

B23K

SOLDERING OR UNSOLDERING; WELDING; CLADDING OR PLATING BY SOLDERING OR WELDING; CUTTING BY APPLYING HEAT LOCALLY, e.g. FLAME CUTTING; WORKING BY LASER BEAM (making metal-coated products by extruding metal B21C23/22; building up linings or coverings by casting B22D19/08; casting by dipping B22D23/04; manufacture of composite layers by sintering metal powder B22F7/00; arrangements on machine tools for copying or controlling B23Q; covering metals or covering materials with metals, not otherwise provided for C23C; burners F23D)

Definition statement

This subclass/group covers:

This subclass covers :

Machines, devices or processes for specific methods of soldering, welding, cladding or plating by soldering or welding, cutting by applying heat locally or working by laser beam ([B23K 1/00](#)-[B23K 26/00](#)).

Welding or cutting machines, devices or processes not covered by any of the preceding groups ([B23K 28/00](#)).

Soldering, welding or cutting processes specially adapted for particular articles or purposes ([B23K 31/00](#)).

Specially-profiled edge portions of workpieces for making soldering or welding connections and filling the seams formed thereby ([B23K 33/00](#)).

Rods, electrodes, materials or media for use in soldering, welding or cutting ([B23K 35/00](#)).

Auxiliary devices or processes, not specially adapted to a soldering, welding or cutting procedure covered by only one of the preceding main groups ([B23K 37/00](#)).

Informative references

Attention is drawn to the following places, which may be of interest for search:

Making metal-coated products by extruding metal	B21C 23/22
Building up linings or coverings by casting	B22D 19/08
Casting by dipping	B22D 23/04

Manufacture of composite layers by sintering metal powder	B22F 7/00
Metal-working machines other than soldering, welding, or flame-cutting machines; Arrangements on machine tools other than tools for soldering, welding, or flame-cutting for copying or controlling Guiding means applicable to metal-working machines other than soldering, welding, or flame-cutting machines.	B23Q
Cutting in general	B26D
Welding of plastics	B29C 65/00
Covering metals or covering materials with metals, not otherwise provided for	C23C
Burners	F23D

Special rules of classification within this subclass

Upon classifying in [B23K 31/00](#), [B23K 33/00](#), [B23K 35/00](#) or [B23K 37/00](#), the appropriate classification in [B23K 1/00](#)-[B23K 26/00](#) or subgroups should be added, if applicable.

B23K 1/00

Soldering, e.g. brazing, or unsoldering (B23K3/00 takes precedence; characterised only by the use of special materials or media B23K35/00; dip or wave soldering in the manufacture of printed circuits H05K3/34)

Definition statement

This subclass/group covers:

Soldering and brazing, which are processes in which two or more metal items are joined together by melting and flowing a filler metal (solder) into the joint, the filler metal having a lower melting point than the workpiece. Brazing is a form of soldering, wherein the temperatures used to melt the filler metal are above 450 °C.

Unsoldering, wherein solder is removed from a joint prior to resoldering.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Arc brazing apparatuses	B23K 3/0384
Dip or wave soldering in the manufacture of printed circuits	H05K 3/34

Special rules of classification within this group

Arc soldering or brazing to be classified in [B23K 9/16](#) and [B23K 1/00](#).

MIG soldering or brazing to be classified in [B23K 9/173](#) and [B23K 1/00](#).

TIG soldering or brazing to be classified in [B23K 9/167](#) and [B23K 1/00](#).

Synonyms and Keywords

In patent documents the following expression/words "braze welding" and "arc brazing" are often used as synonyms.

B23K 3/00

Tools, devices, or special appurtenances for soldering, e.g. brazing, or unsoldering, not specially adapted for particular methods (materials used for soldering B23K35/00)

Definition statement

This subclass/group covers:

Tools, devices for soldering, brazing or unsoldering.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Soldering lamps or blowworkpieceipes	F23D
Electric heating in general	H05B

B23K 5/00

Gas flame welding

Definition statement

This subclass/group covers:

Welding, where a flame is applied to the base metal and held until a small puddle of molten metal is formed with or without addition of more metal from a welding rod or filler rod into the molten metal puddle.

