B23P

OTHER WORKING OF METAL; COMBINED OPERATIONS; UNIVERSAL MACHINE TOOLS (arrangements for copying or controlling B23Q))

Definition statement

This subclass/group covers:

Repairing (B23P 6/00), improving the properties (B23P 9/00), connecting (B23P 5/00,B23P 11/00), manufacturing (B23P 13/00, B23P 15/00), metal-working operations (B23P 17/00) but also to the assembling (B23P 19/00, B23P 21/00) of metallic parts. It also relates to universal machine tools (B23P 23/00) and to auxiliary treating of workpieces during machining (B23P 25/00).

It is evident that the scope of the subclass B23P is so broad that a proper detailed description of the subject matter appropriate for this place is possible only at the group level, e.g. B23P 6/00 and even at subgroup level when required, e.g. B23P 6/04.

Provisions that are valid at a general level (e.g. of a kind appropriate to more than one of the main groups) are provided in the sections that follow.

Relationship between large subject matter areas

B23P is an operation oriented subclass in which the titles of the groups or even subgroups mostly do not specify the object (metal part) which undergoes the operation. It is important, in order to ensure a complete classification, that the documents are circulated to the subclass to which the object (metal part) belongs, especially if a technical feature is imparted to the object (metal part) as a result of the operation. This applies also for the search purposes.

Attention is drawn to the Notes following the title of class B23 in particular to the relations between the subclass B23P and other subclasses of this class, like B23Q, B23B, B23C and B23K.

References relevant to classification in this subclass

This subclass/group does not cover:

Non-mechanical operations on non-metallic materials unless such operations are specially mentioned in this subclass.

Special rules of classification within this subclass

- "combined operations" excludes the assembling of parts if it is an essential feature of the next metal-working operation, since it is not regarded as an operation PER SE.

- "working of metal" and equivalent expressions include non-mechanical

treatment of metal so far as it is not provided for in any other class or subclass, for example in C21D, C22C, C22F, C23. Thus, combinations of such non- mechanical treatment with other metal-working are classified in this subclass.

B23P 5/00

Setting gems or the like on metal parts, e.g. diamonds on tools

Definition statement

This subclass/group covers:

Methods and devices for setting gems or the like in metal parts

Relationship between large subject matter areas

The majority of the documents relate to setting gems in tools (e.g. for metal machining (B23B, B23C, B24D) or earth boring (E21B). Some documents relate to setting gems to jewels (A44C).

Informative references

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

Gems setting-tools	A44C 17/043
Profiling tools for metal drawing - comprising diamond parts	B21C 3/025
Cutting tools of which the bits or tips with diamond bits	B23B 27/20
Manufacture of grinding tools	B24D 18/00
Drill bits characterised by wear resisting parts, e.g. diamond inserts	E21B 10/46

B23P 6/00

Restoring or reconditioning objects (straightening or restoring form of sheet metal, metal rods, metal tubes, metal profiles, or specific articles made therefrom B21D1/00, B21D3/00; repairing defective or damaged objects by casting techniques B22D19/10; procedures or apparatus covered by a

single other subclass, see the relevant subclass)

Definition statement

This subclass/group covers:

Restoring or reconditioning of damaged metallic objects or machine components by operations covered mainly by the class B23.

Relationship between large subject matter areas

In case of procedures or apparatuses covered by a single other subclass of the class B23, or by other subclasses of other classes, being of particular relevance for the scope of the repairing method these subclasses should be also considered for search and classification, e.g. welding (B23K), machining (B23B, B23C), polishing (B24B), coating (C22C), powder metallurgy (B22F), cold-working, heat treating (C21D).

