen usually being positioned in the second principle focal plane of the lens.

(1) Note. The device, commonly known as a camera obscura, usually has a darkened chamber with a lens at the entrance thereof to permit light from external objects to enter and to form an image of the objects on a screen in the chamber.

(2) Note. The combinations classified here are often constructed to function normally only when the light rays approaching the entrant lens from the object are substantially parallel, under which conditions the image produced by the device is always greatly reduced relative to the size of the object. The lens and screen combinations classified in Class 353, Optics: Image Projectors, differ from those classified here in that they are constructed to operate normally only when the light rays approaching the entrant lens from the object are of the widely diverging type, that is, when the object is near the first principal focal plane of the entrant lens, under which conditions the image produced by the device is enlarged relative to the size of the object, a condition that usually necessitates the use of intense artificial object illumination to provide an adequately illuminated image. Moreover, the lens and screen combinations of Class 353, Optics: Image Projectors, always have their object and screen in the conjugate focal planes of the projection lens employed with the screen spaced more distant from the lens than the object, while the lens and screen combinations of this subclass 448 have their object and screen substantially at infinity and at the principal focal plane of the lens respectively.

SEE OR SEARCH THIS CLASS, SUBCLASS:

369, and 400, for a compound lens system combined with a viewing screen.

65, Glass Manufacturing, subclasses 30.1 and 32.1 for processes for forming polarizing glass material.

250, Radiant Energy, subclasses 225 and 559.09 for a light polarizer and a photocell and subclass 341.3 for invisible radiation energy response methods including polarization means.

252, Compositions, subclass 585 for chemical compositions which produce polarized light.

264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclass 1.31 for light polarizing articles.

313, Electric Lamp and Discharge Devices, subclass 112 for electric lamps and electronic tubes combined with a polarizer.

343, Communications: Radio Wave Antennas, subclass 756 for antennas with a polarization converter and subclasses 909+ for radio wave polarizations, per se.

348, Television, subclasses 57 and 58 for stereoscopic displays with polarization.

349, Liquid Crystal Cells, Elements and Systems, subclass 9 for projectors with liquid crystal cell which produces S and P polarized light, subclass 80 for color polarizers in a liquid crystal cell, subclass 87 for variable polarizers in a liquid crystal cell, subclasses 96-103 for liquid crystal cell structure with polarizing element, and subclass 194 for liquid crystal polarizer.

351, Optics: Eye Examining, Vision Testing and Correcting, subclasses 49, 215, and 232 for light-polarizing devices used in eye examining vision testing and correcting means.

353, Optics: Image Projectors, subclasses 8 and 20 for polarizers used with image projectors.

355, Photocopying, subclass 71 for photocopy system having illumination system with a polarizer.

356, Optics: Measuring and Testing, subclasses 30 and 31 for gem or crystal examining using polarized light; subclass 33 for material strain analysis with polarized light, subclasses 322 and 327 for spectrometers which utilize polarized light, subclasses 364-370 for polarized light examination devices generally, and subclasses 453, 487 and 491 for interferometers with polarizing elements.

362, Illumination, subclass 19 for illumination systems with a polarizing element.

365, Static Information Storage and Retrieval, subclasses 121 and 122 for polarization techniques used in the storage and retrieval of information.

369, Dynamic Information Storage or Retrieval, subclasses 13.29 through 13.31 for employing polarized light in a storage or retrieval device and subclasses 110.01-110.04 and 112. 16-112.21 for polarizing optical elements in an optical pick-up device.

372, Coherent Light Generators, subclass 106 for a polarizer in a coherent light generator (i.e., laser).

385, Optical Waveguides, subclass 11 for polarization devices without modulation and including an optical waveguide.

398, Optical Communications, subclass 65 for polarization in multiplexing optical communication devices, subclass 152 for transmitter/receiver systems that include polarization.

427, Coating Processes, subclasses 163.1 through 163.4 for coating processes, per se, where the product is an optical element.

428, Stock Material or Miscellaneous Articles, subclass 1.31 for liquid-crystal layers including polarizer.

472, Amusement Devices, subclasses 57 through 84 for a theatrical stage device which may use a polarizer.

501, Compositions: Ceramic, subclasses 30 and 56 for polarizers with specified glass compositions.

977, Nanotechnology, subclass 834 for nanomaterials having optical properties that may include polarization.

484.01 Polarization using a time invariant electric, magnetic, or electromagnetic field (e.g., electro-optical, magneto-optical):

This subclass is indented under subclass 483.01. Subject matter wherein an electric, magnetic, or electromagnetic field, which is

inclined relative to each other, from which light is reflected or through which light is refracted.

(1) Note. A prism may be employed for refracting or reflecting light. Prism reflections are considered to be internal reflections; that is, the light is inside the prism body both before and immediately after the reflection.

(2) Note. The prismatic element may include a plurality or an array of prisms (e.g., crossed prisms, x-prisms or kernel prisms).

SEE OR SEARCH THIS CLASS, SUBCLASS:

489.09, and 489.1, for prisms used for polarization by birefringence.

629, through 638, for general beam splitting elements.

831, through 837, for prisms, per se.

SEE OR SEARCH CLASS:

349, Liquid Crystal Cells, Elements and Systems, subclasses 8 through 9 for projectors with liquid crystal cell which produces S and P polarized light.

353, Optics: Image Projectors, subclass 20 for polarizers used with image projectors.

485.07 Mirror:

This subclass is indented under subclass 485.01. Subject matter wherein the reflective element is a mirror.

(1) Note. The reflective element may include a plurality or an array of mirrors.

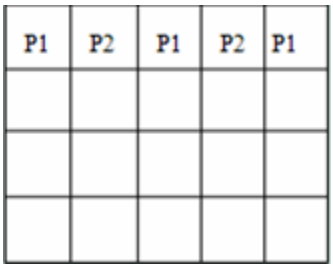
486.01 Polarization (direction or magnitude) variation over surface of the medium:

This subclass is indented under subclass 483.01. Subject matter comprising a surface which transmits or reflects light and whose ability to polarize light is not uniform across the surface.

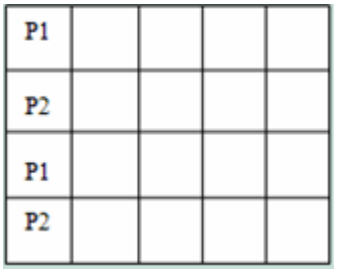
(1) Note. This variation in polarizing ability may be continuous or discontinuous and may form any type of pattern. For example, the different areas of a surface may form an image or design as in a vectograph.

486.02 Linear variation:

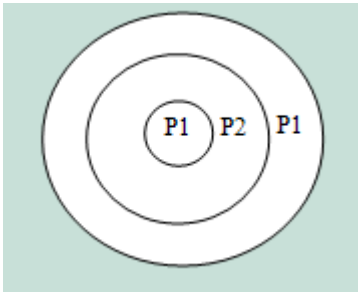
This subclass is indented under subclass 486.01. Subject matter wherein the polarization varies along a single direction or two orthogonal directions (e.g., matrix or checkerboard).



A typical example of the subject matter.



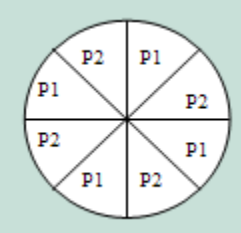
A typical example of the subject matter.



A typical example of the subject matter.

486.03 Radial variation:

This subclass is indented under subclass 486.01. Subject matter wherein the polarization varies around an optical axis.



A typical example of the subject matter.

487.01 Polarization by dichroism:
This subclass is indented under subclass 483.01. Subject matter including an optical element made of dichroic materials which have different absorption for different incident polarization planes of light.

(1) Note. Included here are elements where the medium comprises a lamination or a coating on a supporting structure and where the supporting structure is significant or the means to form the lamination or coating is significant.

SEE OR SEARCH THIS CLASS, SUBCLASS:
352, for a polarizing element having significant infrared or ultraviolet properties.
580, for general dichroic elements without polarization properties.

SEE OR SEARCH CLASS:
156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclasses 99 through 108 for processes of adhesively bonding laminae.
252, Compositions, subclass 585 for chemical compositions which produce polarized light.
427, Coating Processes, subclasses 163.1 through 163.4 for coating processes, per se, where the product is an optical element.

487.02 With stain or dye:
This subclass is indented under subclass 487.01. Subject matter wherein the polarizing optical element is made of dichroic coloring agent, such as a dye or stain (e.g., Polaroid H or K sheets or dichroic iodine-based films).

SEE OR SEARCH CLASS:
428, Stock Material or Miscellaneous Articles, subclass 1.31 for liquid crystal layers including polarizer.

487.03 Wire grid polarizer:
This subclass is indented under subclass 487.01. Subject matter wherein the polarizing optical element includes metallic conductors in the form of an absorptive grid (i.e., each grid opening forms a half wavelength of the applied light) to produce polarization of the applied light.

SEE OR SEARCH THIS CLASS, SUBCLASS:
569, through 576, for diffractive optical elements.

SEE OR SEARCH CLASS:
216, Etching a substrate: Processes, subclass 24 for general etching processes

487.04 Wavelength-selective beamsplitter:
This subclass is indented under subclass 487.01. Subject matter wherein the polarizing dichroic optical element is used to selectively separate or split the light beam into components of different wavelengths.

SEE OR SEARCH THIS CLASS, SUBCLASS:
634, for wavelength-selective, dichroic reflectors.

SEE OR SEARCH CLASS:
349, Liquid Crystal Cells, Elements and Systems, subclasses 8 through 9 for projectors with liquid crystal cell which produces S and P polarized light.
353, Optics: Image Projectors, subclass 20 for polarizers used with image projectors.

487.05 Having plural elements:
This subclass is indented under subclass 487.01. Subject matter wherein the polarizing optical device includes a plurality of dichroic elements.

(1) Note. The plurality of dichroic elements may include a plurality of layers, films, coatings or optical devices.

487.06 Oriented particles:

This subclass is indented under subclass 487.01. Subject matter wherein the polarization of the applied light is dependent upon the spatial positioning of microscopic particles embedded in the dichroic medium of the polarizing optical element.

SEE OR SEARCH THIS CLASS, SUBCLASS:

487.01, for polarization caused by the molecular orientation of the matrix material or of a reaction product.

487.02, for stain or dye molecules acting as oriented particles.

488.01 Glare prevention by discriminating against polarized light:

This subclass is indented under subclass 483.01. Subject matter wherein unwanted glare-producing polarized light is eliminated by a polarizing structure.

SEE OR SEARCH THIS CLASS, SUBCLASS:

490.01, through 490.03, for two superimposed relatively adjustable polarizers mounted as a unit and used to reduce or control light intensity.

601, through 614, for glare reduction not utilizing a polarizer.

489.01 Polarization by birefringence:

This subclass is indented under subclass 483.01. Subject matter wherein the polarizing optical element includes crystalline materials having two distinct indices of refraction associated with different crystallographic directions, i.e. birefringent materials.

