

CPC COOPERATIVE PATENT CLASSIFICATION

B PERFORMING OPERATIONS; TRANSPORTING

(NOTES omitted)

SHAPING

B23 MACHINE TOOLS; METAL-WORKING NOT OTHERWISE PROVIDED FOR
(punching, perforating, making articles by processing sheet metal, tubes, or profiles [B21D](#); wire-working [B21F](#); making pins, needles, or nails [B21G](#); making chains [B21L](#); grinding [B24](#))
(NOTES omitted)

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

NOTES

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

WARNING

In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.

5/00	Setting gems or the like on metal parts, e.g. diamonds on tools	9/02	. Treating or finishing by applying pressure, e.g. knurling (B23P 9/04 takes precedence)
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)	9/025	. . {to inner walls of holes by using axially moving tools}
6/002	. {Repairing turbine components, e.g. moving or stationary blades, rotors, (B23P 6/045 takes precedence)}	9/04	. Treating or finishing by hammering or applying repeated pressure
6/005	. . {using only replacement pieces of a particular form}	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)
6/007	. . {using only additive methods, e.g. build-up welding}	11/005	. {by expanding or crimping}
6/02	. Pistons or cylinders	11/02	. by first expanding and then shrinking or <u>vice versa</u> , e.g. by using pressure fluids; by making force fits
6/04	. Repairing fractures or cracked metal parts or products, e.g. castings	11/022	. . {by using pressure fluids}
6/045	. . {of turbine components, e.g. moving or stationary blades, rotors, etc.}	11/025	. . {by using heat or cold}
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	11/027	. . . {for mounting tools in tool holders}
		13/00	Making metal objects by operations essentially involving machining but not covered by a single other subclass (making specific objects B23P 15/00)
		13/02	. in which only the machining operations are important
		13/04	. involving slicing of profiled material

15/00	Making specific metal objects by operations not covered by a single other subclass or a group in this subclass	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)
15/001	. {valves or valve housings (welding B23K ; valve housings <i>per se</i> F16K)}		
15/002	. . {poppet valves}		
15/003	. {bearings (see also F16C 33/00)}		
15/005	. {keys (making keys without essentially removing material, e.g. by punching B21D 53/42 ; milling grooves in keys B23C 3/35)}	19/001	. {Article feeders for assembling machines (screws or nuts being carried by a disposable strip or disc B25B 23/045)}
15/006	. {turbine wheels}	19/002	. . {orientating the articles}
15/007	. {injection moulding tools}	19/003	. . {Escapement mechanisms used therewith}
15/008	. {Rocket engine parts, e.g. nozzles, combustion chambers}	19/004	. . {Feeding the articles from hoppers to machines or dispensers}
15/02	. turbine or like blades from one piece	19/005	. . . {by using flowing gases}
15/04	. turbine or like blades from several pieces	19/006	. . {Holding or positioning the article in front of the applying tool}
15/06	. piston rings from one piece	19/007	. . {Picking-up and placing mechanisms}
15/065	. . {from metal strip}	19/008	. {the parts being continuously transported through the machine during assembling or disassembling}
15/08	. piston rings from several pieces	19/02	. for connecting objects by press fit or for detaching same
15/10	. pistons		
15/105	. . {Enlarging pistons}	19/021	. . {Railroad wheels on axles}
15/12	. gratings {(making gratings by methods covered by other subclasses B21D 47/005)}	19/022	. . {Extracting or inserting relatively long parts}
15/14	. gear parts, e.g. gear wheels	19/024	. . . {tube bundles}
15/16	. plates with holes of very small diameter, e.g. for spinning or burner nozzles	19/025	. . {For detaching only}
15/18	. brake shoes	19/027	. . using hydraulic or pneumatic means (B23P 19/033 takes precedence)
15/20	. railroad requirements, e.g. buffers	19/033	. . using vibration
15/22	. cartridges or like shells	19/04	. for assembling or disassembling parts
15/24	. dies (B21C 3/18 , B21C 25/10 , B21D 37/20 take precedence)	19/041	. . {for disassembling pallets}
15/243	. . {Honeycomb dies}	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)}
15/246	. . {Laminated dies}		
15/26	. heat exchangers {or the like (making heat exchangers by methods covered by other subclasses B21D 53/02)}	19/043	. . . {for inserting piston-connecting rods assemblies in cylinders}
15/28	. cutting tools (sawing tools B23D 63/00 , B23D 65/00 ; files or rasps B23D 73/00)	19/045	. . . {for assembling valve cotters and retainers of engine valves}
15/30	. . lathes or like tools	19/046	. . {Disassembling lids from drums, e.g. by unfolding, for reconditioning or recovery}
15/32	. . twist-drills	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)}
15/34	. . milling cutters		
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		
15/48	. . threading tools (milling cutters for thread-cutting B23P 15/36)	19/066 {by electrical means}
15/50	. . . dies	19/067	. . . {Bolt tensioners (for hand tools B25B 29/02)}
15/52	. . . taps	19/068 {by using heating means}
17/00	Metal-working operations, not covered by a single other subclass or another group in this subclass	19/069	. . . {Multi-spindle machines}
17/02	. Single metal-working processes; Machines or apparatus therefor	19/08	. . Machines for placing washers, circlips, or the like on bolts or other members
17/04	. characterised by the nature of the material involved or the kind of product independently of its shape		
17/06	. . Making steel wool or the like	19/082	. . . {for placing washers on nuts}

- 19/084 . . . {for placing resilient or flexible rings, e.g. O-rings, circlips}
- 19/086 {Non-metallic protective bellows}
- 19/088 {Piston rings in piston grooves}
- 19/10 {Aligning parts to be fitted together}
- 19/102 {using remote centre compliance devices}
- 19/105 {using sensing means}
- 19/107 {using oscillating, rotating or vibrating movements}
- 19/12 Alignment of parts for insertion into bores
- 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**
- 21/002 {the units stationary whilst being composed}
- 21/004 {the units passing two or more work-stations whilst being composed}
- 21/006 {the conveying means comprising a rotating table}
- 21/008 {the assembling machines or tools moving synchronously with the units while these are being assembled}
- 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](#)})**
- 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