

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:
 - o "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.
 - o "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 preceding a cutting tool]
- B23P25/00B1 . . [N: Heating the workpiece by laser during machining] [N1111]