

# CPC COOPERATIVE PATENT CLASSIFICATION

## B PERFORMING OPERATIONS; TRANSPORTING

(NOTES omitted)

### SHAPING

## B23 MACHINE TOOLS; METAL-WORKING NOT OTHERWISE PROVIDED FOR

(NOTES omitted)

## B23P METAL-WORKING NOT OTHERWISE PROVIDED FOR; 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](#).

### 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 ( <a href="#">B23P 9/04</a> takes precedence)
6/00	Restoring or reconditioning objects ( <a href="#">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</a> )	9/025	• • {to inner walls of holes by using axially moving tools}
6/002	• {Repairing turbine components, e.g. moving or stationary blades, rotors, ( <a href="#">B23P 6/045</a> 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 <a href="#">B21J</a> or <a href="#">B23K</a> (connecting sheet metal or metal tubes, rods, or profiles <a href="#">B21D 39/00</a> ; {objects produced by methods not important <u>per se</u> , see the relevant subclasses dealing with the objects, e.g. <a href="#">B21F 15/00</a> ; <a href="#">B21L 19/00</a> }; hand tools for connecting wire or strip <a href="#">B25B 25/00</a> ; connecting metal parts by adhesives <a href="#">F16B 11/00</a> )
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 ( <a href="#">treatment covered by a single other subclass, see the relevant subclass, e.g. B24C, C21D 7/00, C22F 1/00</a> ); 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 ( <a href="#">making specific objects B23P 15/00</a> )
		13/02	• in which only the machining operations are important
		13/04	• involving slicing of profiled material

<b>15/00</b>	<b>Making specific metal objects by operations not covered by a single other subclass or a group in this subclass</b>
15/001	• {valves or valve housings (welding <a href="#">B23K</a> ; valve housings <a href="#">per se F16K</a> )}
15/002	• . {poppet valves}
15/003	• {bearings (see also <a href="#">F16C 33/00</a> )}
15/005	• {keys (making keys without essentially removing material, e.g. by punching <a href="#">B21D 53/42</a> ; milling grooves in keys <a href="#">B23C 3/35</a> )}
15/006	• {turbine wheels}
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 <a href="#">B21D 47/005</a> )}
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 ( <a href="#">B21C 3/18</a> , <a href="#">B21C 25/10</a> , <a href="#">B21D 37/20</a> 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 <a href="#">B21D 53/02</a> )}
15/28	• cutting tools (sawing tools <a href="#">B23D 63/00</a> , <a href="#">B23D 65/00</a> ; files or rasps <a href="#">B23D 73/00</a> )
15/30	• . lathes or like tools
15/32	• . twist-drills
15/34	• . milling cutters
15/36	• . . for thread-cutting
15/38	• . planing or slotting tools ( <a href="#">B23P 15/30</a> takes precedence)
15/40	• . shearing tools
15/403	• . . {razor blades}
15/406	• . . {rotary or plane die cutters}
15/42	• . broaching tools
15/44	• . scraping or shaving tools
15/46	• . reaming tools
15/48	• . threading tools ( <a href="#">milling cutters for thread-cutting B23P 15/36</a> )
15/50	• . . dies
15/52	• . . taps
<b>17/00</b>	<b>Metal-working operations, not covered by a single other subclass or another group in this subclass</b>
17/02	• Single metal-working processes; Machines or apparatus therefor
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