B23K 7/00

Cutting, scarfing, or desurfacing by applying flames [N: (thermal deburring B23D79/005)]

Definition statement

This subclass/group covers:

Cutting where the flame is not intended to melt the metal, but to bring it to its ignition temperature.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Thermal deburring	B23D 79/005
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Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

Scarfing	Also termed deseaming. It is a process for burning out defective areas on the surface of ingots or semi-finished products such as billets so that the product is suitable for subsequent rolling or forging
Desurfacing	removing surface metal by means of oxidizing gas jets

B23K 9/00

Arc welding or cutting (electro-slag welding B23K25/00; welding transformers H01F; welding generators H02K)

Definition statement

This subclass/group covers:

Welding methods and apparatus, wherein a welding power supply is used to create an electric arc between an electrode and the base material to melt the metals at the welding point.

Arc welding and cutting with direct (DC) or alternating (AC) current.

Arc welding with consumable or non-consumable electrodes.

Arc welding with or without shielding means.

Underwater arc welding.

Backing means for arc welding.

Inserts between the pieces to be joined through arc welding.

Power supply for arc welding.

Drag welding.

Submerged arc welding.

Stud welding.

Percussion welding.

Protecting means used during arc welding.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Masks, shields or hoods for welders	A61F 9/06
Electro-slag welding	B23K 25/00
Form or composition of electrodes	B23K 35/00
Welding studs	B23K 35/0288
Media used during welding or cutting	B23K 35/38
Copying in general	B23Q 35/00

Protective means in general	F16P 1/06
Welding transformers	H01F
Electrical coupling means	H01R
Earthing connections	H01R
Welding generators	H02K

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

TIG welding	Tungsten inert gas welding
MIG/MAG welding	Metal inert gas/metal active gas welding
SAW	Submerged arc welding
SMAW	Shielded metal arc welding
MMA	Manual metal arc welding
Stud welding	Stud welding is a form of spot welding where a bolt or specially formed nut is welded onto another metal part.
Percussion welding	Percussion welding (PEW) is a type of resistance welding that blends dissimilar metals together. Percussion welding creates a high temperature arc that is formed from a short quick electrical discharge. Immediately following the electrical discharge, pressure is applied which forges the materials together. This type of joining brings the materials together in a percussive manner.
Drag welding	known as gravity welding or gravity arc welding. It employs an electrode holder attached to an inclined bar along the length of the weld. Once

	started, the process continues until the electrode is spent.
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B23K 10/00

Welding or cutting by means of a plasma

Definition statement

This subclass/group covers:

Plasma arc welding (PAW), wherein heat is produced between an electrode and a constricting orifice (nontransferred arc). Shielding is generally obtained from the hot, ionized gas issuing from the orifice of the constricting nozzle, which may be supplemented by an auxiliary source of shielding gas. Shielding gas may be an inert gas or a mixture of gases.

Plasma arc cutting (PAC), wherein a pilot arc is first generated between the electrode (cathode) and the nozzle (anode). The pilot arc ionizes gas passing through the nozzle exit orifice. After the ionized gas reduces the electrical resistance between the electrode and the workpiece, the arc transfers from the nozzle to the workpiece. The torch is operated in this transferred plasma arc mode, which is characterized by the conductive flow of ionized gas from the electrode to the workpiece, for the cutting of the workpiece.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Circuits for plasma torches	H05H 1/36
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B23K 11/00

Resistance welding; Severing by resistance heating

Definition statement

This subclass/group covers:

Electric resistance welding, where heat to form the weld is generated by the electrical resistance (Joule effect) of material vs the time and the force used to hold the materials together during welding.

Spot and seam welding.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Brazing of honeycomb sandwich structure	B23K 1/0014
Stud welding with an arc	B23K 9/20
Form or composition of electrodes	B23K 35/00
Electromagnetic counters	G06M

B23K 13/00

Welding by high-frequency current heating

Definition statement

This subclass/group covers:

Welding by conduction heating, wherein a high frequency current produces heat in a tool contacting the workpiece.

Welding by induction heating, high frequency current (called eddy current or Foucault current) is produced by induction in the workpiece and is used to heat the same.

B23K 15/00

Electron-beam welding or cutting g (electron- or ion- beam tubes H01J37/00)

Definition statement

This subclass/group covers:

Electron beam welding wherein a beam of high-velocity electrons is applied to the materials being joined.

Electron beam cutting wherein high-velocity electrons concentrated into a narrow beam are directed toward the work piece, creating heat and vaporizing the material.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Electron- or ion- beam tubes	H01J 37/00
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B23K 17/00

use of the energy of nuclear particles in welding or related techniques

Definition statement

This subclass/group covers:

Welding, micromachining using an ion beam.