(1) Note. A birefringent element has the property of dividing a ray or beam of energy into two polarized rays or beams (known as the ordinary and extraordinary rays), the directions of polarization being at right angles to each other.

SEE OR SEARCH THIS CLASS, SUBCLASS:

489.09, for a birefringent element in the form of a Nicol prism where the unwanted ray is deflected.

SEE OR SEARCH CLASS:

65, Glass Manufacturing, subclasses 30.1 and 32.1 for processes for forming polarizing glass material.

356, Optics: Measuring and Testing, subclass 365 for measuring/testing of polarized light having a birefringent element.

501, Compositions: ceramic, subclasses 30 and 56 for polarizers with specified glass compositions.

489.02 With compensation techniques:

This subclass is indented under subclass 489.01. Subject matter wherein the birefringent element corrects for unwanted effects.

SEE OR SEARCH CLASS:

349, Liquid Crystal Cells, Elements and Systems, subclasses 117 through 121 for liquid crystal cell including compensation.

489.03 Intrinsic birefringence or photoelastic (stress) effect:

This subclass is indented under subclass 489.02. Subject matter wherein the unwanted effect is intrinsic birefringence or photoelastic (stress) effect.

SEE OR SEARCH CLASS:

349, Liquid Crystal Cells, Elements and Systems, subclass 120 for liquid crystal cell including compensation for negative intrinsic birefringence (i.e., negative refractive index anisotropy).

489.04 Temperature:

This subclass is indented under subclass 489.02. Subject matter wherein the unwanted effect is temperature.

489.05 Path length:

This subclass is indented under subclass 489.02. Subject matter wherein the unwanted effect is changes in optical or physical path length.

(1) Note. Included in this subclass are optical delay lines.

489.06 Form birefringent element:
This subclass is indented under subclass 489.01. Subject matter wherein the optical element exhibits different refractive indices as a result of an anisotropic physical structure on a scale much larger than molecular but much smaller than the wavelength of light.

(1) Note. Examples of such elements may include polarizing dielectric diffraction gratings or polarizing lattice grids.

(2) Note. Form birefringence is also known as structural birefringence or structure-induced birefringence.

SEE OR SEARCH THIS CLASS, SUBCLASS:
566, through 576, for diffractive optical elements.

SEE OR SEARCH CLASS:
369, Dynamic Information Storage or Retrieval, subclasses 112.03 through 112.15 for optical pick-up devices having a diffractive element.

489.07 Waveplate or retarder:
This subclass is indented under subclass 489.01. Subject matter wherein the birefringent element is used to alter the polarization state of a light wave traveling through it by shifting the phase between the two perpendicular polarization components of the incident light beam, i.e., birefringent waveplate or retarder.

(1) Note. Included in this subclass are waveplates or retarders that are EXPLICITLY birefringent, i.e. the waveplate or retarder is birefringent, anisotropic, uniaxial, biaxial or double (doubly) refractive; the waveplate or retarder is made from a birefringent crystalline material such as quartz, calcite, tourmaline, rutile, sodium nitrate, magnesium fluoride, sapphire, etc.; or the waveplate or retarder has been specified to have two distinct indices of refraction associated with different crystallographic directions, such as those producing ordinary and extraordinary rays.

SEE OR SEARCH CLASS:
349, Liquid Crystal Cells, Elements and Systems, subclass 18 for projectors with liquid crystal cell that includes a variable or rotatable retarder and subclasses 117-118 for specific liquid crystal cell structures with birefringent retarders.

489.08 Beam deflector or splitter:
This subclass is indented under subclass 489.01. Subject matter wherein the birefringent element is used to change the direction of the entire beam or a portion of the beam for positioning purposes or is used to split the beam into two or more portions.

(1) Note. The polarization splitter may include a plurality or an array of splitters.

SEE OR SEARCH THIS CLASS, SUBCLASS:
485.01, through 485.07, and 487.04, for polarized beam deflection and splitting using nonbirefringent medium.
489.09, for prism structures which could be used for beam splitting.
629, through 638, for diffractive optical elements.

489.09 Prism:
This subclass is indented under subclass 489.08. Subject matter wherein the birefringent element has at least two plane surfaces inclined relative to each other, from which light is reflected or through which light is refracted.

(1) Note. A prism may be employed for refracting or reflecting light. Prism reflections are considered to be internal reflections; that is, the light is inside the prism body both before and immediately after the reflection.

(2) Note. The prismatic element may include a plurality or an array of prisms (e.g., crossed prisms, x-prisms or kernel prisms).

(3) Note. The prismatic element may also be doubly refractive, wherein light incident on the prismatic element undergoes decomposition into two rays, the ordinary ray and the extraordinary ray (e.g., Glan prism, Wollaston prism, Rochon prism, Sernarmont prism, Nicol prism, Feussner polarizer, etc.). This phenomena occurs when the optic axis of the element is at an arbitrary angle with respect to the incident beam direction (i.e., not parallel).

SEE OR SEARCH THIS CLASS, SUBCLASS:

485.06, for prisms used for polarization by reflection or refraction.

639, and 640, for refraction at the beam splitting or combining surface of a prismatic element.

831, through 837, for prisms, per se.

SEE OR SEARCH CLASS:

349, Liquid Crystal Cells, Elements and Systems, subclasses 8 through 9 for projectors with liquid crystal cell which produces S and P polarized light.

353, Optics: Image Projectors, subclass 20 for polarizers used with image projectors.

489.1 Adjustable element(s):

This subclass is indented under subclass 489.09. Subject matter wherein the prismatic element is movable to adjust the optical characteristics of the prismatic element (e.g., Soleil-Babinet compensators).

489.11 Film or layer:

This subclass is indented under subclass 489.08. Subject matter wherein the polarization splitter includes at least one thin film, layer, or coating of birefringent materials.

SEE OR SEARCH CLASS:

427, Coating Processes, subclasses 163.1 through 163.4 for coating processes, per se, where the product is an optical element.

489.12 Uniaxial:

This subclass is indented under subclass 489.11. Subject matter including birefringent materials wherein the refractive indices of two of the three orthogonal directions are the same.

(1) Note. Included in this subclass are both positive and negative birefringent uniaxial materials.

489.13 Biaxial:

This subclass is indented under subclass 489.11. Subject matter including birefringent materials wherein the refractive indices of all three orthogonal directions are different.

489.14 Lens:

This subclass is indented under subclass 489.01. Subject matter wherein the birefringent element is a lens.

(1) Note. A birefringent lens is defined as either a single transparent mass of birefringent refractive material having opposed refracting surfaces or a plurality of such masses arranged along an optical axis with their opposed refracting surfaces disposed transversely of such axis.

SEE OR SEARCH THIS CLASS, SUBCLASS:

489.18, for optical systems with lenses and plural birefringent elements.

489.15 Plural birefringent elements:

This subclass is indented under subclass 489.01. Subject matter wherein beam polarization is achieved by multiple birefringent elements.

SEE OR SEARCH THIS CLASS, SUBCLASS:

371, and 386, for microscopes using polarized light which may utilize birefringent elements.

465, for stereoscopic systems with polarizing elements which may be birefringent.

489.01, for elements where the polarization varies over surface of the medium.

489.09, through 489.1, for prism structures made up of plural elements.

SEE OR SEARCH CLASS:

349, Liquid Crystal Cells, Elements and Systems, subclasses 8 through 9 for projectors with liquid crystal cell which produces S and P polarized light.

353, Optics: Image Projectors, subclass 20 for polarizers used with image projectors.

362, Illumination, subclass 19 for illumination systems with polarizing elements.

489.16 Three or more birefringent elements:

This subclass is indented under subclass 489.15. Subject matter wherein beam polarization is achieved by at least three birefringent elements.

489.17 In parallel:

This subclass is indented under subclass 489.15. Subject matter wherein the birefringent elements are arranged transverse to the light propagation direction, i.e., positioned in parallel.

489.18 With lenses:

This subclass is indented under subclass 489.15. Subject matter wherein the optical system also includes a plurality of lenses in series or in a lens array.

(1) Note. Included in this subclass are optical systems with plural birefringent elements including lens (or lenses) that are NOT birefringent.

489.19 Frequency filter or interference effects:

This subclass is indented under subclass 489.15. Subject matter wherein plural elements act to pass a particular frequency or band of frequencies, or wherein interference effects are used to produce effects such as color or an interference pattern.

SEE OR SEARCH THIS CLASS, SUBCLASS:

370, and 371, for interference microscopes which may utilize birefringent elements.

487.01, for color effects using dichronic medium.

580, through 590, for prism structures made up of plural elements.

634, for wavelength selective beam splitting systems.

885, through 892, for an absorption filter.

489.2 Mounting structure:

This subclass is indented under subclass 489.01. Subject matter wherein detailed structures for mounting the birefringent element are recited.

SEE OR SEARCH THIS CLASS, SUBCLASS:

819, through 830, for generic lens mounts.

SEE OR SEARCH CLASS:

349, Liquid Crystal Cells, Elements and Systems, subclasses 58 through 60 for generic mounting structures to hold liquid crystal cells.

490.01 By relatively adjustable superimposed or in series polarizers:

This subclass is indented under subclass 483.01. Subject matter wherein the polarizers are positioned one on top of another or arranged in a row and their positions are adjustable.

SEE OR SEARCH THIS CLASS, SUBCLASS:

489.2, for mounting structure of superimposed birefringent elements.

SEE OR SEARCH CLASS:

349, Liquid Crystal Cells, Elements and Systems, subclass 18 for projectors with liquid crystal cell that includes a variable or rotatable retarder.

490.02 Rotating elements:

This subclass is indented under subclass 490.01. Subject matter wherein the elements are adjustable by rotation.

490.03 Translating or sliding elements:

This subclass is indented under subclass 490.01. Subject matter wherein the elements are adjustable by translation or sliding.

491.01 With color filter:
This subclass is indented under subclass 483.01. Subject matter where a polarizing structure is combined with structure to selectively absorb or transmit specific light wavelengths.

SEE OR SEARCH THIS CLASS, SUBCLASS:
485.03, for similar subject matter where the only color produced is a result of interference.
487.01, through 487.06, for similar subject mater where the color is produced by a dichoric medium. (See (1) Note under subclass 487.01 for the definition of dichronic.)
489.19, for similar subject matter where the only color produced is a result of interference.

SEE OR SEARCH CLASS:
349, Liquid Crystal Cells, Elements and Systems, subclasses 80 through 97 for liquid crystal cell structure with color filter.

492.01 Polarization by optical activity:
This subclass is indented under subclass 483.01. Subject matter wherein the material of the optical element naturally rotates the plane of polarization of the incident light beam without the application of any external applied fields (e.g., electrical, magnetic, stress or pressure).

SEE OR SEARCH CLASS:
252, Compositions, subclass 585 for chemical compositions which produce polarized light.

493.01 Polarization by scattering:
This subclass is indented under subclass 483.01. Subject matter wherein a light beam is polarized as a result of scattering or diffusing from an optical medium.

