

CPC COOPERATIVE PATENT CLASSIFICATION

B23P OTHER WORKING OF METAL; COMBINED OPERATIONS; UNIVERSAL MACHINE TOOLS (arrangements for copying or controlling [B23Q](#))

NOTES

1. This subclass covers:
 - combinations of work-modifying operations covered by different subclasses of classes [B21](#) - [B24](#);
 - combinations of metal-working operations with non-mechanical treatments of metal not provided for elsewhere, for example in [C21D](#), [C22C](#), [C22F](#) or [C23](#).
2. This subclass does not cover
 - non-mechanical operations on non-metallic materials unless such operations are specially mentioned in this subclass;
 - subsidiary operations performed in conjunction with main operations covered by a single subclass, e.g. assembling of parts as an essential feature of a following metal-working operation, since they are not regarded as operations per se.
3. Attention is drawn to the Notes following the title of class [B23](#).

5/00	Setting gems or the like on metal parts, e.g. diamonds on tools	11/02	• by first expanding and then shrinking or <u>vice versa</u> , e.g. by using pressure fluids; by making force fits
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, <u>see</u> the relevant subclass)	11/022	• • {by using pressure fluids}
6/002	• {Repairing turbine components, e.g. moving or stationary blades, rotors, (B23P 6/045 takes precedence)}	11/025	• • {by using heat or cold}
6/005	• • {using only replacement pieces of a particular form}	11/027	• • • {for mounting tools in tool holders}
6/007	• • {using only additive methods, e.g. build-up welding}	13/00	Making metal objects by operations essentially involving machining but not covered by a single other subclass (making specific objects B23P 15/00)
6/02	• Pistons or cylinders	13/02	• in which only the machining operations are important
6/04	• Repairing fractures or cracked metal parts or products, e.g. castings	13/04	• involving slicing of profiled material
6/045	• • {of turbine components, e.g. moving or stationary blades, rotors, etc.}	15/00	Making specific metal objects by operations not covered by a single other subclass or a group in this subclass
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, <u>see</u> the relevant subclass, e.g. B24C , C21D 7/00 , C22F 1/00); Features of such surfaces not otherwise provided for, their treatment being unspecified	15/001	• {valves or valve housings (welding B23K ; valve housings <u>per se</u> F16K)}
9/02	• Treating or finishing by applying pressure, e.g. knurling (B23P 9/04 takes precedence)	15/002	• • {poppet valves}
9/025	• • {to inner walls of holes by using axially moving tools}	15/003	• {bearings (<u>see also</u> F16C 33/00)}
9/04	• Treating or finishing by hammering or applying repeated pressure	15/005	• {keys (making keys without essentially removing material, e.g. by punching B21D 53/42 ; milling grooves in keys B23C 3/35)}
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 <u>per se</u> , <u>see</u> 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)	15/006	• {turbine wheels}
11/005	• {by expanding or crimping}	15/007	• {injection moulding tools}
		15/008	• {Rocket engine parts, e.g. nozzles, combustion chambers}
		15/02	• turbine or like blades from one piece
		15/04	• turbine or like blades from several pieces
		15/06	• piston rings from one piece
		15/065	• • {from metal strip}
		15/08	• piston rings from several pieces
		15/10	• pistons
		15/105	• • {Enlarging pistons}
		15/12	• gratings {(making gratings by methods covered by other subclasses B21D 47/005)}
		15/14	• gear parts, e.g. gear wheels
		15/16	• plates with holes of very small diameter, e.g. for spinning or burner nozzles
		15/18	• brake shoes
		15/20	• railroad requirements, e.g. buffers
		15/22	• cartridges or like shells
		15/24	• dies (B21C 3/18 , B21C 25/10 , B21D 37/20 take precedence)
		15/243	• • {Honeycomb dies}
		15/246	• • {Laminated dies}