<b>19/00</b>	<b>Machines for simply fitting together or separating metal parts or objects, or metal and non-metal parts, whether or not involving some deformation {(connecting metal parts or objects by metal-working procedures <a href="#">B21J</a>, <a href="#">B23K</a>)}; Tools or devices therefor so far as not provided for in other classes (hand tools in general <a href="#">B25</a>)</b>
19/001	• {Article feeders for assembling machines (screws or nuts being carried by a disposable strip or disc <a href="#">B25B 23/045</a> )}
19/002	• . {orientating the articles}
19/003	• . {Escapement mechanisms used therewith}
19/004	• . {Feeding the articles from hoppers to machines or dispensers}
19/005	• . . {by using flowing gases}
19/006	• . {Holding or positioning the article in front of the applying tool}
19/007	• . {Picking-up and placing mechanisms}
19/008	• {the parts being continuously transported through the machine during assembling or disassembling}
19/02	• for connecting objects by press fit or for detaching same ( <a href="#">B23P 19/10</a> takes precedence)
19/021	• . {Railroad wheels on axles}
19/022	• . {Extracting or inserting relatively long parts}
19/024	• . . {tube bundles}
19/025	• . {For detaching only}
19/027	• . using hydraulic or pneumatic means ( <a href="#">B23P 19/033</a> takes precedence)
19/033	• . using vibration
19/04	• for assembling or disassembling parts
19/041	• . {for disassembling pallets}
19/042	• . {specially adapted for combustion engines (shape of casings adapted to facilitate fitting or dismantling of engine parts for combustion engines <a href="#">F02F 7/0046</a> )}
19/043	• . . {for inserting piston-connecting rods assemblies in cylinders}
19/045	• . . {for assembling valve cotters and retainers of engine valves}
19/046	• . {Disassembling lids from drums, e.g. by unfolding, for reconditioning or recovery}
19/047	• . {for flexible profiles, e.g. sealing or decorating strips in grooves or on other profiles by devices moving along the flexible profile ( <a href="#">hand tools therefor B25B 27/0092</a> )}
19/048	• . {Springs}
19/06	• . Screw or nut setting or loosening machines
19/061	• . . {for pipes or pipe-couplings}
19/062	• . . {Pierce nut setting machines}
19/063	• . . . {Deforming the nut only}
19/064	• . . . {Deforming the support material only, e.g. the sheet or plate}
19/065	• . . {Arrangements for torque limiters or torque indicators in screw or nut setting machines ( <a href="#">for hand tools B25B 23/14</a> )}
19/066	• . . . {by electrical means}
19/067	• . . {Bolt tensioners ( <a href="#">for hand tools B25B 29/02</a> )}
19/068	• . . . {by using heating means}
19/069	• . . {Multi-spindle machines}
19/08	• . Machines for placing washers, circlips, or the like on bolts or other members
19/082	• . . {for placing washers on nuts}

19/084	. . . {for placing resilient or flexible rings, e.g. O-rings, circlips}	2700/11	. Joints, e.g. ball joints, universal joints
19/086	. . . . {Non-metallic protective bellows}	2700/12	. Laminated parts
19/088	. . . . {Piston rings in piston grooves}	2700/13	. Parts of turbine combustion chambers
19/10	. Aligning parts to be fitted together	2700/14	. Suspension elements of automobile vehicles
19/102	. . {using remote centre compliance devices}	2700/50	. Other automobile vehicle parts, i.e. manufactured in assembly lines
19/105	. . . {using sensing means}		
19/107	. . {using oscillating, rotating or vibrating movements}		
19/12	. . Alignment of parts for insertion into bores		
<b>21/00</b>	<b>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</b>		
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}		
<b>23/00</b>	<b>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 <a href="#">B23Q 37/00</a> - <a href="#">B23Q 41/00</a>; {working by laser beam combined with other working of metal <a href="#">B23K 26/0093</a>})</b>		
23/02	. Machine tools for performing different machining operations (lathes, e.g. capstan lathes, <a href="#">B23B</a> ; combined horizontal boring and milling machines <a href="#">B23B 39/02</a> )		
23/04	. for both machining and other metal-working operations		
23/06	. Metal-working plant comprising a number of associated machines or apparatus		
<b>25/00</b>	<b>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</b>		
25/003	. {immediately preceding a cutting tool}		
25/006	. . {Heating the workpiece by laser during machining}		
<b>2700/00</b>	<b>Indexing scheme relating to the articles being treated, e.g. manufactured, repaired, assembled, connected or other operations covered in the subgroups</b>		
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		