(1) Note. The scattering or diffusing phenomena must NOT follow Snell's Law to be appropriate for this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:
599, for general optical elements that diffuse incident light.

494.01 Depolarization:
This subclass is indented under subclass 483.01. Subject matter wherein the optical element converts an incident polarized light beam to produce an unpolarized, depolarized or randomly polarized output light beam.

503 EXTENDED SPACING STRUCTURE FOR OPTICAL ELEMENTS:
This subclass is indented under the class definition. Subject matter including (a) means for maintaining different types of optical elements significantly separated in a fixed or adjustable relationship along the optical axis or (b) means for maintaining lenses significantly separated as in a Galilean telescope or door peep.

SEE OR SEARCH THIS CLASS, SUBCLASS:
744, for afocal lenses (e.g., Galilean telescopes).
894+, for optical apertures or tubes or transparent closures.
896, for miscellaneous optical devices.

504 Wide angle (e.g., door peep):
This subclass is indented under subclass 503. Subject matter wherein an objective element is designed to give a wide field of view, usually at least 120 degrees.

SEE OR SEARCH THIS CLASS, SUBCLASS:
744, for afocal lenses (e.g., Galilean telescopes).
819+, for lens mounts.

505 With screen or reticle in real image plane:
This subclass is indented under subclass 503. Subject matter including a real image display structure or a cross-hair or emblem at a real image plane.

SEE OR SEARCH THIS CLASS, SUBCLASS:
369, for a microscope with a screen.
400, for a telescope with a screen.

422, for a variable magnification telescope including a relay and a reticle.
424, for a telescope with a relay and reticle.
427, for a telescope with focusing or relatively sliding barrels and a reticle.
428, for a telescope with reticle.

506 Extension of tubular element adjustable:
This subclass is indented under subclass 503. Subject matter including a sliding structure, a bellows, or a telescoping structure for adjusting an optical barrel along the optical axis relative to another structure.

(1) Note. Other subclasses in this class indented under subclass 362, Compound lens system and titled "Separation of optical elements axially adjustable", "Variable magnification" or including the word "focusing" may include subject matter related to subject matter in this subclass.

507 PROTECTION FROM MOISTURE OR FOREIGN PARTICLE:
This subclass is indented under the class definition. Subject matter including structure to stop moisture or foreign matter from coming into contact with optical elements or means to remove moisture or foreign matter from optical elements.

(1) Note. Storage or container, per se, for an optical element is classified in Class 206, Special Receptacle or Package, particularly subclasses 5+ for eyeglasses or spectacles and subclasses 316.1+ for other optical or photographic devices or elements.

SEE OR SEARCH CLASS:
15, Brushing, Scrubbing, and General Cleaning, subclasses 300.1+ for cleaning machines involving air blast or suction.
134, Cleaning and Liquid Contact With Sol-ids, appropriate subclasses.
427, Coating Processes, subclasses 162+ for an optical element produced with a coating process.

508 Optical element rotates:
This subclass is indented under subclass 507. Subject matter where an optical element or a shield therefor is rotated or otherwise moved to throw off moisture or other foreign matter, usually by centrifugal force.

(1) Note. The optical element may be rotated by any motor including one operated by air passing over vanes as in an air operated turbine.

509 Fluid directed across optical element:
This subclass is indented under subclass 507. Subject matter with structure to direct a fluid across an optical element to blow or wash moisture, or other foreign matter off or to pull such matter off by suction created by the moving fluid.

SEE OR SEARCH THIS CLASS, SUBCLASS:
508, for apparatus where fluid is directed to vanes, as in a turbine, which rotates the optical element or a shield therefor, such as a transparent disc in front of an objective lens.

SEE OR SEARCH CLASS:
15, Brushing, Scrubbing, and General Cleaning, subclasses 300.1+ for cleaning machine involving air blast or suction.

510 Microscope drape:
This subclass is indented under subclass 507. Subject matter including a thin flexible structure loosely encircling a microscope to isolate the microscope from its surroundings.

SEE OR SEARCH THIS CLASS, SUBCLASS:
368+, for microscope, per se.

SEE OR SEARCH CLASS:
206, Special Receptacle or Package, subclasses 305 and 316.1+ for a special container for an optical instrument.

511 Cap or cover:
This subclass is indented under subclass 507. Subject matter wherein a usually flanged or flat member covers the end of a barrel of an optical

device in order to protect an unused lens, located within a barrel, from dust or from damage by impact with foreign objects.

SEE OR SEARCH THIS CLASS, SUBCLASS:
611+, for a shade to deflect unwanted light from a lens.

SEE OR SEARCH CLASS:
15, Brushing, Scrubbing, and General Cleaning, subclass 247 for a cover or cover holder.
439, Electrical Connectors, appropriate subclasses for movable or removable nonuse covering means.

512 Humidity or temperature control:
This subclass is indented under subclass 507. Subject matter with means for maintaining a desired humidity level or temperature or for increasing or decreasing the humidity level or temperature from its ambient value.

SEE OR SEARCH THIS CLASS, SUBCLASS:
395, for a stage or slide carrier with temperature control.

SEE OR SEARCH CLASS:
34, Drying and Gas or Vapor Contact With Solids, appropriate subclasses.
219, Electric Heating, subclass 219 for an electrically heated mirror.

513 Sealing:
This subclass is indented under subclass 507. Subject matter with means to seal the optical elements from the atmosphere so that dust or moisture, etc., does not fall on them.

514 Mirror, prism or signal reflector:
This subclass is indented under subclass 513. Subject matter wherein an element being sealed includes a mirror, prism, or signal reflecting structure.

515 SIGNAL REFLECTOR:
This subclass is indented under the class definition. Subject matter wherein elements may be specular or diffusing to reflect a light to an observer for signalling purposes.

(1) Note. The presence of a reflector usually is the desired information communicated to an observer, i.e., any light, as from an observer's automobile headlights, reflected from the reflector makes the presence of the reflector, and thus danger or need for caution, known to the observer; however, in indented subclass 527, below, some of the reflectors reflect light from a traffic signal light to an observer or reflect light from a source to an observer merely to determine if the source is operating.

(2) Note. The structure of signs with the nominal recitation of a signal reflector are classified in Class 40. In particular an "indicia" design or the conveyance of specific information would be classifiable in Class 40.

(3) Note. Most of the patents in these subclasses relate to highway traffic in the form of indicating the presence of an approaching curve, vehicle, or pedestrian on a roadway.

(5) Note. Since Class 359 is considered superior to Class 116 (See Lines With Other Classes and Within This Class), the use of a signal reflector as a signal source or indicator will be classified in Class 359, unless the details of the signals and indicators are specified.

(6) Note. Track reflectors having utility with railroads are classified in Class 246.

(7) Note. A nominal recitation, i.e., no optical limitations, of a signal reflector combined with the specifics of its support is classified in Class 248.

(8) Note. The patents of this and indented subclasses are to use the signal reflector to attract attention as opposed to being the source of illumination of Class 362.

(9) Note. A lens, as in a plastic tail light of an automobile used to identify an automobile's presence to a following automobile, is classified in Signal Reflectors

(subclasses 515+), rather than Lens (subclasses 642+).

(10) Note. A mirror, located along the side of the road to cause a light flash for identification of the edge of the road as an automobile approaches, is classified in Signal Reflectors (subclasses 515+), rather than Mirror, (subclasses 838+) since a nominal recitation of a mirror claimed with other structure is classified with the other structure.

(11) Note. The combination of an article of clothing and a signal reflector is classified in this subclass since the combination only is classified in Class 2, if not otherwise classifiable.

(12) Note. The combination of an animal collar (i.e., nominal recitation of a collar or harness) together with a signal reflector is classified with the signal reflector of this and indented subclasses, while a reflector claimed in combination with more than a nominal collar is classified in Class 119, subclass 858.

SEE OR SEARCH THIS CLASS, SUBCLASS:

514, for signal reflector sealing from moisture or foreign particles.

838+, for mirrors which reflect a substantial portion of incident light, but the reflected light is not used for signalling purposes.

SEE OR SEARCH CLASS:

36, Boots, Shoes, and Leggings, subclass 137 for light reflecting or illumination attached to a shoe.

40, Card, Picture, or Sign Exhibiting, sub-class 208 for a license plate and reflector, subclass 219 for translucent mirrors with indicia, and subclasses 582+ for illuminated signs which may include reflective elements.

116, Signals and Indicators, subclass 20 for helios graphic code signaling and subclasses 63+ for mechanical street traffic signalling structure, such as a semphore, light shutter, or pointer.

119, Animal Husbandry, subclass 858 for an animal collar including a reflector.

246, Railway Switches and Signals, subclass 474 for railway track reflectors which are disclosed as having special utility with railroads.

248, Supports, subclasses 201+ for brackets and subclasses 466+ for mirror or picture type supports.

250, Radiant Energy, subclasses 483.1+ for reflectors including luminescent, fluorescent or phosphorescent material.

264, Plastic and Nonmetallic Article Shaping or Treating Processes, subclass 1.9 for reflective type.

301, Land Vehicles: Wheels and Axles, subclass 37 for protectors or trim members.

313, Electric Lamp and Discharge Devices, subclasses 113+ for an electric lamp or discharge device with a reflector integral therewith.

340, Communications: Electrical, appropriate subclasses for traffic and vehicle signal lights, subclasses 815.4+ for visual indicator, and subclass 815.76 for lens type indicator.

342, Communications: Directive Radio Wave Systems and Devices (e.g., Radar, Radio Navigation), subclasses 5+ for radar reflectors, i.e., reflectors of radio frequency waves.

362, Illumination, for artificial illumination means, subclasses 296.01 through 296.1 for projectors with reflectors, subclasses 341-350 for constant reflectors, and subclasses 459-549 for illumination with vehicle structure.

404, Road Structure, Process, or Apparatus, subclasses 9+ includes reflector support structure combined with road structure.

427, Coating Processes, subclasses 162+ for optical element produced.

428, Stock Material or Miscellaneous Articles, subclass 98 for structurally defined web or sheet.

516 Body carried:

This subclass is indented under subclass 515. Subject matter including apparatus to enable a user (human or animal) to carry the reflector.

(1) Note. A reflector carried by the hand or wrist but not worn by the user, belongs in this subclass, rather than subclass 517.

(2) Note. The combination of either a flashlight or a cane with an attached reflector, which is normally carried by the hand, belongs in this subclass.

(3) Note. The combination of an article of clothing and a signal reflector belongs in this subclass not with the apparel of Class 2, since the combination only belongs in Class 2, if not otherwise classifiable.

(4) Note. The combination of an animal collar (i.e., nominal recitation of a collar or harness) together with a signal reflector is classified with the signal reflector not the collar of Class 119, subclass while a reflector claimed in combination with more than a nominal collar is classified in Class 119, subclass 858.

SEE OR SEARCH THIS CLASS, SUBCLASS:

517, for a signal reflector that is part of or attached to an article worn on the hand or wrist of the user.

