

CPC**COOPERATIVE PATENT CLASSIFICATION****B23P****OTHER WORKING OF METAL; COMBINED OPERATIONS;
UNIVERSAL MACHINE TOOLS** ([arrangements for copying or controlling B23Q](#))**NOTE**

This subclass does not cover non-mechanical operations on non-metallic materials unless such operations are specially mentioned in this subclass.

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.

Attention is drawn to the Notes following the title of class [B23](#) .

B23P 5/00

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

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 [B21D 1/00](#), [B21D 3/00](#); repairing defective or damaged objects by casting techniques [B22D 19/10](#); procedures or apparatus covered by a single other subclass, see the relevant subclass)

B23P 6/002

- . { Repairing turbine components, e.g. moving or stationary blades, rotors, ([B23P 6/045](#) takes precedence) }

B23P 6/005

- . . { using only replacement pieces of a particular form }

B23P 6/007

- . . { using only additive methods, e.g. build-up welding }

B23P 6/02

- . Pistons or cylinders

B23P 6/04

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

B23P 6/045

- . . { of turbine components, e.g. moving or stationary blades, rotors, etc. }

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](#) , [C21D 7/00](#), [C22F 1/00](#)) ; **Features of such surfaces not otherwise provided for, their treatment being unspecified**

B23P 9/02

- . Treating or finishing by applying pressure, e.g. knurling ([B23P 9/04](#) takes precedence)

B23P 9/025

- . . { to inner walls of holes by using axially moving tools }

B23P 9/04

- . Treating or finishing by hammering or applying repeated pressure

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 B21D 39/00; {objects produced by methods not important per se, see the relevant subclasses dealing with the objects, e.g. B21F 15/00; B21L 19/00 }; hand tools for connecting wire or strip B25B 25/00; connecting metal parts by adhesives F16B 11/00)
B23P 11/005	. {by expanding or crimping }
B23P 11/02	. by first expanding and then shrinking or <u>vice versa</u> , e.g. by using pressure fluids; by making force fits
B23P 11/022	.. {by using pressure fluids }
B23P 11/025	.. {by using heat or cold }
B23P 11/027	... { for mounting tools in tool holders }
B23P 13/00	Making metal objects by operations essentially involving machining but not covered by a single other subclass (making specific objects B23P 15/00)
B23P 13/02	. in which only the machining operations are important
B23P 13/04	. involving slicing of profiled material
B23P 15/00	Making specific metal objects by operations not covered by a single other subclass or a group in this subclass
B23P 15/001	. {valves or valve housings (welding B23K ; valve housings per se F16K) }
B23P 15/002	.. {poppet valves }
B23P 15/003	. {bearings (see also F16C 33/00) }
B23P 15/005	. {keys (making keys without essentially removing material, e.g. by punching B21D 53/42 ; milling grooves in keys B23C 3/35) }
B23P 15/006	. {turbine wheels }
B23P 15/007	. {injection moulding tools }
B23P 15/008	. { Rocket engine parts, e.g. nozzles, combustion chambers }
B23P 15/02	. turbine or like blades from one piece
B23P 15/04	. turbine or like blades from several pieces
B23P 15/06	. piston rings from one piece
B23P 15/065	.. {from metal strip }
B23P 15/08	. piston rings from several pieces
B23P 15/10	. pistons
B23P 15/105	.. {Enlarging pistons }

- B23P 15/12 . gratings { (making gratings by methods covered by other subclasses [B21D 47/005](#)) }
- B23P 15/14 . gear parts, e.g. gear wheels
- B23P 15/16 . plates with holes of very small diameter, e.g. for spinning or burner nozzles
- B23P 15/18 . brake shoes
- B23P 15/20 . railroad requirements, e.g. buffers
- B23P 15/22 . cartridges or like shells
- B23P 15/24 . dies ([B21C 3/18](#), [B21C 25/10](#), [B21D 37/20](#) take precedence)
- B23P 15/243 .. { Honeycomb dies }
- B23P 15/246 .. { Laminated dies }
- B23P 15/26 . heat exchangers {or the like (making heat exchangers by methods covered by other subclasses [B21D 53/02](#)) }
- B23P 15/28 . cutting tools (sawing tools [B23D 63/00](#), [B23D 65/00](#); files or rasps [B23D 73/00](#))
- B23P 15/30 .. lathe or like tools
- B23P 15/32 .. twist-drills
- B23P 15/34 .. milling cutters
- B23P 15/36 ... for thread-cutting
- B23P 15/38 .. planing or slotting tools ([B23P 15/30](#) takes precedence)
- B23P 15/40 .. shearing tools
- B23P 15/403 ... { razor blades }
- B23P 15/406 ... { rotary or plane die cutters }
- B23P 15/42 .. broaching tools
- B23P 15/44 .. scraping or shaving tools
- B23P 15/46 .. reaming tools
- B23P 15/48 .. threading tools (milling cutters for thread-cutting [B23P 15/36](#))
- B23P 15/50 ... dies
- B23P 15/52 ... taps

B23P 17/00 Metal-working operations, not covered by a single other subclass or another group in this subclass

- B23P 17/02 . Single metal-working processes; Machines or apparatus therefor
- B23P 17/04 . characterised by the nature of the material involved or the kind of product independently of its shape
- B23P 17/06 .. Making steel wool or the like