References relevant to classification in this group

This subclass/group does not cover:

Straightening, restoring form or removing local distortions of sheet metal or specific articles made therefrom	B21D 1/00
Straightening or restoring form of sheet metal, metal rods, metal tubes, metal profiles, or specific articles made therefrom	B21D 3/00
Repairing defective or damaged objects by casting techniques	B22D 19/10
Repairing of articles made from plastics or substances in a plastic state	B29C 73/00
Operations specially adapted for layered products and not otherwise provided for, e.g. repairing; Apparatus therefor	B32B 43/00
Designing, manufacturing, assembling, cleaning, maintaining, or repairing aircraft, not otherwise provided for	B64F 5/0081

Special rules of classification within this group

For reasons of completeness of the search and classification, when the document refers to the repairing method of a specific object, the group where the product is classified should be consulted and the document should circulate for eventual classification within the product(s) groups.

The entries of the scheme B23P 2700/00 should be allocated together with the group B23P 6/00 for the corresponding objects, e.g. parts of combustion chambers, cooling passages of turbine components, etc being repaired.

The same applies for search purposes, in case an entry for the corresponding object exists on said scheme.

Synonyms and Keywords

In patent documents the following words "insert" and "patch" are often used as synonyms.

In patent documents the expression "additive process" is often used instead of "buil[d,t]-up welding" or "cladding" which is used in the classification scheme of this group.

In patent documents the terms "repair", "refurbish", "remanufacture", "rebuild" are often used instead of "restore" or "recondition" which are used in the classification scheme of this group.

B23P 6/002

[N: repairing turbine components, e.g. moving or stationary blades, rotors, etc. (B23P6/045 takes precedence)]

Definition statement

This subclass/group covers:

Repairing of damaged metallic (not composite) turbine components, e.g. moving or stationary blades, casings, discs, flanges, shrouds, etc.

The repair operation must be carried out on the part body and not only on the coating.

References relevant to classification in this group

This subclass/group does not cover:

Wind motors with rotation axis substantially in wind direction, maintenance or repair; equipment therefor	F03D 1/003

Informative references

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

Repairing methods or devices for blades or blade-carrying members	F01D 5/005
Articles made by soldering, welding or cutting by applying heat locally: turbines	L23K 101/00B
Repairing, retrofitting or upgrading methods	F05B 2230/80

B23P 6/04

Repairing fractures or cracked metal parts or products, e.g. castings

Definition statement

This subclass/group covers:

Repair methods or devices of cracks on metal parts or fractured metal parts, e.g. filling of cracks, avoiding the propagation of existing cracks.

B23P 6/045

[N: of turbine components, e.g. moving or stationary blades, rotors, etc.]

Definition statement

This subclass/group covers:

Repairing of fractured or cracked metallic (not composite) turbine components, e.g. moving or stationary blades, casings, discs, flanges, shrouds, etc.

The repair operation must be carried out on the part body and not only on the coating.

References relevant to classification in this group

This subclass/group does not cover:

Wind motors with rotation axis	F03D 1/003

substantially in wind direction, maintenance or repair; equipment therefor	

Informative references

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

Repairing methods or devices for blades or blade-carrying members	F01D 5/005
Articles made by soldering, welding or cutting by applying heat locally: turbines	L23K 101/00B
Repairing, retrofitting or upgrading methods	F05B 2230/80

B23P 9/00

Treating or finishing surfaces mechanically, with or without calibrating, primarily to resist wear or impact, e.g. smoothing or roughening turbine blades or bearings (treatment covered by a single other subclass, see the relevant subclass, e.g. B24C, C21D7/00, C22F1/00); Features of such surfaces not otherwise provided for, their treatment being unspecified

Definition statement

This subclass/group covers:

Mechanical treatment of surfaces independently of their shape (flat, cylindrical, holes, openings, etc) in order to improve their mechanical properties, e.g. fatigue resistance, wear or impact resistance.

It also covers cases where more than one method covered by B23P 9/02 and B23P 9/04 is exemplified.

Relationship between large subject matter areas

There is a significant overlapping between this group and C21D 7/00.

Other groups for treating or finishing surfaces like B24C 1/00, B24B 39/00, B21H 5/00 and B21H 7/00 might overlap with the content of documentation of this group.

Documents relating to "autofrettage" are also present in this group.