518, for reflectors that are an integral part of the clothing used as apparel.

519, for reflectors that are worn over clothing, but not held.

SEE OR SEARCH CLASS:

36, Boots, Shoes, and Leggings, subclass 137 for light reflecting or illumination attached to a shoe.

63, Jewelry, for pertinent subclass(es) as determined by schedule review.

116, Signals and Indicators, subclass 35 for motion and direction indicators for vehicles.

119, Animal Husbandry, subclass 858 for an animal collar including a reflector.

340, Communications: Electrical, subclass 321 for portable self-contained (e.g., movie usher's signalling flashlight) and subclass 475 for turn signals.

362, Illumination, subclass 103 for wearing apparel or body support, subclass 104 for jewelry with wearing apparel or body support.

517 Worn by hand or wrist:

This subclass is indented under subclass 516. Subject matter wherein the reflector is a part of or attached to clothing or a device both of which are worn by the wrist or hand.

(1) Note. A glove having a reflector is classified in this subclass.

(2) Note. A wrist band having a reflector is classified in this subclass.

(3) Note. A reflector carried by the hand or wrist, but not worn, is classified in subclass 516.

(4) Note. Safety belts, pins, etc., wherein the sole function of the apparatus is to mount a signal reflector for safety purposes are classified in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

516, for reflectors that are carried by the body and not worn by the user.

SEE OR SEARCH CLASS:

2, Apparel, subclasses 158+ for hand or arm covering.

36, Boots, Shoes, and Leggings, subclass 71.5 for preformed, externally applied, wear-connecting attachments.

63, Jewelry, subclasses 3+ for bracelets and subclasses 15+ for finger rings.

362, Illumination, subclass 104 for jewelry with wearing apparel or body support.

518 Permanently fixed to clothing:

This subclass is indented under subclass 516. Subject matter wherein a reflector is attached to an article of clothing and remains on the clothing when a person discontinues wearing the clothing.

(1) Note. Signal reflectors that are part of the clothing a person wears and the clothing serves other purposes than as a mount for a reflector are classified in this subclass.

(2) Note. A belt, having a reflector, worn through the loops of a pair of trousers functions as an article of clothing and is classified and in this subclass.

(3) Note. Signal reflectors that are transparent spheres permanently fixed to clothing by glue, transparency, etc., are classified in this subclass.

(4) Note. A helmet, hat, shoe, or boot is considered clothing for this subclass, but Class 36, subclass 137 takes light reflecting or illumination attached to a shoe.

(5) Note. A pin with a reflector is not permanently fixed to clothing, but is classified in subclass 519.

(6) Note. A signal reflector permanently attached to an animal collar, leash, or harness is classified in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

519, for safety belts, pins, etc., having a reflector and the sole purpose of wearing the article is for safety reasons. A safety belt is not worn through the loops of a pair of trousers.

538, for minute transparent reflective spheres mounted on a flexible substrate that is not clothing.

SEE OR SEARCH CLASS:

2, Apparel, subclasses 158+ for hand or arm covering.

36, Boots, Shoes, and Leggings, subclass 71.5 for preformed, externally applied, wear-connected attachments.

63, Jewelry, subclasses 3+ for bracelets and subclasses 15+ for finger rings.

519 Worn over clothing:

This subclass is indented under subclass 516. Subject matter wherein the reflector is mounted on apparatus that is placed over the apparel of a user.

(1) Note. This would include a safety belt, a safety belt harness, and pins that are worn solely for the reflecting properties not as part of the normal dress of the person. A safety belt is not used through the loops of a pair of trousers.

SEE OR SEARCH THIS CLASS, SUBCLASS:

516, for a signal reflector that is held by the user rather than worn.

518, for a belt used as an article of clothing for a pair of trousers which also has a reflector integral or as part of the belt.

SEE OR SEARCH CLASS:

2, Apparel, subclasses 158+ for hand or arm covering.

36, Boots, Shoes, and Leggings, subclass 71.5 for preformed, externally applied, wear-connecting attachments.

63, Jewelry, subclasses 3+ for bracelets and subclasses 15+ for finger rings.

520 Moving:

This subclass is indented under subclass 515. Subject matter where the signal reflector is in a continuous state of motion to be more easily observed.

(1) Note. The continuous state of motion could be vibration, oscillation, or rotation on a specified device whether or not they are “claimed” as rotating etc.

(2) Note. The motion of reflectors resulting from vehicle vibration, vehicle wheels, wind action, etc., are considered to be an irregular nature for this subclass and not periodic.

(3) Note. The beam deflection caused by a nonperiodic moving reflector solely to present a clearer observation of the reflector belong in this subclass not beam deflection by the reflector to communicate some specific information via the modulation produced by the signal reflector beam deflection.

(4) Note. Rigidly mounted reflectors such as bicycle reflectors mounted on the frame do not belong here but in subclass 550.

SEE OR SEARCH THIS CLASS, SUBCLASS:

212.1 through 215.1, for a periodically moving reflector to produce light beam deflection/scanning without modulation.

508, for rotating reflector to throw off moisture or foreign particle.

526, for reflectors that are wobbly mounted on the support.

549+, for reflectors rigidly mounted to a vehicle in order to move exactly as the vehicle.

SEE OR SEARCH CLASS:

40, Card, Picture, or Sign Exhibiting, subclass 208 for a license plate and reflector, subclasses 427+ and 446+ for display devices that simulate motion or a changing exhibitor, subclasses 582+ for illuminated signs which may include reflective elements.

116, Signals and Indicators, subclasses 28+ for vehicle, subclasses 46+ for rotatable motion and direction indicators for vehicles, and subclass 56 for vehicle-energy actuated.

246, Railway Switches and Signals, subclass 125 for electric automatic highway signals, mine doors, and gates.

521 Pedal mounted:

This subclass is indented under subclass 520. Subject matter wherein the reflector is attached to the pedal of a vehicle that requires pedal movement for vehicle motion.

(1) Note. These patents are generally bicycle pedals but are not limited only to bicycles.

SEE OR SEARCH THIS CLASS, SUBCLASS:

523, for spoke mounted moving reflectors.

524, for tire, valve stem, wheel, hub cap, or axle mounted moving reflectors.

550, for reflectors rigidly mounted to a bicycle or motorcycle.

SEE OR SEARCH CLASS:

74, Machine Element or Mechanism, subclass 560 for pedals and subclasses 594.4 for pedals connected to a crank.

522 Rotating:

This subclass is indented under subclass 520. Subject matter wherein the reflector movement is rotational about some axis.

(1) Note. This includes reflectors that are rotated by the gases expelled from the exhaust pipe of a vehicle.

(2) Note. The structure of signs with the nominal recitation of a signal reflector are classified in Class 40. In particular, an “indicia” design or the conveyance of specific information would be classifiable in Class 40.

SEE OR SEARCH THIS CLASS, SUBCLASS:

508, for optical elements that are rotated for protection from moisture or foreign particles.

520, for reflectors that appear to move but are stationary and moving apertures in front of the reflectors make them appear to be moving.

525, for wind driven rotating reflectors.

SEE OR SEARCH CLASS:

40, Card, Picture, or Sign Exhibiting, subclasses 430+ for rotatable displays with special effects.

116, Signals and Indicators, subclasses 28+ for vehicle, subclasses 46+ for rotatable motion and direction indicators for vehicles, and subclass 56 for vehicle-energy actuated.

523 Spoke mounted:

This subclass is indented under subclass 522. Subject matter wherein the reflector is attached onto one or more spokes that position the rim from the hub.

(1) Note. This subclass includes bicycle and motorcycle spokes as well as any other type of spoked wheel.

SEE OR SEARCH THIS CLASS, SUBCLASS:

521, for pedal mounted moving reflectors.

524, for tire, valve stem, wheel, hub cap, or axle mounted moving signal reflectors.

550, for reflectors rigidly mounted on a bicycle or motorcycle.

SEE OR SEARCH CLASS:

301, Land Vehicles: Wheels, and Axles, subclass 37 for wheel covers fastened to the spokes of a wheel.

340, Communications: Electrical, appropriate subclasses for bicycle traffic and vehicle communications.

362, Illumination, subclasses 473+ with a bicycle or motorcycle supporting the illumination source.

524 Tire, wheel, valve stem, hub cap, or axle mounted:

This subclass is indented under subclass 522. Subject matter wherein the reflector is attached to either a rotating tire, valve stem, wheel, hub cap, or axle of a vehicle.

(1) Note. This also includes reflectors attached to or part of a dust cover of a valve stem.

SEE OR SEARCH THIS CLASS, SUBCLASS:

521, for pedal mounted moving reflectors.

523, for spoke mounted moving reflectors.

SEE OR SEARCH CLASS:

40, Card, Picture, or Sign Exhibiting, subclass 587 for tire and wheel signs.

138, Pipes and Tubular Conduits, subclass 89.4 for inflation stem dust covers.

301, Land Vehicles: Wheels, and Axles, subclass 37 for wheel protectors or trim members, or wheel covers fastened to the spokes of a wheel, and subclass 108 for wheel hub caps.

340, Communications: Electrical, appropriate subclasses for bicycle traffic and vehicle communications.

362, Illumination, subclasses 473+ with a bicycle or motorcycle supporting the illumination source.

525 Wind driven:

This subclass is indented under subclass 522. Subject matter wherein the rotation of the reflector, attached to a vehicle, is controlled by wind.

SEE OR SEARCH CLASS:

40, Card, Picture, or Sign Exhibiting, subclass 440 for rotatable fluid operated display with special effects and subclass 479 for rotatable fluid operated changing exhibitor.

116, Signals and Indicators, digest 7 for fluid actuated.

446, Amusement Devices: Toys, subclasses 217+ for fluid driven rotatable blade (e.g., pinwheel).

526 Vibration:

This subclass is indented under subclass 520. Subject matter wherein the signal reflector attracts attention by its own random movement relative to its support.

(1) Note. This reflector is not driven by any motor or other source of energy such as the wheel of a vehicle or the wind.

(2) Note. The reflector is wobbly mounted with respect to its support.

(3) Note. The reflector has additional movement from that created by its support (i.e., it is suspended from its support bracket).

(4) Note. Reflectors rigidly mounted to a support via a helical or other spring belong in this subclass since they will vibrate.

(5) Note. A reflector attached to a mudflap of a vehicle would be classified here since the movement of the mudflap having the reflector attracts attention.

(6) Note. Rigidly mounted reflectors such as bicycle reflectors mounted on the frame do not belong here but in subclass 550.

SEE OR SEARCH THIS CLASS, SUBCLASS:

520, for reflectors that are in a continuous state of motion relative to their support.

549, for reflectors that are rigidly mounted on a moving vehicle.

SEE OR SEARCH CLASS:

40, Card, Picture, or Sign Exhibiting, subclasses 613+ for vibratory signs.

527 For a signal source remote from observer:

This subclass is indented under subclass 515. Subject matter including structure to reflect light from a signal originating from a source remote from the observer, i.e., not coming from a light source at the location of the observer.