B23K 20/00

Non-electric welding by applying impact or other pressure, with or without the application of heat, e.g. cladding or plating

Definition statement

This subclass/group covers:

Wire welding; Capillary welding; Ball bonding.

Isostatic pressure welding.

Thermo-compression bonding, bonding tips therefore.

Explosive welding.

Ultrasonic welding.

Friction welding; friction stir welding.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Coating by spraying the coating material in the molten state, e.g. by flame, plasma or electric discharge e.g. Cold spray coating	C23C 4/00
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B23K 23/00

Alumino-thermic welding

Definition statement

This subclass/group covers:

Alumino-thermic welding during which a reacting composition of iron oxide red

(rust) powder and aluminium powder is ignited at high temperatures and a strongly exothermic (heat-generating) reaction occurs that produces through reduction and oxidation a white hot mass of molten iron and a slag of refractory aluminium oxide.

Welding, wherein heat is generated by an exothermic reaction other than alumino-thermic (e.g. US2007/0295782).

B23K 25/00

Slag welding, i.e. using a heated layer or mass of powder, slag, or the like in contact with the material to be joined (B23K23/00 takes precedence; submerged-arc welding B23K9/18)

Definition statement

This subclass/group covers:

Electroslag welding (ESW) which is a single pass welding process for thick materials in a vertical or close to vertical position wherein an electric arc is initially struck by a wire that is fed into the desired weld location, flux is added until the molten slag, reaching the tip of the electrode, extinguishes the arc upon which the wire is then continually fed through a consumable guide tube into the surfaces of the metal workpieces and the filler metal are then melted using the electrical resistance of the molten slag to cause coalescence.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Submerged arc welding (SAW)	B23K 9/18
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B23K 26/00

Working by laser beam, e.g. welding, cutting, boring (lasers per se H01S3/00 [N: laser assisted deposition C23C; laser inspection or alignment G01B; laser sintering of metallic powder B22F3/105, of plastics B29C67/00, of glass C03B19/06, of ceramics C04B35/64; applying identification marks by laser B41M5/24])

Definition statement

This subclass/group covers:

Laser scribing for making a weakened layer, even without notching.

Laser shock processing.

Apparatuses for laser surface treatment.

Laser ablation except ablation for laser recording covered by [G11B 7/00](#) or [B41M 5/00](#) as appropriate.

References relevant to classification in this group

This subclass/group does not cover:

Laser sintering which is covered by group	B22F 3/105
Laser lift-off by applying laser at an interface through the front layer	B23K 26/0054 + B23K 26/4025 or subgroup, e.g. US2010009515
Laser bending	B23K 26/0093 + B21D 11/20 or subgroup (e.g. US2009229335)
For metallic powder, by group	B29C 67/00
Laser marking for applying identification marks	B41M 5/24
For plastics, by group	C03B 19/06
By group for ceramics	C04B 35/64
Re-melting metals	C22B 9/02E2
Laser assisted deposition which is covered by subclass group	C23C
Alloying	C23C
Laser assisted chemical etching which is covered by main group	C23F 1/00
Laser inspection or alignment which is covered by subclass group	G01B
Direct Laser Writing, i.e. creating small features in a photosensitive material or in a masking layer for photosensitive material	G03F 7/20 and G03F 1/00
Direct laser writing systems for	G03F 7/20T18

microlithography	
Marking cable or electric conductors	H01B 13/12
Lasers per se	H01S 3/00
(electric circuits for) controlling the cavity and excitation of the cavity	H01S 3/10

Informative references

Attention is drawn to the following places, which may be of interest for search:

Electroplating using locally applied laser (e.g. galvano)	C25D 25/02C
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Special rules of classification within this group

Indexing Code [B23K 26/00](#) and subgroups are not used.

