

ECLA**EUROPEAN CLASSIFICATION****B23P****OTHER WORKING OF METAL; COMBINED OPERATIONS;
UNIVERSAL MACHINE TOOLS (arrangements for copying or
controlling B23Q)****Notes**

1. This subclass does not cover non-mechanical operations on non-metallic materials unless such operations are specially mentioned in this subclass.
2. In this subclass, the following expressions are used with the meanings indicated:
 - "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.
3. Attention is drawn to the Notes following the title of class B23.

B23P5/00**Setting gems or the like on metal parts, e.g. diamonds on tools****B23P6/00**

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)

B23P6/00A

- [N: Repairing turbine components, e.g. moving or stationary blades, rotors, [B23P6/04A](#) takes precedence] [N1111] [C1204]

B23P6/00A1

- · [N: using only replacement pieces of a particular form] [N1204]

B23P6/00A2

- · [N: using only additive methods, e.g. build-up welding] [N1204]

B23P6/02

- Pistons or cylinders

B23P6/04

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

B23P6/04A

- · [N: of turbine components, e.g. moving or stationary blades, rotors, etc.] [N1111]

B23P9/00

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**

B23P9/02

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

- B23P9/02A
 - . . [N: to inner walls of holes by using axially moving tools] [N1111]
- B23P9/04
 - . Treating or finishing by hammering or applying repeated pressure
- B23P11/00**

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](#))
- B23P11/00A
 - . [N: by expanding or crimping]
- B23P11/02
 - . by first expanding and then shrinking or vice versa, e.g. by using pressure fluids; by making force fits
- B23P11/02A
 - . . [N: by using pressure fluids]
- B23P11/02B
 - . . [N: by using heat or cold]
- B23P11/02B1
 - . . . [N: for mounting tools in tool holders] [N1111]
- B23P13/00**

Making metal objects by operations essentially involving machining but not covered by a single other subclass (making specific objects [B23P15/00](#))
- B23P13/02
 - . in which only the machining operations are important
- B23P13/04
 - . involving slicing of profiled material
- B23P15/00**

Making specific metal objects by operations not covered by a single other subclass or a group in this subclass
- B23P15/00B
 - . [N: valves or valve housings (welding [B23K](#); valve housings per se [F16K](#))]
- B23P15/00B1
 - . . [N: poppet valves]
- B23P15/00C
 - . [N: bearings (see also [F16C33/00](#))]
- B23P15/00D
 - . [N: keys (making keys without essentially removing material, e.g. by punching [B21D53/42](#); milling grooves in keys [B23C3/35](#))]
- B23P15/00E
 - . [N: turbine wheels]
- B23P15/00F
 - . [N: injection moulding tools]
- B23P15/00G
 - . [N: Rocket engine parts, e.g. nozzles, combustion chambers] [N1111]
- B23P15/02
 - . turbine or like blades from one piece
- B23P15/04
 - . turbine or like blades from several pieces
- B23P15/06
 - . piston rings from one piece
- B23P15/06A
 - . . [N: from metal strip]
- B23P15/08
 - . piston rings from several pieces

- B23P15/10 . pistons
- B23P15/10B . . [N: Enlarging pistons]
- B23P15/12 . gratings [N: (making gratings by methods covered by other subclasses [B21D47/00B](#)) [C9608]
- B23P15/14 . gear parts, e.g. gear wheels
- B23P15/16 . plates with holes of very small diameter, e.g. for spinning or burner nozzles
- B23P15/18 . brake shoes
- B23P15/20 . railroad requirements, e.g. buffers
- B23P15/22 . cartridges or like shells
- B23P15/24 . dies ([B21C3/18](#), [B21C25/10](#), [B21D37/20](#) take precedence)
- B23P15/24A . . [N: Honeycomb dies] [N1111]
- B23P15/24B . . [N: Laminated dies] [N1111]
- B23P15/26 . heat exchangers [N: or the like (making heat exchangers by methods covered by other subclasses [B21D53/02](#)) [C9608]
- B23P15/28 . cutting tools (sawing tools [B23D63/00](#), [B23D65/00](#); files or rasps [B23D73/00](#))
- B23P15/30 . . lathe or like tools
- B23P15/32 . . twist-drills
- B23P15/34 . . milling cutters
- B23P15/36 . . . for thread-cutting
- B23P15/38 . . planing or slotting tools ([B23P15/30](#) takes precedence)
- B23P15/40 . . shearing tools
- B23P15/40A . . . [N: razor blades] [N1204]
- B23P15/40B . . . [N: rotary or plane die cutters] [N1204]
- B23P15/42 . . broaching tools
- B23P15/44 . . scraping or shaving tools
- B23P15/46 . . reaming tools
- B23P15/48 . . threading tools (milling cutters for thread-cutting [B23P15/36](#))
- B23P15/50 . . . dies
- B23P15/52 . . . taps
- B23P17/00 Metal-working operations, not covered by a single other subclass or another group in this subclass**
- B23P17/02 . Single metal-working processes; Machines or apparatus therefor
- B23P17/04 . characterised by the nature of the material involved or the kind of product independently of its shape
- B23P17/06 . . Making steel wool or the like