References relevant to classification in this group

This subclass/group does not cover:

Finishing surfaces by grinding or polishing	B24B
Finishing surfaces by blasting	B24C
Changing the physical structure of non-ferrous metals or alloys by heat treatment or by hot or cold working	C22F 1/00

Informative references

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

Devices for performing "autofrettage"	B21D 26/033
Modifying the physical properties of iron or steel by deformation, by expanding tubular bodies ("autofrettage")	C21D 7/12

B23P 9/02

Treating or finishing by applying pressure, e.g. knurling (B23P9/04 takes precedence)

Definition statement

This subclass/group covers:

The mechanical treatment or finishing of surfaces by applying pressure, e.g. roller burnishing, "Festwalzen" (deep-rolling), knurling and the like.

Informative references

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

Finishing gear teeth with cylindrical outline, e.g. burnishing	B21H 5/022
Finishing bevel gear teeth, e.g.	B21H 5/045

burnishing	
Making grooved pins; Rolling grooves, e.g. oil grooves, in articles	B21H 7/18
Burnishing machines or devices, i.e. requiring pressure members for compacting the surface zone	B24B 39/00
Modifying the physical properties of iron or steel by burnishing or the like	C21D 7/08

Special rules of classification within this subgroup

Documents in this subgroup should also circulate for classification in C21D 7/00.

If device details are mentioned and the device itself is covered by other groups the document should also circulate for classification in those groups, e.g. burnishing machines (B24B 39/00 and lower). These remarks apply for search purposes as well.

B23P 9/025

[N: to inner walls of holes by using axially moving tools]

Definition statement

This subclass/group covers:

Processes and devices for imparting beneficial stresses to inner walls of holes by using axial moving tools (mandrels).

B23P 9/04

Treating or finishing by hammering or applying repeated pressure

Definition statement

This subclass/group covers:

The mechanical treatment of surfaces by means of repeated pressure, e.g. impact burnishing, hammering and the like.

References relevant to classification in this subgroup

This subclass/group does not cover:

Laser shock processing	C21D 10/005

Informative references

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

Methods for compacting surfaces, e.g. shot-peening	B24C 1/10
Percussive tool bits	B25D 17/02
Modifying the physical properties of iron or steel by shot-peening or the like	C21D 7/06

Special rules of classification within this subgroup

Documents in this subgroup should also circulate for classification in C21D 7/00.

If device details are mentioned and the device itself is covered by other group the document should also circulate for classification in those groups, e.g. impact tools. These remarks apply for search purposes as well.

B23P 11/00

Connecting metal parts or objects by metal-working techniques, not covered wholly by either B21J or B23K (connecting sheet metal or metal tubes, rods, or profiles B21D39/00; [N: objects produced by methods not important per se, see the relevant subclasses dealing with the objects, e.g. B21F15/00; B21L19/00]; hand tools for connecting wire or strip B25B25/00; connecting metal parts by adhesives F16B11/00)

Definition statement

This subclass/group covers:

Methods and devices for connecting metal parts or objects by metal-working techniques, generally involving deformation, and not covered alone by groups in the subclasses of forging (B21J) and welding (B23K).

The connections achieved by the methods covered by this group can be

achieved by frictional forces "kraftshlüssig" (non-positive or friction fit) and/or by the shape of the parts in the connection area "formschlüssig" (positive or interlock fit).

Relationship between large subject matter areas

There is a significant overlapping between this group and B21K 25/00, F16B 17/00 and F16B 4/00.

Press fit methods and machines might also be found on B23P 19/02.

Objects produced by connecting methods not important per se, see the relevant subclasses dealing with the objects.