Groups relating to workpiece material:

[B23K 26/32](#) and subgroups: welding

[B23K 26/40](#) and subgroups for cutting technique

[B23K 26/0006](#) and subgroups: others technique

Interpretation of entry titles relating to materials [B23K 26/0006](#), [B23K 26/32](#), [B23K 26/40](#) and respective subgroups:

- Metals covers Steel, Fe, Cast iron or steel
- Non-ferrous metals or alloys covers Si, Ge, Cu, Ni, Co, Au
- Refractory metals or alloys covers Ti, V, Cr, Zr, Nb, Mo, Hf, Ta, W or their alloys
- Light metals covers Li, Be, Al, Na, K, Ca, Sc, Mg, Ti, Rb, Sr, Z, Cs, Ba, Fr
- Dissimilar metals or alloys covers processing materials of different metals, e.g. Welding of iron steel components and copper components, or welding of cast iron components and stainless steel components.
- Organic materials covers Containing carbon, low-k, e.g. dielectric

- Paper covers processing filter of tobacco, e.g. JP.A.S54-74592; does not cover metallic paper
- Plastics covers e.g. resin, organic glass
- Inorganic materials covers e.g. asbestos, SC materials, diamond
- Ceramics including concrete; see e.g. JP.A.S61-126987
- Composite materials materials having composite structures including laminates; e.g. Fibre reinforced materials, sandwich steel plates or vibration control steel plates
- Surface treated material materials on which surface treatments are applied, e.g. plating, coating or painting

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

Laser	Masers, lasers, X-ray lasers, gamma lasers, optical amplifiers
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Synonyms and Keywords

In patent documents the following abbreviations are often used:

Multiphoton lithography	Also known as direct laser lithography or direct laser writing (DLW)
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B23K 26/0003

[N: Trimming, tuning]

Definition statement

This subclass/group covers:

Adjusting contact position; mechanical tuning (e.g. US2002070203).

References relevant to classification in this group

This subclass/group does not cover:

Laser trimming of resistors	H01C 17/242
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Special rules of classification within this group

Mechanical trimming [B23K 26/362](#).

Balancing rotating objects [B23K 26/0823](#).

B23K 26/0006

[N: taking account of the properties of the materials involved (B23K26/20, B23K26/36 take precedence)]

References relevant to classification in this group

This subclass/group does not cover:

Alloying, chemical coating or sputtering of metallic materials	C23C
Direct Laser Writing	G03F 7/20 and G03F 1/00

Special rules of classification within this group

See definition of [B23K 26/0066](#).

For titles interpretation, see [B32K 26/00](#) definition.

Cutting [B23K 26/36](#) and subgroups.

Bonding, welding [B23K 26/20](#) and subgroups.

Direct Laser Writing see [B23K 26/00](#) definition.

B23K 26/0066

[N: for surface treatment (for changing the physical structure of ferrous metals or alloys C21D, of non-ferrous metals or alloys C22F; for alloying C23C; annealing crystalline material C30B33/02; laser treatment of semiconductors H01L)]

Definition statement

This subclass/group covers:

Glazing.

References relevant to classification in this group

This subclass/group does not cover:

Laser melting or welding of glass	C03
Surface treatment of glass	C03C
For changing the physical structure of ferrous metals or alloys	C21D
Annealing metallic materials	C21D , C22E
Laser re-melting of metals by wave energy	C22B 9/22
Of non-ferrous metals or alloys	C22F
Chemical coating, alloying or chemical coating of metallic materials	C23C
Annealing non-metallic materials	C30B
Laser melting for crystallising non-metallic material	C30B
Annealing semiconductor	H01L 21/20 or C30B

Special rules of classification within this group

Nanostructuring, e.g. Colouring metal, e.g. Us2008299408, [B23K 26/0084](#).

Melting [B23K 26/0081](#).

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

Annealing (F recuit, G Glühen)	process that produces conditions by heating to above the recrystallization temperature, maintaining a suitable temperature, and then cooling.
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B23K 26/02

Positioning or observing the workpiece, e.g. with respect to the point of impact; Aligning, aiming or focusing the laser beam

Definition statement

This subclass/group covers:

Method and devices for positioning or observing the workpiece.

Aligning, aiming or focussing the laser beam by exchanging the focussing optics, e.g. WO2011004084, US5312397, JP61137382.

Relationship between large subject matter areas

Interchange of lenses in general	G02B 7/14
Optical focussing aids	G02B 7/40

Special rules of classification within this group

Nozzle exchange in [B23K 26/1482](#).

Devices for moving the workpiece in [B23K 26/08](#)

B23K 26/08

Devices involving relative movement between laser beam and workpiece

Special rules of classification within this group

Features of workpiece holding or support member [B23K 26/422](#) + [B23K 26/08](#) or subgroup.

If the workpiece is immobile at the moment of being laser processed [B23K 26/10](#).

