

**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)

**B23B TURNING; BORING** (arrangements for copying or controlling B23Q)

|                                  |                        |                                |                        |
|----------------------------------|------------------------|--------------------------------|------------------------|
| TURNING                          |                        | other parts .....              | 17/00, 21/00,<br>33/00 |
| Methods .....                    | 1/00                   |                                |                        |
| Lathes                           |                        | accessories .....              | 25/00                  |
| general-purpose lathes .....     | 3/00                   | BORING, DRILLING               |                        |
| semi-automatic or automatic      |                        | Methods .....                  | 35/00, 37/00           |
| lathes .....                     | 7/00, 9/00,<br>11/00   | Machines                       |                        |
| for particular work .....        | 5/00                   | general-purpose machines ..... | 39/00                  |
| handling, adjusting .....        | 13/00, 15/00           | for particular work .....      | 41/00                  |
| component parts                  |                        | hand-held machines .....       | 45/00                  |
| headstocks, tailstocks,          |                        | component parts .....          | 47/00, 49/00,<br>51/00 |
| chucks .....                     | 19/00, 23/00,<br>31/00 | DEVICES FOR ATTACHMENT TO ANY  |                        |
| tools, or holders therefor ..... | 27/00, 29/00           | MACHINE TOOL .....             | 43/00                  |

### Turning

**1/00 Methods for turning or working essentially requiring the use of turning-machines; Use of auxiliary equipment in connection with such methods**

**3/00 General-purpose turning-machines or devices, e.g. centre lathes with feed rod and lead screw; Sets of turning-machines**

- 3/02 . Small lathes, e.g. for toolmakers (specially designed for watchmakers G04D 3/00)
- 3/04 . Turning-machines in which the workpiece is rotated by means at a distance from the headstock
- 3/06 . Turning-machines or devices characterised only by the special arrangement of constructional units (B23Q 37/00 takes precedence; structural features of details, see the relevant groups; such features of general applicability B23Q)
- 3/08 . Turning-machines characterised by the use of faceplates
- 3/10 . . with the faceplate horizontal, i.e. vertical boring and turning machines
- 3/12 . . with the faceplate vertical, i.e. face lathes
- 3/14 . . Mountings or drives of faceplates
- 3/16 . Turret lathes for turning individually-chucked workpieces
- 3/18 . . with horizontal working-spindle
- 3/20 . . with vertical working-spindle
- 3/22 . Turning-machines or devices with rotary tool heads
- 3/24 . . the tools of which do not perform a radial movement; Rotary tool heads therefor
- 3/26 . . the tools of which perform a radial movement; Rotary tool heads thereof
- 3/28 . Turning-machines in which the feed is controlled by a copying device, i.e. copying lathes (features of copying devices B23Q 35/00)
- 3/30 . Turning-machines with two or more working-spindles, e.g. in fixed arrangement
- 3/32 . . for performing identical operations simultaneously on two or more workpieces

- 3/34 . Short turning-machines with one or multiple working-spindles attended from the end (B23B 3/12 takes precedence)
- 3/36 . Associations of only turning-machines directed to a particular metal-working result (if the metal-working result is not essential B23Q 39/00)
- 5/00 Turning-machines or devices specially adapted for particular work; Accessories specially adapted therefor**
- 5/02 . for turning hubs or brake drums (B23B 5/04 takes precedence)
- 5/04 . for reconditioning hubs or brake drums or axle spindles without removing same from the vehicle
- 5/06 . for turning valves or valve bodies
- 5/08 . for turning axles, bars, rods, tubes, rolls, i.e. shaft-turning lathes, roll lathes; Centreless turning
- 5/10 . . for turning pilgrim rolls
- 5/12 . . for peeling bars or tubes by making use of cutting bits arranged around the workpiece (making use of cutting bits arranged around the workpiece otherwise than by turning B23D 79/12) [2]
- 5/14 . Cutting-off lathes (shearing B23D)
- 5/16 . for bevelling, chamfering, or deburring the ends of bars or tubes
- 5/18 . for turning crankshafts, eccentrics, or cams, e.g. crankpin lathes
- 5/20 . . without removing same from the engine
- 5/22 . . Holding the workpiece in the machine, e.g. chucking devices
- 5/24 . for turning pistons or other workpieces to a slightly non-circular cross-section
- 5/26 . for simultaneously turning internal and external surfaces of a body
- 5/28 . for turning wheels or wheel sets or cranks thereon, i.e. wheel lathes
- 5/30 . . Arrangements providing for tool control by templates