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 [B23P 11/00](#), [B21J](#) , [B23K](#)) ; Tools or devices therefor so far as not provided for in other classes (hand tools in general [B25](#))

- B23P 19/001 . {Article feeders for assembling machines (screws or nuts being carried by a disposable strip or disc [B25B 23/045](#)) }
- B23P 19/002 . . {orientating the articles }
- B23P 19/003 . . {Escapement mechanisms used therewith }
- B23P 19/004 . . {Feeding the articles from hoppers to machines or dispensers }
- B23P 19/005 . . . {by using flowing gases }
- B23P 19/006 . . {Holding or positioning the article in front of the applying tool }
- B23P 19/007 . . {Picking-up and placing mechanisms }
- B23P 19/008 . {the parts being continuously transported through the machine during assembling or disassembling }
- B23P 19/02 . for connecting objects by press fit or for detaching same
- B23P 19/021 . . { Railroad wheels on axles }
- B23P 19/022 . . {Extracting or inserting relatively long parts }
- B23P 19/024 . . . {tube bundles }
- B23P 19/025 . . { For detaching only }
- B23P 19/027 . . using hydraulic or pneumatic means ([B23P 19/033](#) takes precedence)
- B23P 19/033 . . using vibration
- B23P 19/04 . for assembling or disassembling parts
- B23P 19/041 . . {for disassembling pallets }
- B23P 19/042 . . {specially adapted for combustion engines (shape of casings adapted to facilitate fitting or dismantling of engine parts for combustion engines [F02F 7/0046](#)) }
- B23P 19/043 . . . { for inserting piston-connecting rods assemblies in cylinders }
- B23P 19/045 . . . { for assembling valve cotters and retainers of engine valves }
- B23P 19/046 . . {Disassembling lids from drums, e.g. by unfolding, for reconditioning or recovery }
- B23P 19/047 . . {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 B25B 27/0092](#)) }
- B23P 19/048 . . {Springs }
- B23P 19/06 . . Screw or nut setting or loosening machines
- B23P 19/061 . . . {for pipes or pipe-couplings }
- B23P 19/062 . . . {Pierce nut setting machines }
- B23P 19/063 { Deforming the nut only }
- B23P 19/064 { Deforming the support material only, e.g. the sheet or plate }
- B23P 19/065 . . . {Arrangements for torque limiters or torque indicators in screw or nut setting machines ([for hand tools B25B 23/14](#)) }
- B23P 19/066 {by electrical means }
- B23P 19/067 . . . {Bolt tensioners ([for hand tools B25B 29/02](#)) }
- B23P 19/068 { by using heating means }
- B23P 19/069 . . . {Multi-spindle machines }
- B23P 19/08 . . Machines for placing washers, circlips, or the like on bolts or other members
- B23P 19/082 . . . {for placing washers on nuts }
- B23P 19/084 . . . {for placing resilient or flexible rings, e.g. O-rings, circlips }

B23P 19/086 { Non-metallic protective bellows }
B23P 19/088 { Piston rings in piston grooves }
B23P 19/10	. Aligning parts to be fitted together
B23P 19/102	. . { using remote centre compliance devices }
B23P 19/105	. . . { using sensing means }
B23P 19/107	. . { using oscillating, rotating or vibrating movements }
B23P 19/12	. . Alignment of parts for insertion into bores
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
B23P 21/002	. {the units stationary whilst being composed }
B23P 21/004	. {the units passing two or more work-stations whilst being composed }
B23P 21/006	. . {the conveying means comprising a rotating table }
B23P 21/008	. { the assembling machines or tools moving synchronously with the units while these are being assembled }
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 B23Q 37/00 to B23Q 41/00; { working by laser beam combined with other working of metal B23K 26/0093 })
B23P 23/02	. Machine tools for performing different machining operations (lathes, e.g. capstan lathes, B23B ; combined horizontal boring and milling machines B23B 39/02)
B23P 23/04	. for both machining and other metal-working operations
B23P 23/06	. Metal-working plant comprising a number of associated machines or apparatus
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
B23P 25/003	. {immediately preceeding a cutting tool }
B23P 25/006	. . { Heating the workpiece by laser during machining }
B23P 2700/00	Indexing scheme relating to the articles being treated, e.g. manufactured, repaired, assembled, connected or other operations covered in the subgroups
B23P 2700/01	. Aircraft parts
B23P 2700/02	. Camshafts
B23P 2700/03	. Catalysts or parts thereof

- B23P 2700/04 . Connecting rods
- B23P 2700/05 . Cooking vessels
- B23P 2700/06 . Cooling passages of turbine components, e.g. unblocking or preventing blocking of cooling passages of turbine components
- B23P 2700/07 . Crankshafts
- B23P 2700/08 . Fittings for doors and windows of buildings
- B23P 2700/09 . Heat pipes
- B23P 2700/10 . Heat sinks
- B23P 2700/11 . Joints, e.g. ball joints, universal joints
- B23P 2700/12 . Laminated parts
- B23P 2700/13 . Parts of turbine combustion chambers
- B23P 2700/14 . Suspension elements of automobile vehicles
- B23P 2700/50 . Other automobile vehicle parts, i.e. manufactured in assembly lines