SECTION B — PERFORMING OPERATIONS; TRANSPORTING

B23 MACHINE TOOLS; METAL-WORKING NOT OTHERWISE PROVIDED FOR

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

Note(s)

1. This subclass does not cover non-mechanical operations on non-metallic materials unless such operations are specially mentioned in this subclass.
2. In this subclass, the following expressions are used with the meanings indicated:
   - "combined operations" excludes the assembling of parts if it is an essential feature of the next metal-working operation, since it is not regarded as an operation per se;
   - "working of metal" and equivalent expressions include non-mechanical treatment of metal so far as it is not provided for in any other class or subclass, for example, in C21D, C22C, C22F, C23. Thus, combinations of such non-mechanical treatment with other metal-working are classified in this subclass.
3. Attention is drawn to the Notes following the title of class B23.

Subclass index

METAL-WORKING PROCESSES
- Setting of diamonds.....5/00
- Reconditioning; finishing.....6/00, 9/00
- Connecting or disconnecting.....11/00, 19/00, 21/00
- Other processes.....6/00, 13/00, 15/00, 17/00
- Auxiliary treatments.....25/00

COMBINED PROCESSES; MULTI-PURPOSE MACHINES
- Reconditioning; finishing.....6/00, 9/00
- Other combined operations.....6/00, 23/00
- Auxiliary treatments.....25/00

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) **[3]**

6/02 • Pistons or cylinders **[3]**

6/04 • Repairing fractures or cracked metal parts or products, e.g. castings **[3]**

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)

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

11/00 Connecting or disconnecting metal parts or objects by metal-working techniques, not otherwise provided for (connecting sheet metal or metal tubes, rods or profiles B21D 39/00; riveting B21J; soldering, unsoldering, welding B23K; hand tools for connecting wire or strip B25B 25/00; connecting metal parts by adhesives F16B 11/00) **[1, 7]**

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

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

15/02 • turbine or like blades from one piece

15/04 • turbine or like blades from several pieces

15/06 • piston rings from one piece

15/08 • piston rings from several pieces

15/10 • pistons

15/12 • gratings

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)
15/26 • heat exchangers
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
15/42 • • 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; Tools or devices therefor so far as not provided for in other classes (hand tools in general B25) **[3]**

19/02 • for connecting objects by press fit or for detaching same (B23P 19/10 takes precedence) **[1, 7]**
19/027 • • using hydraulic or pneumatic means (B23P 19/033 takes precedence) **[7]**
19/033 • • using vibration **[7]**
19/04 • for assembling or disassembling parts (B23P 19/10 takes precedence) **[1, 7]**
19/06 • • Screw or nut setting or loosening machines
19/08 • • Machines for placing washers, circlips, or the like on bolts or other members
19/10 • Aligning parts to be fitted together **[7]**
19/12 • • Alignment of parts for insertion into bores **[7]**

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

23/00 Machines or arrangements of machines for performing specified combinations of different metal-working operations not covered by a single other subclass (combined horizontal boring and milling machines B23B 39/02; if the particular kinds of operation are not essential B23Q 37/00-B23Q 41/00; features relating to operations covered by a single subclass, see the relevant subclass for the operation)
23/02 • Machine tools for performing different machining operations (lathes, e.g. capstan lathes, B23B)
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