- 5/32 . . for reconditioning wheel sets without removing same from the vehicle; Underfloor wheel lathes for railway vehicles
- 5/34 . . Holding the workpiece in the machine, e.g. chucking devices therefor; Drivers therefor
- 5/36 . for turning specially-shaped surfaces by making use of relative movement of the tool and work produced by geometrical mechanisms, i.e. forming-lathes
- 5/38 . . for turning conical surfaces inside or outside, e.g. taper pins
- 5/40 . . for turning spherical surfaces inside or outside
- 5/42 . . for turning relieving surfaces, i.e. relieving-lathes
- 5/44 . . for turning polygonal or other non-circular surfaces controlled by gear or guide mechanisms, i.e. eccentric lathes
- 5/46 . . for turning helical or spiral surfaces (thread cutting B23G)
- 5/48 . . . for cutting grooves, e.g. oil grooves of helicoidal shape
- 7/00 Automatic or semi-automatic turning-machines with a single working-spindle, e.g. controlled by cams; Equipment therefor; Features common to automatic and semi-automatic turning-machines with one or more working-spindles**
- 7/02 . Automatic or semi-automatic machines for turning of stock
- 7/04 . . Turret machines
- 7/06 . . with sliding headstock
- 7/08 . . with the working-spindle vertical
- 7/10 . . Accessories, e.g. guards
- 7/12 . Automatic or semi-automatic machines for turning of workpieces
- 7/14 . . with the working-spindle horizontal
- 7/16 . . with the working-spindle vertical
- 9/00 Automatic or semi-automatic turning-machines with a plurality of working-spindles, e.g. automatic multiple-spindle machines with spindles arranged in a drum carrier able to be moved into pre-determined positions; Equipment therefor** (equipment applicable to single-spindle machines B23B 7/00)
- 9/02 . Automatic or semi-automatic machines for turning of stock
- 9/04 . . with the working-spindles horizontal
- 9/06 . . with the working-spindles vertical
- 9/08 . Automatic or semi-automatic machines for turning of workpieces
- 9/10 . . with the working-spindles horizontal
- 9/12 . . with the working-spindles vertical
- 11/00 Automatic or semi-automatic turning-machines incorporating equipment for performing other working procedures, e.g. slotting, milling, rolling**
- 13/00 Arrangements for automatically conveying or chucking or guiding stock**
- 13/02 . for turning-machines with a single working-spindle
- 13/04 . for turning-machines with a plurality of working-spindles
- 13/06 . Arrangements for switching-off the drive of turning-machines after the stock has been completely machined
- 13/08 . Arrangements for reducing vibrations in feeding-passages or for damping noise (damping noise in general G10K)
- 13/10 . with magazines for stock
- 13/12 . Accessories, e.g. stops, grippers

**15/00 Arrangements for conveying, loading, adjusting, reversing, chucking, or discharging workpieces specially designed for automatic or semi-automatic turning-machines**