(1) Note. This structure may be merely a plane mirror mounted on an automobile hood to reflect light from an overhead traffic signal to the driver or it may be a reflector at a street intersection which reflects light from the headlights of one car to the driver of another car travelling in a direction approximately 90 degrees different than that of the first car.

(2) Note. Road reflectors remote from the vehicle, to reflect all of an automobile's headlight beams back to the driver are not classified in this subclass since the source of the vehicle headlight beams are at the location of the observer.

(3) Note. The reflection of the light beams of one vehicle's headlights to another vehicle would be classified in this subclass.

(4) Note. A reflector which reflects a portion of the light output of a vehicle's headlight or taillight to be observable by the driver of the vehicle is classified in this subclass, rather than Class 362, since the reflection is for observation rather than illumination.

SEE OR SEARCH THIS CLASS, SUBCLASS:

529+, for 3 corner retroreflectors which return a light beam back to the source.

531, for unitary retroreflectors mounted on the road surface.

546+, for plural reflecting elements for a single sheet or plate such as in some road reflectors.

551, for reflectors mounted on the roadway that reflect the light from a vehicle back to the driver of the vehicle.

552, for reflectors mounted adjacent the roadway which reflect the light beams from a vehicle's headlights back to the driver of the vehicle.

838, for similar mirrors which are not disclosed as signal mirrors, which only have to reflect light, but which are disclosed as reflecting images.

SEE OR SEARCH CLASS:

40, Card, Picture, or Sign Exhibiting, subclass 559 for illuminated sign external light source if indicia is present.

246, Railway Switches and Signals, subclass 474 for track reflectors. A railway and switch in combination with a nominally recited signal reflector are also classified in this class (246).

248, Supports, subclasses 476+ for adjustable mirror or picture position.

296, Land Vehicles: Bodies and Tops, subclass 97.1 for glare or screen body and subclass 97.2 for specific structure or properties for diffusing or reflecting light to reduce the glare on the viewer's eyes.

362, Illumination, subclasses 341+ for a reflector light modifier.

404, Road Structure, Process, or Apparatus, subclass 16 for reflectors used to detect the presence of traffic.

528 Light transmitting from source behind a reflector:

This subclass is indented under subclass 515. Subject matter where the reflector is adapted to transmit light from a source which is behind the surface of the reflector which is normally viewed, such as in a tail-light reflector which transmits light from a light bulb behind the reflector or lens and also reflects a large amount of light which is directed to the front surface of the reflector by an external source such as the headlights of an approaching automobile.

(1) Note. The patents of this subclass use a signal reflector combination with a light source behind the reflector in order to attract attention of other vehicles, either by the light source itself or reflection of the other vehicle's light.

(2) Note. The use of a reflector to change (i.e., concentrate, disperse, collimate) the light from a source for illumination purposes belong in Class 362 (e.g., the reflector behind the light source of a headlight used to direct the outgoing beam in a particular pattern).

SEE OR SEARCH THIS CLASS, SUBCLASS:

549, for a taillight that reflects incoming light from a reflector behind the light source that transmits away from the vehicle.

SEE OR SEARCH CLASS:

362, Illumination, subclasses 296.01 through 296.1 for a light source and modifier including a reflector where the reflector is used to modify the outgoing source light beam, subclasses 341-350 for reflector light modifiers, subclasses 459-549 for illumination with vehicle structure, and subclass 494 for mirror or reflector with vehicle structure (e.g., rear view mirror).

428, Stock Material or Miscellaneous Articles, subclass 31 for vehicle body ornament.

529 3-Corner retroreflective (i.e., cube corner, trihedral, or triple reflector type):

This subclass is indented under subclass 515. Subject matter wherein the light is reflected from three reflecting surfaces and wherein after the three reflections, it moves in a direction opposite to and parallel to its direction before the three reflections.

(1) Note. The reflections may be external or internal, i.e., the light may be reflected without entering the material from which the reflector is made or the light may enter one surface of the reflector, be reflected three times internally, and exit through the same surface.

(2) Note. Single or plural 3-corner reflectors are classified in this subclass but plural reflectors formed into a single substrate are classified in subclass 530.

SEE OR SEARCH THIS CLASS, SUBCLASS:

527, for a structure which reflects light from a signal source remote from an observer.

530, for plural 3-corner reflectors in a single substrate.

831+, for prisms, per se.

SEE OR SEARCH CLASS:

65, Glass Manufacturing, subclasses 357+ for a mold with separating or clamping.

72, Metal Deforming, subclasses 379.2+ for deforming sheet metal.

204, Chemistry: Electrical and Wave Energy, subclass 281 for electroforming mold or strips, plates, electrodes apparatus for forming electrolytic elements.

228, Metal Fusion Bonding, subclasses 141.1+ for the process of shaping.

249, Static Molds, subclass 117 for container type molding device.

264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclass 1.9 for reflective composite or multilayer optical article shaping or treating.

342, Communications: Directive Radio Wave Systems and Devices (e.g., Radar, Radio Navigation), subclasses 7+ for radio wave cube corner reflectors.

425, Plastic Article or Earthenware Shaping or Treating: Apparatus, subclass 403 for shaping surfaces, per se, and subclass 808 for lens mold.

530 Unitary plate or sheet comprising plural reflecting elements:

This subclass is indented under subclass 529. Subject matter wherein the reflective elements, such as the individual triple reflectors, are part of a single plate or sheet comprising a plurality of the 3-corner reflective elements.

(1) Note. The reflective elements are a part of the structure of the plate or sheet.

(2) Note. Many of these retroreflectors are used on highways for road makers.

(3) Note. Plural reflectors combined into a single substrate are classified in this subclass whereas plural reflectors using multiple substrates are classified in subclass 529.

SEE OR SEARCH CLASS:

65, Glass Manufacturing, subclasses 357+ for a mold with separating or clamping.

72, Metal Deforming, subclasses 379.2+ for deforming sheet metal.

204, Chemistry: Electrical and Wave Energy, subclass 281 for electroforming mold or strips, plates, electrodes apparatus for forming electrolytic elements.

228, Metal Fusion Bonding, subclasses 141.1+ for the process of shaping.

249, Static Molds, subclass 117 for container type molding device.

264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclass 1.9 for reflective composite or multilayer optical article shaping or treating.

342, Communications: Directive Radio Wave Systems and Devices (e.g., Radar, Radio Navigation), subclasses 7+ for radio wave cube corner reflectors.

404, Road Structure, Process, or Apparatus, subclass 14 for lane marker impregnated with reflective material, subclass 16 for vibration inducing member including a reflector.

425, Plastic Article or Earthenware Shaping or Treating: Apparatus, subclass 403 for shaping surfaces, per se, and subclass 808 for lens mold.

531 Mounted on roadway:

This subclass is indented under subclass 530. Subject matter wherein the reflector is positioned onto the vehicle road surface in order to enable easier viewing of that portion of the roadway.

(1) Note. A reflector sign, having a unitary plate of 3-corner reflectors, permanently fastened to a road surface would belong in this subclass but the same reflector counterbalanced within a recess in the roadway - ordinarily up and visible but capable of retraction into the recess when contacted by the vehicle wheel - is classified in Class 404.

SEE OR SEARCH THIS CLASS, SUBCLASS:

514, for signal reflector sealing from moisture or foreign particle.

547, for a unitary mass of discrete reflecting elements mounted on or adjacent the roadway.

551, for a broad reflector mounted on the roadway.

SEE OR SEARCH CLASS:

40, Card, Picture, or Sign Exhibiting, subclass 612 for highway or street marker.

180, Motor Vehicles, subclass 168 having controlling apparatus adapted to interact with stationary apparatus which describes the course of the vehicle's travel.

404, Road Structure, Process, or Apparatus, subclasses 9+ for traffic director where the reflector is not permanently fixed to the road surface.

532 Mounted adjacent roadway:

This subclass is indented under subclass 530. Subject matter wherein the reflector is positioned off of the roadway surface but within viewing distance of the driver of a vehicle in order to enable easier viewing of the edge of the roadway.

(1) Note. A reflector sign permanently fastened to a road surface would belong in this subclass but the same reflector counterbalanced within a recess in the roadway - ordinarily up and visible but capable of retraction into the recess when contacted by the vehicle wheel is classified in Class 404.

SEE OR SEARCH THIS CLASS, SUBCLASS:

514, for signal reflector sealing from moisture or foreign particle.

547, for a unitary mass of discrete reflecting elements mounted on or adjacent the roadway.

552, for a broadly recited reflector mounted adjacent the roadway.

SEE OR SEARCH CLASS:

40, Card, Picture, or Sign Exhibiting, subclass 612 for highway or street marker.

116, Signals and Indicators, subclasses 63+ for street traffic where the device for giving signals are generally due to some movement of some part or element from a normal or nonsignalling or signal-controlled position (e.g., a semaphore).

180, Motor Vehicles, subclass 168 having controlling apparatus adapted to interact with stationary apparatus which describes the course of the vehicle's travel.

404, Road Structure, Process, or Apparatus, subclasses 9+ for traffic director where the reflector is not permanently fixed to the road surface.

533 Mounted on vehicle:

This subclass is indented under subclass 530. Subject matter wherein the reflector is positioned on a vehicle.

(1) Note. This vehicle could be an airplane, boat, automobile, train, etc.

SEE OR SEARCH THIS CLASS, SUBCLASS:

548, for discrete reflecting elements formed as a unitary mass mounted on a vehicle.

549, for broadly recited reflectors mounted on a vehicle.

534 Including a curved refracting surface:

This subclass is indented under subclass 515. Subject matter including a surface which is curved and which refracts or bends the light before or after it is reflected.

(1) Note. The reflector operates as a separate function and is located behind the actual curved refracting surface.

SEE OR SEARCH THIS CLASS, SUBCLASS:

546+, for reflecting elements formed as a unitary piece.

642+, for lenses generally, and especially subclasses 727+ for lenses including concave or convex reflecting surfaces.

535 Within individual indentations:

This subclass is indented under subclass 534. Subject matter wherein the curved refracting surface is positioned either within an indentation of the substrate or within a socket created by a plurality of elements to hold it in place.

(1) Note. Multiple minute spheres used to retain a much larger curved refracting optical element within a socket for the larger element belong in this subclass.

(2) Note. These indentations can be produced by a platen which forces refracting beads against a substrate to form indentations, thus producing separate indentations for each bead.

SEE OR SEARCH THIS CLASS, SUBCLASS:

543, for individual reflector (not microsphere) element mount.

536 Minute transparent spheres:

This subclass is indented under subclass 534. Subject matter where the elements which refract and reflect are tiny transparent spheres, commonly called "little glass beads".

(1) Note. The elements may be partially or fully embedded. The matrix may be attached to a surface of any shape such as a spherical or a flat surface.

(2) Note. These spheres range in size between 3-6 mils (i.e., 0.003 - 0.006 inches).