15/26	. heat exchangers {or the like (making heat exchangers by methods covered by other subclasses B21D 53/02)}	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)}
15/28	. cutting tools (sawing tools B23D 63/00 , B23D 65/00 ; files or rasps B23D 73/00)	19/043	. . . {for inserting piston-connecting rods assemblies in cylinders}
15/30	. . lathe or like tools	19/045	. . . {for assembling valve cotters and retainers of engine valves}
15/32	. . twist-drills	19/046	. . {Disassembling lids from drums, e.g. by unfolding, for reconditioning or recovery}
15/34	. . milling cutters	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)}
15/36	. . . for thread-cutting	19/048	. . {Springs}
15/38	. . planing or slotting tools (B23P 15/30 takes precedence)	19/06	. . Screw or nut setting or loosening machines
15/40	. . shearing tools	19/061	. . . {for pipes or pipe-couplings}
15/403	. . . {razor blades}	19/062	. . . {Pierce nut setting machines}
15/406	. . . {rotary or plane die cutters}	19/063 {Deforming the nut only}
15/42	. . broaching tools	19/064 {Deforming the support material only, e.g. the sheet or plate}
15/44	. . scraping or shaving tools	19/065 {Arrangements for torque limiters or torque indicators in screw or nut setting machines (for hand tools B25B 23/14)}
15/46	. . reaming tools	19/066 {by electrical means}
15/48	. . threading tools (milling cutters for thread-cutting B23P 15/36)	19/067 {Bolt tensioners (for hand tools B25B 29/02)}
15/50	. . . dies	19/068 {by using heating means}
15/52	. . . taps	19/069 {Multi-spindle machines}
17/00	Metal-working operations, not covered by a single other subclass or another group in this subclass	19/08	. . Machines for placing washers, circlips, or the like on bolts or other members
17/02	. Single metal-working processes; Machines or apparatus therefor	19/082	. . . {for placing washers on nuts}
17/04	. characterised by the nature of the material involved or the kind of product independently of its shape	19/084	. . . {for placing resilient or flexible rings, e.g. O-rings, circlips}
17/06	. . Making steel wool or the like	19/086 {Non-metallic protective bellows}
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)	19/088 {Piston rings in piston grooves}
19/001	. {Article feeders for assembling machines (screws or nuts being carried by a disposable strip or disc B25B 23/045)}	19/10	. Aligning parts to be fitted together
19/002	. . {orientating the articles}	19/102	. . {using remote centre compliance devices}
19/003	. . {Escapement mechanisms used therewith}	19/105	. . . {using sensing means}
19/004	. . {Feeding the articles from hoppers to machines or dispensers}	19/107	. . {using oscillating, rotating or vibrating movements}
19/005	. . . {by using flowing gases}	19/12	. . Alignment of parts for insertion into bores
19/006	. . {Holding or positioning the article in front of the applying tool}	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
19/007	. . {Picking-up and placing mechanisms}	21/002	. {the units stationary whilst being composed}
19/008	. {the parts being continuously transported through the machine during assembling or disassembling}	21/004	. {the units passing two or more work-stations whilst being composed}
19/02	. for connecting objects by press fit or for detaching same	21/006	. . {the conveying means comprising a rotating table}
19/021	. . {Railroad wheels on axles}	21/008	. {the assembling machines or tools moving synchronously with the units while these are being assembled}
19/022	. . {Extracting or inserting relatively long parts}	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 - B23Q 41/00; {working by laser beam combined with other working of metal B23K 26/0093})
19/024	. . . {tube bundles}		
19/025	. . {For detaching only}		
19/027	. . using hydraulic or pneumatic means (B23P 19/033 takes precedence)		
19/033	. . using vibration		
19/04	. for assembling or disassembling parts		
19/041	. . {for disassembling pallets}		

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](#))

- 23/04 . for both machining and other metal-working operations

- 23/06 . Metal-working plant comprising a number of associated machines or apparatus

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

- 25/003 . {immediately preceding a cutting tool}

- 25/006 . . {Heating the workpiece by laser during machining}

2700/00 Indexing scheme relating to the articles being treated, e.g. manufactured, repaired, assembled, connected or other operations covered in the subgroups

- 2700/01 . Aircraft parts

- 2700/02 . Camshafts

- 2700/03 . Catalysts or parts thereof

- 2700/04 . Connecting rods

- 2700/05 . Cooking vessels

- 2700/06 . Cooling passages of turbine components, e.g. unblocking or preventing blocking of cooling passages of turbine components

- 2700/07 . Crankshafts

- 2700/08 . Fittings for doors and windows of buildings

- 2700/09 . Heat pipes

- 2700/10 . Heat sinks

- 2700/11 . Joints, e.g. ball joints, universal joints

- 2700/12 . Laminated parts

- 2700/13 . Parts of turbine combustion chambers

- 2700/14 . Suspension elements of automobile vehicles

- 2700/50 . Other automobile vehicle parts, i.e. manufactured in assembly lines