#### **Components or accessories particularly for turning machines**

- 17/00 Lathe beds** (foundation frames, carriage guides as such B23Q 1/00)
- 19/00 Headstocks; Equivalent parts of any machine tools**
- 19/02 . Working-spindles; Features relating thereto, e.g. supporting arrangements (B23B 13/00 takes precedence)
- 21/00 Lathe carriages; Cross-slides; Tool posts** (tool holders B23B 29/00); **Similar parts of any machine tools**
- 23/00 Tailstocks; Centres**
- 23/02 . Dead centres
- 23/04 . Live centres
- 25/00 Accessories or auxiliary equipment for turning-machines** (for machine tools in general B23Q; cooling or lubricating B23Q 11/12)
- 25/02 . Arrangements for chip-breaking in turning-machines (on cutting tools B23B 27/22)
- 25/04 . Safety guards specially designed for turning-machines (in general F16P)
- 25/06 . Measuring, gauging, or adjusting equipment on turning-machines for setting-on, feeding, controlling, or monitoring the cutting tools or work (measuring devices or gauges G01B)
- 27/00 Tools for turning or boring machines** (for drilling machines B23B 51/00); **Tools of a similar kind in general; Accessories therefor**
- 27/02 . Cutting tools with straight main part and cutting edge at an angle (B23B 27/04 B23B 27/08 take precedence)
- 27/04 . Cutting-off tools (B23B 27/08 takes precedence)
- 27/06 . Profile cutting tools, i.e. forming-tools
- 27/08 . Cutting tools with blade- or disc-like main parts
- 27/10 . Cutting tools with special provision for cooling
- 27/12 . . with a continuously-rotated circular cutting edge; Holders therefor
- 27/14 . Cutting tools of which the bits or tips are of special material
- 27/16 . . with exchangeable cutting bits, e.g. able to be clamped
- 27/18 . . with cutting bits or tips rigidly mounted, e.g. by brazing
- 27/20 . . with diamond bits
- 27/22 . Cutting tools with chip-breaking equipment
- 27/24 . Knurling tools
- 29/00 Holders for non-rotary cutting tools** (B23B 27/12 takes precedence); **Boring bars or boring heads; Accessories for tool holders**
- 29/02 . Boring bars
- 29/03 . Boring heads
- 29/034 . . with tools moving radially, e.g. for making chamfers or undercuts [4]
- 29/04 . Tool holders for a single cutting tool
- 29/06 . . Tool holders equipped with longitudinally-arranged grooves for setting the cutting tool
- 29/08 . . Tool holders equipped with grooves arranged crosswise to the longitudinal direction for setting the cutting tool

- 29/10 . . . with adjustable counterbase for the cutting tool
- 29/12 . . Special arrangements on tool holders
- 29/14 . . . affording a yielding support of the cutting tool, e.g. by spring clamping
- 29/16 . . . for supporting the workpiece in a backrest
- 29/18 . . . for retracting the cutting tool
- 29/20 . . . for placing same by shanks in sleeves of a turret
- 29/22 . . . for tool adjustment by means of shims or spacers
- 29/24 . Tool holders for a plurality of cutting tools, e.g. turrets
- 29/26 . . Tool holders in fixed position
- 29/28 . . Turrets manually adjustable about a vertical pivot
- 29/30 . . Turrets manually adjustable about a horizontal pivot
- 29/32 . . Turrets adjustable by power drive, i.e. turret heads
- 29/34 . . Turrets equipped with triggers for releasing the cutting tools

**31/00 Chucks; Expansion mandrels; Adaptations thereof for remote control** (devices for securing work or tools to spindles in general B23Q 3/12; rotary devices holding by magnetic or electrical force acting directly on work B23Q 3/152)

- 31/02 . Chucks
- 31/06 . . Features relating to the removal of tools or work; Accessories therefor
- 31/07 . . . Ejector wedges [5]
- 31/08 . . holding tools or work yieldably
- 31/10 . . characterised by the retaining or gripping devices or their immediate operating means

Group B23B 31/12 takes precedence over groups B23B 31/103 B23B 31/117. [5]

- 31/103 . . . Retention by pivotal elements, e.g. catches, pawls [5]
- 31/107 . . . Retention by laterally-acting detents, e.g. pins, screws, wedges; Retention by loose elements, e.g. balls [5]
- 31/11 . . . Retention by threaded connection [5]
- 31/113 . . . Retention by bayonet connection [5]
- 31/117 . . . Retention by friction only, e.g. using springs, resilient sleeves, tapers [5]
- 31/12 . . . Chucks with simultaneously-acting jaws, whether or not also individually adjustable
- 31/14 . . . . involving the use of centrifugal force
- 31/16 . . . . moving radially
- 31/163 . . . . . actuated by one or more spiral grooves [5]
- 31/165 . . . . . actuated by screw-and-nut mechanisms [5]
- 31/167 . . . . . actuated by oblique racks [5]
- 31/169 . . . . . actuated by toothed gearing (B23B 31/167 takes precedence) [5]
- 31/171 . . . . . actuated by a cam surface in a radial plane [5]
- 31/173 . . . . . actuated by coaxial conical surfaces (B23B 31/177 takes precedence) [5]
- 31/175 . . . . . actuated by levers moved by a coaxial control rod [5]
- 31/177 . . . . . actuated by the oblique surfaces of a coaxial control rod (B23B 31/167 takes precedence) [5]