SEE OR SEARCH THIS CLASS, SUBCLASS:

539, for a mixture of spheres in a liquid binder (e.g., paint or resin).

540, for spheres placed on top of a binder (e.g., resin, asphalt, glue).

SEE OR SEARCH CLASS:

501, Compositions: Ceramic, subclass 34 for reflective glass beads.

523, Synthetic Resins or Natural Rubbers, subclass 219 for process of forming glass void.

537 Directional reflection (e.g., prevent viewing unless critical angle of light is used):

This subclass is indented under subclass 536. Subject matter wherein the reflective structure behind the spheres is arranged to permit viewing of the image behind the spheres, only if the incident light is transmitted to the spheres at the desired critical angle.

(1) Note. The directional reflection of this subclass permits viewing of the image only by those authorized (i.e., knowing the angle).

(2) Note. The image is not changed by the directional reflection but observation is accomplished dependent upon viewing at the proper angle.

(3) Note. A picture that is covered by a substrate containing minute glass spheres to permit viewing of the picture via the reflected light only if the incident light is at a predetermined angle belongs in this subclass.

SEE OR SEARCH CLASS:

380, Cryptography, subclass 54 for modifying optical image (e.g., transmissive overlay) by changing its visible appearance.

538 On flexible substrate (e.g., flexible sheeting, bumper sticker, etc.):

This subclass is indented under subclass 536. Subject matter wherein the spheres are placed on a flexible material by transfer, glue, etc., and this material can be used for an reflective purpose.

(1) Note. Spheres embedded in a resin that remains flexible (e.g., elastomeric composition) are classified in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

518, for signal reflectors (e.g., transparent spheres, etc.) permanently fixed to clothing (e.g., by glue, transparency, etc.).

SEE OR SEARCH CLASS:

2, Apparel, for apparel, per se.

539 Mixture in liquid binder (e.g., paint, resin):

This subclass is indented under subclass 536. Subject matter wherein the spheres are located within the mixture of paint or resin and are simultaneously applied to the surface as a complete mixture.

(1) Note. This mixture can be painted onto signs, vehicles, or roadway surfaces.

SEE OR SEARCH THIS CLASS, SUBCLASS:

540, for spheres that are placed on top of a binder prior to the hardening of the binder.

551, for reflective paint that does not have minute spheres.

SEE OR SEARCH CLASS:

106, Compositions: Coating or Plastic, subclasses 228 and 253 for a natural resin or derivative containing filler, dye, or pigment.

523, Synthetic Resins or Natural Rubbers, subclass 527 for glass DNRM nonreactive material mixed with a composition.

540 Placed on top of binder (e.g., resin, asphalt, glue, etc.):

This subclass is indented under subclass 536. Subject matter wherein the binder is first placed on the surface and subsequently, prior to hardening of the binder, the spheres are placed thereon to ensure that they are fixed to the surface via the binder.

(1) Note. This includes exposed spheres which are glued to the surface, resulting in an exposed glass-sphere surface.

(2) Note. Spheres which are not completely surrounded by the binder belong in this subclass.

(3) Note. A monolayer (single) of spheres on a binder belong in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

539, for spheres which are completely surrounded by the binder.

541 With single transparent coating between spheres and atmosphere:

This subclass is indented under subclass 540. Subject matter wherein a single coating, which is transparent to light, surrounds and either (1) completely envelopes the normally exposed surface of the sphere, (2) touches only a portion of the spheres, or (3) is an interface for the minute spheres where the spheres are confined but not touching the exposed surface.

(1) Note. This single coating will cover the sphere relative to the environment yet have no optical effect on the light that would impinge on a normally exposed surface of the sphere. If reference is made to protection of the reflector from moisture or foreign particle it belongs in subclass 514.

(2) Note. A transparent coating used simply to hold the spheres onto the binder is not considered a sealer as in subclass 514.

SEE OR SEARCH THIS CLASS, SUBCLASS:

514, for a sealed signal reflector to protect it from moisture or foreign particle.

SEE OR SEARCH CLASS:

428, Stock Material or Miscellaneous Articles, subclass 34 for light transmissive sheets with gas space therebetween and edge sealed (e.g., double glazed storm window, etc.).

542 Plural refracting elements formed as a unitary mass:

This subclass is indented under subclass 534. Subject matter including a unitary mass of transparent material which comprises a plurality of curved refracting surfaces.

(1) Note. This unitary mass performs refraction of the incoming light prior to reflection by the reflector, and also of the outgoing light after reflection.

SEE OR SEARCH THIS CLASS, SUBCLASS:

454+, for projection screens having a unitary sheet of plural refracting areas.

530, for plural cube corner reflectors which together make up a unitary plate.

546, for discrete reflecting elements which comprise a unitary mass.

543 With individual reflector element mount:

This subclass is indented under subclass 534. Subject matter including means for mounting the individual optical elements such as small socket-like mounts in which the elements are inserted and held or further including means for mounting the small socket-like mounts.

(1) Note. Reflector buttons that simply reflect light falling on them, autocollimating, without the creation of a single image of an object at a focal point are classified in this subclass rather than the lens subclasses of this class.

(2) Note. Although reflector buttons are often called “lenses” they are not classified in the lens subclasses of this class unless they create a single image of an object at a focal point.

SEE OR SEARCH THIS CLASS, SUBCLASS:

535, for minute transparent spheres within individual indentations.

546, for a multifaceted single glass reflector which is considered a unitary mass of discrete reflecting elements.

642+, for lenses, per se.

SEE OR SEARCH CLASS:

40, Card, Picture, or Sign Exhibiting, subclasses 201+ for a license plate with a theft-preventive feature.

404, Road Structure, Process, or Apparatus, subclasses 9+ for reflector support structure combined with road structure.

544 Including a snap, spring clip, or spring retainer:

This subclass is indented under subclass 543. Subject matter wherein either the curved refracting surface or the reflecting surface behind the refractor are individually mounted on a support by being pushed into a retainer which opens for entrance and closes around a portion of the element when it is in the settled position or a coil spring holds each element in place.

(1) Note. The snap or spring clip retainer could either clamp onto the refractor/reflector or could be used to clamp a retainer to a housing and the refractor/reflector force fitted into the retainer. The combination of a refractor/reflector and a retainer that is snapped into a third device belong in this subclass.

(2) Note. A rubber slot into which the refractor or reflector are pushed into for retention in the slot belong in subclass 543.

(3) Note. Although the reflector buttons of this subclass are often referred to as lenses, these have not been crossed into lenses since these simply reflect the light falling on them rather than create a single image of an object at a focal point. These buttons are often referred to as auto collimating.

SEE OR SEARCH THIS CLASS, SUBCLASS:

545, for a mount using a threaded member.

SEE OR SEARCH CLASS:

248, Supports, subclass 27.3 for holding an instrument in a panel by a biased clip.

267, Spring Devices, subclass 159 for a snap spring and subclasses 166+ for coil springs.

545 Including a threaded member:

This subclass is indented under subclass 543. Subject matter where the means for mounting includes a threaded member for screw attachment and this can be used to mount the curved refracting surface that is located in front of the reflecting surface.

(1) Note. Reflector buttons that simply reflect light falling on them, autocollimating, without the creation of a single image of an object at a focal point are classified in this subclass rather than the lens subclasses of this class.

(2) Note. Although reflector buttons are often called “lenses” they are not classified in the lens subclasses of this class unless they create a single image of an object at a focal point.

SEE OR SEARCH CLASS:

411, Expanded, Threaded, Driven, Headed, Tool-Deformed, or Lock-Threaded Fastener, subclasses 81+ for threaded fastener and means for restricting rotation thereof relative to coacting substructure.

546 Discrete reflecting elements formed as a unitary mass:

This subclass is indented under subclass 515. Subject matter wherein a plurality of reflective elements are each part of a unitary plate or sheet.

(1) Note. This unitary mass performs the actual reflection of the incoming beam.

(2) Note. This includes a single glass reflector having multiple facets.

(3) Note. The individual reflectors are arranged to reflect light as if it came from one single reflector having a particular characteristic.

SEE OR SEARCH THIS CLASS, SUBCLASS:

459, for a unitary sheet comprising plural reflecting elements on a projection screen.

527, for reflectors that reflect headlight beams to the eyes of the driver.

529, for retroreflective reflectors that reflect the light directly to the source of the light.

530, for a plurality of triple reflectors which are each part of a unitary plate or sheet.

542, for a plurality of signal reflectors with a curved reflecting and a curved refracting surface which are each part of a unitary plate or sheet.

547 Mounted on or adjacent roadway:

This subclass is indented under subclass 546. Subject matter wherein the unitary mass is positioned either on or off of the roadway surface within viewing distance of the driver of a vehicle in order to enable an easier view of that portion of the roadway or the edge of the roadway.

(1) Note. A reflector sign, having discrete reflecting elements, permanently fastened to a road surface would belong in this subclass but the same reflector counterbalanced within a recess in the roadway - ordinarily up and visible but capable of retraction into the recess when contacted by the vehicle wheel is classified in Class 404.

SEE OR SEARCH THIS CLASS, SUBCLASS:

514, for signal reflector sealing from moisture or foreign particle.

531, for a unitary plate of 3-corner reflectors mounted on the roadway.

532, for a unitary plate of 3-corner retroreflectors mounted adjacent the roadway.

551, for a broad reflector mounted on the roadway.

552, for a broadly recited reflector mounted adjacent the roadway.

SEE OR SEARCH CLASS:

40, Card, Picture, or Sign Exhibiting, subclass 612 for highway or street marker.

116, Signals and Indicators, subclasses 63+ for street traffic where the device for giving signals are generally due to some movement of some part or element from a normal or nonsignalling or signal-controlled position (e.g., a semaphore).

404, Road Structure, Process, or Apparatus, subclasses 9+ for traffic director where the reflector is not permanently fixed to the road surface.

548 Mounted on vehicle:

This subclass is indented under subclass 546. Subject matter wherein the unitary mass is positioned on a vehicle.

(1) Note. This vehicle could be an airplane, boat, automobile, train, etc.

(2) Note. This includes a single glass reflector having multiple facets.

SEE OR SEARCH THIS CLASS, SUBCLASS:

533, for a unitary plate of 3-corner retroreflectors mounted on a vehicle.

549, for broadly recited reflectors mounted on a vehicle.

549 Rigidly mounted on vehicle:

This subclass is indented under subclass 515. Subject matter wherein the reflector is rigidly attached to any type of vehicle used to carry passengers.

(1) Note. This vehicle could be an airplane, boat, automobile, train, etc.

SEE OR SEARCH THIS CLASS, SUBCLASS:

520, for reflectors that are in a continuous state of motion relative to a vehicle.

526, for reflectors that attract attention by the random movement with respect to the support.

533, for a unitary plate of 3-corner retroreflectors mounted on a vehicle.

548, for discrete reflecting elements formed as a unitary mass mounted on a vehicle.

550 Bicycle or motorcycle:
This subclass is indented under subclass 549. Subject matter wherein the vehicle is a two wheeled vehicle in the form of either a bicycle or motorcycle.