References relevant to classification in this group

This subclass/group does not cover:

Connecting sheet metal or metal tubes, rods, or profiles	B21D 39/00
Connecting wire to wire or other metallic material or objects; Connecting parts by means of wire	B21F 15/00
Appurtenances for chain-making not restricted to any particular process	B21L 19/00
Hand tools for connecting wire or strip	B25B 25/00
Connecting metal parts by adhesives	F16B 11/006

Example of Places where the subject matter of this group is covered when specially adapted, used for a particular purpose, or incorporated into a larger system:

Connecting bearing to vehicle axles (Hubs)	B60B 27/00
Assembling camshafts (Valve-gear or valve arrangements -camshafts)	F01L 1/047
Fuel-injectors [Assembling; Disassembling; Manufacturing; Adjusting]	F02M 61/168
Rigid support of bearing units;	F16C 35/063

Housings - Fixing them on the shaft	
Assembling rolling-contact bearings	F16C 43/04
Couplings for rigidly connecting two coaxial shafts or other movable machine elements - involving plastic deformation	F16D 1/072
Cams; Non-rotary cams; Cam followers [construction]	F16H 53/025

Special rules of classification within this group

The entries of the scheme B23P 2700/00 should be allocated together with the group B23P 11/00, or one of its subgroups when appropriate, for the corresponding objects, e.g. camshafts, catalysts, etc. being connected.

The same applies for search purposes, in case an entry for the corresponding object exists on said scheme.

B23P 11/027

[N: for mounting tools on tool holders]

Definition statement

This subclass/group covers:

Assembling and disassembling of tools (drills, mills, etc.) in tool holders by thermal shrinking.

Informative references

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

Tool holders (chucks)	B23B 31/02
Arrangements for indicating or measuring existing or desired position of tool or work	B23Q 17/22
Shrinkage connections	F16B 4/006
Heating by electric, magnetic, or electromagnetic fields - tools	H05B 6/14 H05B 6/38

B23P 13/00

Making metal objects by operations essentially involving machining but not covered by a single other subclass (making specific objects B23P15/00))

B23P 15/00

Making specific metal objects by operations not covered by a single other subclass or a group in this subclass

Definition statement

This subclass/group covers:

In addition to the title above, this group covers not only manufacturing methods of metal objects covered by its subgroups but also manufacturing methods of other objects that include combined operations in the sense used on this subclass.

Relationship between large subject matter areas

The title of the group B23P 15/00 does not specify the object which undergoes the operation. It is therefore important that B23P 15/00 is not the single class that is attributed to the document and, in order to ensure a complete classification and more targeted search, that the documents are circulated to the class to which the object (metal part) belongs.

This applies of course also for the subgroups of B23P 15/00 wherein the object is specified, especially if a technical feature is imparted to the object (metal part) as a result of the operation. In those cases, the documents should also circulate and a search should be conducted into the class to which the specific object (metal part) belongs.

Special rules of classification within this group

The entries of the scheme B23P 2700/00 should be allocated together with the group B23P 15/00 for the corresponding objects, e.g. connecting rods, joints, etc. being manufactured. The same applies for search purposes, in case an entry for the corresponding object exists on said scheme.

B23P 15/105

[N: Enlarging pistons]

Definition statement

This subclass/group covers:

Documents relating to to enlarging (terms as expanding, resizing and reshaping are also used) pistons to compensate for wear, incorrect machining, or for any other reason.

B23P 15/14

gear parts, e.g. gear wheels

Definition statement

This subclass/group covers:

The making of gear parts, e.g. gear wheels by operations not covered by a single other subclass or a group in this subclass.

References relevant to classification in this group

This subclass/group does not cover:

Making gears or toothed racks (by stamping B21D; by rolling B21H; by forging or pressing B21K; by casting B22; arrangements for copying or controlling B23Q; machines or devices for grinding or polishing, in general B24B)	B23F

B23P 17/00

Metal-working operations, not covered by a single other subclass or another group in this subclass

Definition statement

This subclass/group covers:

The main group B23P 17/00 is not widely used due to the fact that documents relating to metal-working operations and not specifying the kind of product produced by this operation are rather rare. Since in the great majority of the documentation the type of the product is mentioned and the metal working operation has its application on the particular product the main group B23P 15/00 and its subgroups have been used instead. Also since in many cases the metal working operation involves machining the main group B23P 13/00 and its subgroups are more appropriate.

The same applies for the subgroup B23P 17/02 and B23P 17/04.