Robots [B23K 26/0884](#).

B23K 26/12

in a special atmosphere, e.g. in an enclosure

Relationship between large subject matter areas

Selection of media, e.g. Atmosphere surrounding the haz [B23K 35/38](#).

Informative references

Attention is drawn to the following places, which may be of interest for search:

Reactive-ion etching	H01L 21/3065
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Special rules of classification within this group

With a nozzle contacting the workpiece and forming thus an enclosure see definition of [B23K 26/1476](#).

B23K 26/14

using a flow, e.g. a jet of gas, in conjunction with the laser beam; [N: Nozzles therefor] (B23K26/12 takes precedence)

Informative references

Attention is drawn to the following places, which may be of interest for search:

Ionisation of the arc gap by radiation	B23K 9/0675
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Special rules of classification within this group

Constructional features influencing pressure [B23K 26/1441](#), e.g. DE9117180U.

Gas debit or speed [B23K 26/1447](#).

Conveying gas by a cover on workpiece [B12K 26/14H6](#), e.g. FR2446141.

B23K 26/16

Removing of by- products, e.g. particles or vapours produced during treatment of a workpiece (by a flow of gas B23K26/14)

Definition statement

This subclass/group covers:

Special configuration for evacuating by products between pieces.

References relevant to classification in this group

This subclass/group does not cover:

Removal of by product by using a flow e.g. aspiration of by products	B23K 26/1405
Protecting focussing optics against fumes by a flow of gas, e.g. suction	B23K 26/1405
Protecting layer on the material: if beam absorbing	B23K 26/18
Protecting layer on the material: if not beam absorbing	B23K 26/18B
Evacuation of fumes during welding of plated metal, e.g. zinked or galvanised by creating a gap between workpieces	B23K 26/3293
If by shaping workpiece	B23K 33/00 and subgroups.

B23K 26/18

using absorbing layers on the material being worked, e.g. for marking or protecting purposes [N: (observing devices provided with laser radiation protection devices B23K26/03; using a mask put on workpiece B23K26/06F2; laser anti-reflection devices, e.g. optical isolators H01S3/0064)]

Definition statement

This subclass/group covers:

Marking by way of material removal.

Feeding welding wire e.g. DE-U1-9401081, DE-A-4330497, US5408065, DE19944470, DE10061309.

Elements for intercepting radiations at the end of boring a hole even if not applied to the surface, e.g.US6070813.

Relationship between large subject matter areas

Interposition of material for facilitating bonding [B23K 26/203](#).

References relevant to classification in this group

This subclass/group does not cover:

Marking by changing colour or else	B41M 5/26
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Reactive-ion etching	H01L 21/3065
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Special rules of classification within this group

Mask on workpiece [B23K 26/0661](#).

Feeding electrode [B23K 26/1429](#).

B23K 26/20

Bonding, e.g. welding (soldering by means of radiant energy B23K1/005; joining of performed plastics parts by heating using laser beam B29C65/16)

Definition statement

This subclass/group covers:

Localised welding with special shaped welded area, e.g. button shaped (GB2342881, US4661677).

References relevant to classification in this group

This subclass/group does not cover:

Coupling light guides	G02B 6/4237
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Joining of semiconductor bodies for junction formation by direct bonding	H01L 21/185
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Special rules of classification within this group

Localised welding with special shaped welded area [B23K 26/20](#) and

if shape contains a spot, thus + [B23K 26/22](#),

if shape contains a seam, thus + [B23K 26/24](#) and subgroups.

B23K 26/34

**Welding for purposes other than joining, e.g. buildup welding
[N: (laser alloying or sintering C23C)]**

Definition statement

This subclass/group covers:

Laser Cladding.

Relationship between large subject matter areas

Manufacture by laser welding [F05B 2230/234](#).

References relevant to classification in this group

This subclass/group does not cover:

Stereolithography	B29C 67/0051
If metallic	B22F 3/1055
Laser assisted deposition	C23C
Alloying or chemical coating of metallic materials	C23C
Diffusion treatment of metallic material (e.g. surface alloying); coating of metallic or coating material with metallic material by chemical coating or vacuum evaporation, e.g. sputtering	C23C 14/00
Laser Based Metal Deposition (LBMD): if powder passing through laser	C23C 4/12
If not	C23C 24/10 or C23C 26/02

Informative references

Attention is drawn to the following places, which may be of interest for search:

Shaped metal deposition (SMD)	B22F 3/1055
Sintering Glass	C03B 19/06
Sintering ceramics	C04B 7/4461

Special rules of classification within this group

Cladding repair [B23K 26/34](#) + [B23K 26/32A](#), e.g. EP2042618.

