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 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)
   11/005 . . (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 F16S))
   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)]
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 . . 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)]
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 objects, or metal and non-metal parts, whether or not involving some deformation [(connecting metal parts or objects by metal-working procedures 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 26/00093})

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