COOPERATIVE PATENT CLASSIFICATION

B PERFORMING OPERATIONS; TRANSPORTING
(NOTES omitted)

SHAPING

B23 MACHINE TOOLS; METAL-WORKING NOT OTHERWISE PROVIDED FOR
(NOTES omitted)

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.

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

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)

6/002. (Repairing turbine components, e.g. moving or stationary blades, rotors, (B23P 6/045 takes precedence))

6/005. (using only replacement pieces of a particular form)

6/007. (using only additive methods, e.g. build-up welding)

6/02 Pistons or cylinders

6/04 Repairing fractures or cracked metal parts or products, e.g. castings

6/045. (of turbine components, e.g. moving or stationary blades, rotors, etc.)

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

9/02 Treating or finishing by applying pressure, e.g. knurling (B23P 9/04 takes precedence)

9/025. (to inner walls of holes by using axially moving tools)

9/04 Treating or finishing by hammering or applying repeated pressure

11/00 Connecting metal parts or objects by metalworking 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)

11/002. (by expanding or crimping)

11/02 by first expanding and then shrinking or vice versa, e.g. by using pressure fluids; by making force fits

11/022. (by using pressure fluids)

11/025. (by using heat or cold)

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

15/001. (valves or valve housings (welding B23K; valve housings per se F16K))

15/002. (poppet valves)
B23P

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)]
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 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 . cartrdges 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)]
15/28 . cutting tools (sawing tools B23D 63/00, B23D 65/00; files or rasps B23D 73/00)
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 (B23P 15/30 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 (milling cutters for thread-cutting B23P 15/36)
15/50 . . dies
15/52 . . . taps
17/00 Metal-working operations, not covered by a single other subclass or another group in this subclass
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
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)
19/107 . . {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