SEE OR SEARCH THIS CLASS, SUBCLASS:
521, for pedal mounted reflectors.
523, for spoke mounted reflectors.

551 Mounted on roadway:
This subclass is indented under subclass 515. Subject matter wherein the reflector is attached to the road surface itself either in the form of individual reflector units fastened to the road surface or reflective paint.

(1) Note. Reflective paint, without minute transparent spheres, for highway marking is classified in this subclass.

(2) Note. A reflector sign (not having a unitary plate of 3-corner reflectors or a unitary mass of discrete reflecting elements) permanently fastened to a road surface would belong in this subclass but the same reflector counterbalanced within a recess in the roadway - ordinarily up and visible, but capable of retraction into the recess when contacted by the vehicle wheel - is classified in Class 404.

SEE OR SEARCH THIS CLASS, SUBCLASS:
531, for a unitary plate of 3-corner retroreflectors mounted on the roadway.
539, for paint containing minute transparent spheres.
547, for a unitary mass of discrete reflecting elements mounted on or adjacent the roadway.

SEE OR SEARCH CLASS:
106, Compositions: Coating or Plastic, subclasses 228 and 253 for a natural resin or derivative containing filler, dye, or pigment.
523, Synthetic Resins or Natural Rubbers, subclass 527 for glass DNRM nonreactive material mixed with a composition.

552 Mounted adjacent roadway:
This subclass is indented under subclass 515. Subject matter wherein the reflector is permanently mounted next to the roadway for viewing by the driver of an automobile and generally reflecting the beams of automobile headlights.

(1) Note. A reflector sign permanently fastened to a road surface would belong in this subclass but the same reflector counterbalanced within a recess in the roadway - ordinarily up and visible but capable of retraction into the recess when contacted by the vehicle wheel is classified in Class 404.

SEE OR SEARCH THIS CLASS, SUBCLASS:
532, for a unitary plate of 3-corner retroreflectors mounted adjacent the roadway.
547, for a unitary mass of discrete reflecting elements mounted on or adjacent the roadway.
553, for a reflector which is portable, i.e., temporarily placed.

SEE OR SEARCH CLASS:
40, Card, Picture, or Sign Exhibiting, subclass 612 for highway or street marker.
116, Signals and Indicators, subclasses 63+ for street traffic where the device for giving signals are generally due to some movement of some part or element from a normal or nonsignalling or signal - controlled position (e.g., a semaphore).
180, Motor Vehicles, subclass 168 having controlling apparatus adapted to interact with stationary apparatus which describes the course of the vehicle's travel.
404, Road Structure, Process, or Apparatus, subclasses 9+ for traffic director where the reflector is not permanently fixed to the road surface.

553 Emergency or temporary reflectors (i.e., portable self standing):
This subclass is indented under subclass 515. Subject matter wherein the reflectors are used as temporary barricades placed on or adjacent the roadway, foldable or collapsible reflectors for use when a car breaks down or directing traffic.

(1) Note. These reflectors are not rigidily mounted but simply placed on the surface (roadway or adjacent areas) to warn oncoming traffic of a necessary change in driving conditions along the roadway.

SEE OR SEARCH THIS CLASS, SUBCLASS:
529+, for 3-corner retroreflectors.
532, for 3-corner retroreflectors which are permanently adjacent the roadway.
534+, for reflectors having a curved refracting surface.
546+, for discrete reflecting elements formed as a unitary mass.
552, for reflectors which are permanently adjacent the roadway.

SEE OR SEARCH CLASS:
116, Signals and Indicators, subclass 63 for specific mechanisms for folding and expanding a portable street traffic signal and indicator with only a nominal recitation of a signal reflector.
248, Supports, subclass 472 for a foldable mirror or picture type.

554 IMAGE STABILIZATION:
This subclass is indented under the class definition. Subject matter wherein an optical element moves or changes its optical characteristic to compensate for vibrations, atmospheric turbulence, etc., to maintain a stable image.

SEE OR SEARCH THIS CLASS, SUBCLASS:
399+, for telescopes.
401, for a telescope with antirotation.
402+, for periscopes.
407+, for binoculars.

SEE OR SEARCH CLASS:
74, Machine Element or Mechanism, subclass 5.22 for gyroscopes combined with other structure.
250, Radiant Energy, subclass 201.1 for photocell control that could include image stabilization.

555 By movable reflective structure:
This subclass is indented under subclass 554. Subject matter wherein the motion or turbulence compensating optical element is a light reflecting device for redirecting a light beam and movable such that the combined effects of motion and reflection provides the desired compensation.

556 Having plural reflecting surfaces:
This subclass is indented under subclass 555. Subject matter having a movable compensation reflector having multiple reflective surfaces.

(1) Note. This subclass includes reflector binocular devices wherein one side is stabilized relative to the other side.

(2) Note. This subclass includes image stabilization of a reflective telescope.

SEE OR SEARCH THIS CLASS, SUBCLASS:
480+, for binocular devices.

SEE OR SEARCH CLASS:
356, Optics: Measuring and Testing, subclass 149 for gyroscope or pendulum stabilized optical element and subclass 250 for pendulum suspension of optical element or reticle fiducial instruments.

557 By movable refractive structure:
This subclass is indented under subclass 554. Subject matter wherein image stabilization is accomplished via the movements of a light bending (i.e., refracting) optical element.

(1) Note. Gyroscopically supported lenses to compensate for motion belong in this subclass.

(2) Note. Compensation for the bending of periscopes also belongs here if the opti-

cal elements are movable for the compensation.

(3) Note. The refractive elements are moved individually or as a unit to compensate for the instability of the image.

(4) Note. Motion picture cameras (Class 352) would take precedence over this class but cross references for motion picture camera lenses that are gyroscopically controlled for image stabilization should go in this subclass.

SEE OR SEARCH CLASS:

33, Geometrical Instruments, subclass 268 for celestial straightline light ray type.

89, Ordnance, subclass 41.09 for gyroscopically or pendulum controlled motor operated ordnance training mechanism.

248, Supports, subclass 123.1 for counter balanced stand and bracket.

348, Television, subclass 208 for camera image stabilization.

352, Optics: Motion Pictures, subclass 140 for focus control having gyroscopically controlled lenses.

356, Optics: Measuring and Testing, subclass 149 for gyroscope or pendulum stabilized optical element angle measuring or axial alignment.

558 DIFFRACTION:

This subclass is indented under the class definition. Subject matter wherein a light beam is split and caused to interfere with itself, which causes a change in the direction of the beam.

(1) Note. Diffraction bands result from interference of one part of a beam with another, as when the ray is deflected at the edge of an opaque obstacle, passed through a narrow slit, or deflected by an optical element such as a prism.

(2) Note. Diffraction usually, but not always, causes a break-up of the light into bands or a spectrum. Additionally, diffraction may also form a plurality of images from an object or merely redirect it, as in light diffractive scanners.

(3) Note. This subclass includes systems operating on diffraction from a straight edge, a circular disk or aperture, a slit or a grating; and also includes systems operating on Fraunhofer diffraction (far field wherein the incident light rays are parallel and the diffracted rays are brought to a focus by a focusing means) or on Fresnel diffraction (near field wherein the incident light rays arise from a finite source and no focusing means are used for rendering the diffracted rays parallel, or convergent).

(4) Note. Devices for producing moire fringes by shadow casting through grating-like elements are excluded from this subclass.

(5) Note. All diffraction has interference but interference does not require diffraction.

SEE OR SEARCH THIS CLASS, SUBCLASS:

577+, for interference of light waves.

831+, for prisms.

SEE OR SEARCH CLASS:

65, Glass Manufacturing, subclass 59.1 for the process of bonding and subclass 154 for bonding glass to metal.

156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclass 81 with melting or gasification of permanently associated solid material in situ in airtight cavity.

204, Chemistry: Electrical and Wave Energy, subclass 192.26 for the coating, forming or etching with optical or photoactive deposition material by glow discharge sputter deposition.

264, Plastic and Nonmetallic Article Shaping and Treating: Processes, subclasses 1.1+ for optical article shaping or treating.

356, Optics: Measuring and Testing, subclasses 485, 494, 499, and 521 for dif light interference, and subclass 618 for moire fringe generation by shadow casting through grating-like elements.

365, Static Information Storage and Retrieval, subclass 124 for systems utilizing diffraction for selected masking of information.

369, Dynamic Information Storage or Retrieval, subclasses 109.01 through 109.02 with diffrac radiation beam modification.

382, Image Analysis, subclasses 210+ for pattern recognition using spatial filtering (e.g., holography).

427, Coating Processes, subclasses 164+ for transparent base optical element production and subclass 166 for vapor depositing.

428, Stock Material or Miscellaneous Articles, subclass 167 for parallel ribs or grooves.

430, Radiation Imagery Chemistry: Process, Composition, or Product Thereof, subclass 5 for radiation mask, subclasses 9+ for imaged product, subclass 32 for making an optical device, subclass 323 for etching, and subclass 325 for elevated pattern.

451, Abrading, subclasses 41+ for a process of grinding glass or stone.

559 Using Fourier transform spatial filtering:
This subclass is indented under subclass 558. Subject matter wherein an optical Fourier transform is taken of a diffracted beam of light and a spatial filter is placed at the Fourier transform plane to spatially limit the output optical wave to those having Fourier transform coefficients passed by the filter.

(1) Note. A spatial filter is generally an emulsion mask having a transparent annular region in an otherwise opaque region used to eliminate undesired radiation that diverges from the optical axis beyond the confines of the transparent region.

(2) Note. A spatial filter is sometimes referred to as a mask used as an aperture to cause diffraction of the light beam passing therethrough.

(3) Note. A Fourier transform of a wave function is the amplitude representation of the components of each frequency of a given wavefront.

(4) Note. Amplitude and phase information over a discrete spatial area of the diffracted energy pattern is obtained by placing a lens at one focal length from the aperture to produce a “Fourier Transform”, and the aperture at the second focal plane of the lens creates a diffraction pattern.

SEE OR SEARCH THIS CLASS, SUBCLASS:

29, for Fourier transform holography.

SEE OR SEARCH CLASS:

382, Image Analysis, subclasses 181+ for pattern recognition where an image analyzing system possesses the capability of identifying discrete patterns, subclasses 210+ for spatial filtering wherein the optical image of each pattern to be recognized is transformed into a light amplitude distribution that is proportional to the two dimensional Fourier Transform of the pattern image, subclasses 276+ for mathematical image transformation or pre-recognition processing transformation of an image into another representation to facilitate the acquisition or subsequent recognition of imaging patterns, and subclasses 280+ for Fourier, Hadamard, or Walsh Transform of an image prior to the recognition processing.

708, Electrical Computers: Arithmetic Processing and Calculating, subclass 821 for Fourier transform computation in electrical analog computers.

560 For convolution (cross-correlation):
This subclass is indented under subclass 559. Subject matter wherein the optical Fourier transform spectrum is mathematically convolved (cross-correlated) with the spectrum of the spatial filter at the Fourier transform plane.