B23P 17/06

Making steel wool or the like

Informative references

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

Wire-working in the manufacture of other particular articles	B25F 45/00
Reinforcing elements, e.g. for concrete; Auxiliary elements therefor, [Discrete reinforcing elements, e.g. fibres	E04C 5/012

Synonyms and Keywords

In the patent documents the following words/ expressions " steel wool "," steel fibers (fibres)" and " steel wiskers " are often used as synonyms.

B23P 19/00

Machines for simply fitting together or separating metal parts, or metal and non-metal parts, whether or not involving some deformation (connecting metal parts or objects by metal-working procedures B23P11/00, B21J, B23K); Tools or devices therefor so far as not provided for in other classes (hand tools in general B25)

Definition statement

This subclass/group covers:

Machines for simply fitting together or separating metal parts, or metal and non-metal parts, whether or not involving some deformation; Tools or devices therefor so far as not provided for in other classes.

Relationship between large subject matter areas

The group generally relates to the use of machines but not hand tools which are classified in B25.

Connecting metal parts or objects by metal-working procedures, see B23P 11/00, B21J, B23K.

The subclasses of B21D and F16B also include devices for connecting parts together.

If more detailed reference to another subclass, group or subgroup of another subclass can be made, it will be made at a subgroup level.

Although the hand tools are in principle in B25, an overlapping with this group and the class B25 is to be expected, since there are aspects that are common in hand tools and automatic machines. Therefore reference to groups of B25 (in particular of B25B) relevant for search is stated at the subgroup level definitions.

References relevant to classification in this group

This subclass/group does not cover:

Hand tools, specially adapted for fitting together or separating parts or objects whether or not involving some deformation, not otherwise provided for	B25B 27/00
Joining of preformed plastic parts	B29C 65/00

B23P 19/001

[N: Article feeders for assembling machines (screws or nuts being carried by a disposable strip or disc B25B23/045)]

References relevant to classification in this subgroup

This subclass/group does not cover:

Screws or nuts being carried by a disposable strip or disc	B25B 23/045
Bolts, screws, or nuts formed in integral series but easily separable, particularly for use in automatic machines	F16B 27/00

B23P 19/02

for connecting objects by press fit or for detaching same

References relevant to classification in this subgroup

This subclass/group does not cover:

Hand tools for connecting objects by	B25B 27/02

press fit or detaching same	

Informative references

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

Connecting metal parts or objects by metal-working technique	B23P 11/00
Press fits, force fits, interference fits, i.e. fits without heat or chemical treatment	F16B 4/004

B23P 19/033

using vibration

Definition statement

This subclass/group covers:

Apparatuses that use physical means for causing parts to vibrate in a manner to as to connect the parts in a press fitting manner, or to detach parts from one another that were press fitted.

Other physical means used for the same purposed, i.e. for causing parts to vibrate, can also be covered within this subgroup, e.g. electromagnetic forces, water, etc.

B23P 19/04

for assembling or disassembling parts

Definition statement

This subclass/group covers:

Apparatuses used for assembling or disassembling operations when the operation is performed by a device (not by an operator).

B23P 19/047

[N: for flexible profiles, e.g. sealing or decorating strips in grooves or on other profiles by devices moving along the flexible profile (hand tools therefor B25B27/0092)]

References relevant to classification in this subgroup

This subclass/group does not cover:

Hand tools moving along strips, e.g. decorating or sealing strips, to insert them in, or remove them from, grooves or profiles	B25B 27/0092

Informative references

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

Assembling sealing arrangements with vehicle parts	B60J 10/0088
Joining weather strips or seals	B62D 65/08
Implements for finishing work on buildings	E04F 21/00

B23P 19/06

Screw or nut setting or loosening machines

Definition statement

This subclass/group covers:

Machines for screwing or unscrewing screws or nuts.

Relationship between large subject matter areas

Hand tools for screw and nut setting or loosening machines are in B25B.

B23P 19/061

[N: for pipes or pipe-couplings]

Informative references

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

Connecting or disconnecting pipe couplings or joints	E21B 19/16
Screw-threaded joints	F16L 15/00

B23P 19/062

[N: Pierce nut setting machines]

Definition statement

This subclass/group covers:

Machines for assembling fastening elements to metal sheets. Although the title only mentions pierce nuts, other elements, e.g. studs, bolts are included.