B23P19/00	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)
B23P19/00B	. [N: Article feeders for assembling machines (screws or nuts being carried by a disposable strip or disc B25B23/04B)]
B23P19/00B1	. . [N: orientating the articles]
B23P19/00B2	. . [N: Escapement mechanisms used therewith]
B23P19/00B3	. . [N: Feeding the articles from hoppers to machines or dispensers]
B23P19/00B3B	. . . [N: by using flowing gases]
B23P19/00B4	. . [N: Holding or positioning the article in front of the applying tool]
B23P19/00B5	. . [N: Picking-up and placing mechanisms]
B23P19/00D	. [N: the parts being continuously transported through the machine during assembling or disassembling]
B23P19/02	. for connecting objects by press fit or for detaching same
B23P19/02A	. . [N: Railroad wheels on axles] [N1111]
B23P19/02B	. . [N: Extracting or inserting relatively long parts]
B23P19/02B1	. . . [N: tube bundles]
B23P19/02C	. . [N: For detaching only] [C1204]
B23P19/027	. . using hydraulic or pneumatic means (B23P19/033 takes precedence) [N1111]
B23P19/033	. . using vibration [N1111]
B23P19/04	. for assembling or disassembling parts
B23P19/04B	. . [N: for disassembling pallets]
B23P19/04C	. . [N: specially adapted for combustion engines (shape of casings adapted to facilitate fitting or dismantling of engine parts for combustion engines F02F7/00C1)]
B23P19/04C1	. . . [N: for inserting piston-connecting rods assemblies in cylinders] [N1111]
B23P19/04C2	. . . [N: for assembling valve cotters and retainers of engine valves] [N1111]
B23P19/04D	. . [N: Disassembling lids from drums, e.g. by unfolding, for reconditioning or recovery]
B23P19/04E	. . [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 B25B27/00L)]
B23P19/04F	. . [N: Springs]
B23P19/06	. . Screw or nut setting or loosening machines
B23P19/06A	. . . [N: for pipes or pipe-couplings]
B23P19/06B	. . . [N: Pierce nut setting machines]
B23P19/06B2 [N: Deforming the nut only] [N1204]
B23P19/06B4 [N: Deforming the support material only, e.g. the sheet or plate] [N1204]
B23P19/06C	. . . [N: Arrangements for torque limiters or torque indicators in screw or nut setting machines (for hand tools B25B23/14)]
B23P19/06C1 [N: by electrical means]
B23P19/06D	. . . [N: Bolt tensioners (for hand tools B25B29/02)]

B23P19/06D1 [N: by using heating means] [N1111]
B23P19/06E	. . . [N: Multi-spindle machines]
B23P19/08	. . Machines for placing washers, circlips, or the like on bolts or other members
B23P19/08A	. . . [N: for placing washers on nuts]
B23P19/08B	. . . [N: for placing resilient or flexible rings, e.g. O-rings, circlips]
B23P19/08B1 [N: Non-metallic protective bellows] [N1111]
B23P19/08B2 [N: Piston rings in piston grooves] [N1111]
B23P19/10	. Aligning parts to be fitted together [N1111]
B23P19/10A	. . [N: using remote centre compliance devices] [N1111]
B23P19/10A1	. . . [N: using sensing means] [N1111]
B23P19/10B	. . [N: using oscillating, rotating or vibrating movements] [N1111]
B23P19/12	. . Alignment of parts for insertion into bores [N1111]
B23P21/00	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
B23P21/00A	. [N: the units stationary whilst being composed]
B23P21/00B	. [N: the units passing two or more work-stations whilst being composed]
B23P21/00B1	. . [N: the conveying means comprising a rotating table]
B23P21/00C	. [N: the assembling machines or tools moving synchronously with the units while these are being assembled] [N1204]
B23P23/00	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 B23K26/00M]) [C1204]
B23P23/02	. Machine tools for performing different machining operations (lathes, e.g. capstan lathes, B23B ; combined horizontal boring and milling machines B23B39/02)
B23P23/04	. for both machining and other metal-working operations
B23P23/06	. Metal-working plant comprising a number of associated machines or apparatus
B23P25/00	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
B23P25/00B	. [N: immediately preceeding a cutting tool]
B23P25/00B1	. . [N: Heating the workpiece by laser during machining] [N1111]