(1) Note. As opposed to the perfect match of the correlation function in matched filtering systems, the convolution function indicates a partial match between the optical Fourier transform spectrums of object and spatial filter.

(2) Note. A spatial filter is generally an emulsion mask having a transparent annular region in an otherwise opaque region used to eliminate undesired radiation that diverges from the optical axis beyond the confines of the transparent region.

(3) Note. The cross-correlation function is a measure of the similarity between two signals when one is delayed with respect to the other.

(4) Note. "Convolution" and "Cross-correlation" are interchangeable terms.

SEE OR SEARCH CLASS:
365, Static Information Storage and Retrieval, subclass 106 for radiant energy.
708, Electrical Computers: Arithmetic Processing and Calculating, subclass 816 for optical correlation and convolution in electrical analog computers.

561 For correlation:
This subclass is indented under subclass 559. Subject matter wherein the optical Fourier transform spectrum is mathematically correlated with the spectrum of the spatial filter at the Fourier transform plane.

(1) Note. Included in this subclass are the so-called "matched filtering systems", wherein the Fourier transform spectrum of an object is perfectly matched or correlated to a spectrum presented at the Fourier transform plane (usually by means of a previously generated spatial filter).

(2) Note. A spatial filter is generally an emulsion mask having a transparent annular region in an otherwise opaque region used to eliminate undesired radiation that diverges from the optical axis beyond the confines of the trans-parent region.

(3) Note. Correlation is a measure, expressed as a number between minus one and plus one between two sets of data, of the similarity of two signals.

(4) Note. Correlation is also a relationship between two variables where the strength of the linear relationship is indicated by the coefficient of correlation.

562 For changing zeroth order intensity:
This subclass is indented under subclass 559. Subject matter wherein the spatial filter located at the Fourier transform plane is designed to have a positive effect (i.e., blocks, transparent, increase intensity, etc.) on the zeroth order term in the Fourier series representative of the light wave input.

SEE OR SEARCH THIS CLASS, SUBCLASS:
559, for spatial filtering at the Fourier transform plane.

563 With diffraction grating:
This subclass is indented under subclass 559. Subject matter wherein a series of very fine, closely spaced parallel slits, or of very narrow, parallel reflecting surfaces are included in the optical system, either before or at the Fourier transform plane in order to produce a succession of spectra when light is incident thereon at a specific angle.

(1) Note. An example of a diffraction grating is a glass substrate carrying a layer of deposited aluminum that has been pressure-ruled with a large number of fine equidistant grooves, using a diamond edge as a tool.

(2) Note. Light falling on a diffraction grating is dispered into a series of spectra on both sides of the incident beam, the angular dispersion being inversely proportional to the line spacing.

(3) Note. Phase gratings using Fourier transform filtering also belongs in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:
1+, for holograms and holographic systems.
560, for systems using a spatial filter placed at the Fourier transform plane for convolution (cross-correlation).

561, for systems using a spatial filter placed at the Fourier transform plane for correlation.

564 With photographic media:
This subclass is indented under subclass 559. Subject matter wherein a photographic negative, transparency, plate, etc., is used at or near the Fourier transform plane to record the data at that plane.

565 From zone plate:
This subclass is indented under subclass 558. Subject matter comprising a plate of glass, usually a photograph, on which there is a central spot surrounded by concentric annular zones, alternately opaque and transparent, the radii of the boundaries between the zones being proportional to the square roots of the natural numbers 1,2,3, etc. It has the property of forming a real image of a point on the axis, as does a lens, but by a process of diffraction instead of refraction.

(1) Note. Zone plates are also known as "Fresnel zone plates".

(2) Note. The diffraction occurs from a circular diffraction grating of variable spacing having focal properties, and also including means for forming such a circular focal grating.

(3) Note. Phase zone plates are also included in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:
742, for Fresnel lenses.

566 From grating:
This subclass is indented under subclass 558. Subject matter wherein diffraction occurs at an optical element having a series of very close lines or fine slits.

(1) Note. The lines on the grating may be ruled grooves or fine slits may be applied by other mechanical, photographic, holographic, or chemical processes.

(2) Note. This subclass includes both amplitude and phase gratings and also includes gratings having mounting means therefor.

(3) Note. Excluded from this subclass are acoustic or other compression wave diffraction gratings, see Search Class note to subclass 358.

SEE OR SEARCH THIS CLASS, SUBCLASS:
1+, for holographic production of diffraction gratings.
285+, for light control by causing a fluid or deformable medium to act as a diffraction grating under the influence of compressional waves.

SEE OR SEARCH CLASS:
348, Television, subclass 291 for diffraction gratings which are used for frequency separation in color television systems ("strip filters").
356, Optics: Measuring and Testing, subclass 51 for devices which utilize diffraction gratings in optical test devices involving infrared or ultraviolet application, subclasses 300+ for spectroscopic instruments, including spectrographic devices in subclasses 305 and 328 which utilize a diffraction grating, subclass 334 for monochromators which use diffraction gratings, subclasses 485, 494, 499, and 521 for wavefront division by diffraction in interferometers, and subclass 395 for optical test devices employing relatively movable diffraction gratings.
385, Optical Waveguides, subclass 37 for an input/output optical coupler using a grating.

567 For ornamental effect or display:
This subclass is indented under subclass 566. Subject matter wherein the diffraction of light from the grating is purely for an aesthetic or ornamental effect or for display purposes.

SEE OR SEARCH CLASS:
40, Card, Picture, or Sign Exhibiting, subclasses 427+ for display devices exhibiting special optical effects.

568 For diffractive subtractive filtering:
This subclass is indented under subclass 566. Subject matter wherein diffraction gratings are used to diffractively remove unwanted spectral wavelengths from polychromatic incident light.

SEE OR SEARCH THIS CLASS, SUBCLASS:
885+, for optical filters in general and particularly subclass 888 for neutral or different density filters.

569 Including particular grating characteristic:
This subclass is indented under subclass 566. Subject matter wherein the diffraction grating has one or more particular structural characteristics, such as thickness, shape, line spacing, aspect ratio, etc.

570 Nonplanar grating substrate (e.g., concave):
This subclass is indented under subclass 569. Subject matter wherein the diffractive surface of the grating is of a shape other than planar, for example, a concave diffraction grating.

SEE OR SEARCH THIS CLASS, SUBCLASS:
534+, for a signal refletor having a curved refracting surface.

571 Echelette or blazed grating:
This subclass is indented under subclass 569. Subject matter wherein the diffraction grating is an echelette (sawtooth) type of grating or wherein the grating is designed for maximum intensity at a desired region of the diffraction spectrum.

(1) Note. Theoretically, the most efficient groove shape for any grating is a right triangle. The inclination of its hypotenuse is called the blaze angle because it determines the direction in which a diffracted beam has its greatest efficiency. Such gratings are termed blazed.

(2) Note. A blazed diffraction grating is one having properly shaped grooves to concentrate most of the energy into a single spectral order.

SEE OR SEARCH THIS CLASS, SUBCLASS:
1+, for blazed holograms.

572 Reflection grating (e.g., retrodirective):
This subclass is indented under subclass 569. Subject matter wherein the grating reflects a desired wave while at the same time allowing one or more waves to pass freely.

(1) Note. A reflection grating reflects the desired wave whereas a “transmission” grating passes the diffracted light through the grating in the same general direction as the incident light.

(2) Note. Aluminizing of a grating will cause it to be a reflecting grating.

(3) Note. Reflection back in the opposite direction to the incident light would be considered retrodirective.

SEE OR SEARCH THIS CLASS, SUBCLASS:
529+, for 3-corner retroreflectors (i.e., cube corner, trihedral or triple reflector type).
838+, for optical mirrors and other reflecting elements.

SEE OR SEARCH CLASS:
342, Communications: Directive Radio Wave Systems and Devices (e.g., Radar, Radio Navigation), subclass 7 for radio frequency corner reflectors which are retrodirective.

573 Variable grating:
This subclass is indented under subclass 569. Subject matter wherein the optical characteristics of the diffraction grating can be altered by the application of an external force.

(1) Note. Examples of variable gratings included in this subclass are gratings comprised of electro-optical or magneto-optical stripe domains.

(2) Note. A stripe domain is a stripe-shaped region having its own proper-ties, such as an ion-shiny electro-optic stripe.

SEE OR SEARCH THIS CLASS, SUBCLASS:

95, for liquid crystal devices exhibiting variable diffraction.

240, for temporal modulation of a light beam by changing the bulk optical parameter.

301+, for polarizer light wave spatial modulation.

483.01, through 494.01, for polarization without modulation.

SEE OR SEARCH CLASS:

365, Static Information Storage and Retrieval, subclass 122 for polarization information masking using magneto-optical devices.

574 With curved or geometrically shaped corrugation:

This subclass is indented under subclass 569. Subject matter wherein the grating has at least one ridge or groove for the light to impinge and the edges of the ridge or groove are either nonlinear or form some geometrical shape by the connection of plural lines.

(1) Note. The geometric corrugations are in the form of a circle, parallelogram, rhombus, etc.

SEE OR SEARCH THIS CLASS, SUBCLASS:

575, for nonuniform corrugation width, spacing, or depth.

576, for a laminated or layered grating which usually has parallel corrugations.

575 With nonuniform corrugation width, spacing, or depth:

This subclass is indented under subclass 569. Subject matter wherein the grating has at least one ridge or groove for the light to impinge and the width, depth, height, or spacing of each ridge or groove varies along the corrugation.

SEE OR SEARCH THIS CLASS, SUBCLASS:

574, for curved or geometrically shaped corrugations of a grating.

576, for laminated or layered grating which usually has parallel corrugations.

576 Laminated or layered:

This subclass is indented under subclass 569. Subject matter wherein multiple layers of different optical materials are formed into a single mass to form the optical grating.

(1) Note. The corrugations of this type of grating are usually parallel to one another.

SEE OR SEARCH THIS CLASS, SUBCLASS:

574, for curved or geometrically shaped corrugations of a grating.

575, for nonuniform corrugation width, spacing, or depth.

586+, for laminated or layered articles which produce nondiffractive interference.

SEE OR SEARCH CLASS:

264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclass 1.7 for composite or multiple layer optical article shaping or treating.

577 LIGHT INTERFERENCE:

This subclass is indented under the class definition. Subject matter wherein two light waves, as a result of their relative phases, interact to produce a cancellation or reinforcement of wave energy.

SEE OR SEARCH THIS CLASS, SUBCLASS:

370+, for interference microscopes.

489.19, for frequency filter or interference effect where the light is polarized.

SEE OR SEARCH CLASS:

356, Optics: Measuring and Testing, subclass 450 for optical test devices which utilize light interference.

578 Electrically or mechanically variable (e.g., tunable, adjustable):

This subclass is indented under subclass 577. Subject matter including means for producing a change in a geometric or optical characteristic of an interfering light wave or beam.