The method of connection can be by deforming a fastening element portion, a metal sheet portion or both, wherein a pre-pierced hole may or may not exist in the metal sheet, i.e. the fastening element may or may not pierce itself the metal sheet.

Informative references

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

Nuts or like thread-engaging members [N: by means of riveting]	F16B 37/062

B23P 19/067

[N: Bolt tensioners (for hand tools B25B29/02)]

Definition statement

This subclass/group covers:

Devices for axially tensioning (elongating) a bolt. A nut is tightened while the bolt is in the elongated tensioned state; consequently a pre-stressed bolted connection is achieved.

References relevant to classification in this subgroup

This subclass/group does not cover:

Bolt tensioners (for hand tools)	B25B 29/02

Informative references

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

Flange connections; Bolting arrangements	F01D 25/243
Prestressed connections tensioned by means of liquid, grease, rubber, explosive charge, or the like	F16B 31/043

B23P 19/084

[N: for placing resilient or flexible rings, e.g. O-rings, circlips]

Informative references

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

Inserting or withdrawing split pins or circlips	B25B 27/20

B23P 19/086

[N: Non-metallic protective bellows]

Informative references

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

Mounting or demounting piston rings	B25B 27/12

B23P 19/102

[N: using remote centre compliance devices]

Informative references

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

Compliance devices	B25J 17/0208

Synonyms and Keywords

In patent documents the following abbreviations are often used:

RCC	Remote Center Compliance

B23P 21/00

Machines for assembling a multiplicity of different parts to compose units, with or without preceding or subsequent working of such parts, e.g. with programme control

Definition statement

This subclass/group covers:

Machines for assembling, assembly cells, assembly lines or combinations thereof, when it is not covered alone by other groups of other subclasses, e.g. B62D 65/00, H05K 13/00.

Conveyance means is usually present.

Relationship between large subject matter areas

The subject-matter covered by this group can in some cases or overlap with the groups of automobiles (B62D 65/00) and electronic assembling lines (H05K 13/00) when general aspects of the assembling machines are covered, e.g. layouts, modularity, flexible assembling, etc.

References relevant to classification in this subgroup

This subclass/group does not cover:

Designing, manufacturing, e.g. assembling, facilitating disassembly, or structurally modifying motor vehicles or trailers, not otherwise provided for	B62D 65/00
Total factory control, i.e. centrally controlling a plurality of machines, e.g. direct or distributed numerical control (DNC), flexible manufacturing systems (FMS), integrated manufacturing systems (IMS), computer integrated manufacturing (CIM)	G05B 19/418
Apparatus or processes specially adapted for manufacturing or adjusting assemblages of electric components	H05K 13/00

B23P 23/00

Machines or arrangements of machines for performing specified combinations of different metal-working operations not covered by a single other subclass (if the particular kinds of operation are not essential B23Q37/00 to B23Q41/00; [N: working by laser beam combined with other working of metal B23K26/0093])

Definition statement

This subclass/group covers:

Machines or arrangements of machines for performing specified combinations of different metal-working operations not covered by a single other subclass.

Relationship between large subject matter areas

There is a significant overlapping between this group and its subgroups with the subclass B23Q. This applies for search and classification purposes.

In case the particular kinds of operation are not essential, see B23Q 37/00 to B23Q 41/00 take precedence.

Features relating to operations covered by a single subclass, see the relevant subclass for the operation.

B23P 25/00

Auxiliary treatment of workpieces, before or during machining operations, to facilitate the action of the tool or the attainment of a desired final condition of the work, e.g. relief of internal stress

Definition statement

This subclass/group covers:

Auxiliary treatment of workpieces, before or during machining operations, to facilitate the action of the tool or the attainment of a desired final condition of the work, e.g. relief of internal stress.

Relationship between large subject matter areas

There is a significant overlapping between this group and its subgroups with the subclass B23Q, B23B and B23C. This applies for search and classification purposes