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

Laser net shape manufacturing	laser cladding or laser consolidation. In laser cladding and/or consolidation, a laser beam creates a molten pool on a substrate into which powder is deposited in a beam/powder interaction zone. Concurrently, the substrate on which the deposition is occurring is moving with respect to the beam/powder interaction zone to fabricate the desired cross-sectional geometry. Consecutive layers may be additively deposited, thereby producing a three-dimensional part.
Laser cladding	to enhance the surface properties of machine parts locally with powder or wires melted via a laser beam.
Laser consolidation	involves manufacturing a part through depositing multiple layers of material (EP07102761).

B23K 26/36

Removing material [N: (laser wire stripping H02G1/128; cleaning by laser treatment B08B7/0042)]

Definition statement

This subclass/group covers:

Removing material e.g. ablating, without cutting or boring.

References relevant to classification in this group

This subclass/group does not cover:

Removing of foreign material i.e.g. cleaning, coating removal	B08B 7/0042
Laser assisted chemical etching	C23F 1/00
Stripping of resist	G03F 7/42
Ablation for laser recording	G11B 7/00 or B41M 5/00
Severing conductive links on memory integrated circuits	H01L 23/5258
Laser etching of printed circuit substrate	H05K 3/0026

Informative references

Attention is drawn to the following places, which may be of interest for search:

Laser removal of surface material for decorative purpose	B44C 1/228
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Special rules of classification within this group

Etching, e.g. engraving: [B23K 26/365](#).

Scribing: [B23K 26/36S](#).

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

Engraving	Is the practice of incising a design on to a hard, usually flat surface, by cutting grooves into it
Etching	The cut is superficial or partially through the workpiece, e.g. engraving
Scribing	Cutting deep grooves by laser light on workpieces to separate them mechanically; e.g. Arts for perforating semiconductor wafers or ceramic substrates by laser processing, and dividing them into elements of many units when manufacturing integrated circuits, such as IC

B23K 28/00

Welding or cutting not covered by any of the preceding groups, e.g. electrolytic welding

Definition statement

This subclass/group covers:

Welding in a furnace.

Welding by means of an electrolyte.

Combined welding or cutting procedures or apparatus.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Arc sustained laser working	B23K 26/1423
Cutting by means of an electrolyte	B23H

B23K 31/00

Processes relevant to this subclass, specially adapted for particular articles or purposes, but not covered by only one of the preceding main groups (making tubes or profiled bars involving operations other than soldering or welding

B21C37/04, B21C37/08)

Definition statement

This subclass/group covers:

Making of profiled bars.

Connecting cutting edges or the like to tools.

Attaching reinforcements to workpieces, e.g. wear-resisting zones to tableware.

Making tubes with soldering or welding.

Processes specially adapted for particular articles or purposes relating to cutting or desurfacing.

Investigating the properties, e.g. the weldability of materials.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Making tubes or profiled bars involving operations other than soldering or welding	B21C 37/04 , B21C 37/08
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B23K 33/00

Specially-profiled edge portions of workpieces for making soldering or welding connections; Filling the seams formed thereby [N: (B23K11/14 takes precedence)]

Definition statement

This subclass/group covers:

Filling of continuous seams of cylindrical workpieces.

Filling of continuous seams for automotive applications.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Edge treatment flanging	B21D 19/00
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B23K 37/00

Auxiliary devices or processes, not specially adapted to a procedure covered by only one of the preceding main groups (eye-shields for welders worn on the operator's body or carried in the hand A61F9/00[N: i.e. A61F9/02]; applicable to metal-working machines other than soldering, welding, or flame-cutting machines B23Q; [N: laser protective screens B23K26/427;] protective shields for other welding methods F16P1/06)

Definition statement

This subclass/group covers:

Cooling means for welding or cutting.

Safety devices for welding or cutting.

Carriages supporting the welding or cutting element.

Devices or processes for holding or positioning work.

Devices or processes for aligning cylindrical work; clamping devices therefore.

Devices or processes for positioning molten material, e.g. confining it to a desired area.

Devices or processes for flash removal.