- 31/18 . . . . pivotally movable in planes containing the axis of the chuck
- 31/19 . . . . moving parallel to the axis of the chuck
- 31/20 . . . . Longitudinally-split sleeves, e.g. collet chucks
- 31/22 . . . . Jaws in the form of balls
- 31/24 . . characterised by features relating primarily to remote control of the gripping means
- 31/26 . . . using mechanical transmission through the working-spindle
- 31/28 . . . using electric or magnetic means in the chuck
- 31/30 . . . using fluid-pressure means in the chuck
- 31/32 . . with jaws carried by diaphragm
- 31/34 . . with means enabling the workpiece to be reversed or tilted
- 31/36 . . with means for adjusting the chuck with respect to the working-spindle
- 31/38 . . with overload clutches
- 31/39 . . Jaw changers [5]
- 31/40 . Expansion mandrels
- 31/42 . . characterised by features relating primarily to remote control of the gripping means

**33/00 Drivers; Driving centres; Nose clutches, e.g. lathe dogs**

**Boring; Drilling** (for surgical purposes A61B 17/16; in metal using electric current B23H 9/14; by laser beam B23K 26/00; earth or rock drilling E21B) [3]

**35/00 Methods for boring or drilling, or for working essentially requiring the use of boring or drilling machines; Use of auxiliary equipment in connection with such methods**

**37/00 Boring by making use of vibrations of ultrasonic frequency** (working materials by subjecting the grinding tools or the abrading medium to vibration, e.g. grinding with ultrasonic frequency, B24B 1/04)

**39/00 General-purpose boring or drilling machines or devices; Sets of boring or drilling machines**

- 39/02 . Boring machines; Combined horizontal boring and milling machines
- 39/04 . Co-ordinate boring or drilling machines; Machines for making holes without previous marking
- 39/06 . . Equipment for positioning work
- 39/08 . . Devices for programme control
- 39/10 . characterised by the drive, e.g. by fluid-pressure drive, pneumatic power drive
- 39/12 . Radial drilling machines
- 39/14 . with special provision to enable the machine or the drilling or boring head to be moved into any desired position, e.g. with respect to immovable work
- 39/16 . Drilling machines with a plurality of working-spindles; Drilling automatons
- 39/18 . . Setting work or tool carrier along a straight index line
- 39/20 . . Setting work or tool carrier along a circular index line; Turret head drilling machines
- 39/22 . . with working-spindles in opposite headstocks
- 39/24 . . designed for programme control

## B23B

- 39/26 . in which the working position of tool or work is controlled by copying discrete points of a pattern (features of copying devices B23Q 35/02)
- 39/28 . Associations of only boring or drilling machines directed to a particular metal-working result (if not producing a particular metal-working result B23Q 39/00)
- 41/00 Boring or drilling machines or devices specially adapted for particular work; Accessories specially adapted therefor**
- 41/02 . for boring deep holes; Trepanning, e.g. of gun or rifle barrels
- 41/04 . for boring polygonal or other non-circular holes
- 41/06 . for boring conical holes
- 41/08 . for boring, drilling, or tapping holes in tubes under fluid or gas pressure (sealing features or operations, combined with placing branch parts F16L 41/04)
- 41/10 . for boring holes in steam boilers
- 41/12 . for forming working surfaces of cylinders, of bearings, e.g. in heads of driving rods, or of other engine parts
- 41/14 . for very small holes
- 41/16 . for boring holes with high-quality surface
- 43/00 Boring or drilling devices able to be attached to a machine tool, whether or not replacing an operative portion of the machine tool** (if specially adapted for particular work B23B 41/00)
- 43/02 . to the tailstock of a lathe
- 45/00 Hand-held or like portable drilling machines, e.g. drill guns; Equipment therefor** (details or components, e.g. casings, bodies, of portable power-driven tools not particularly related to the operation performed B25F 5/00) [4]
- 45/02 . driven by electric power
- 45/04 . driven by fluid-pressure or pneumatic power
- 45/06 . driven by man-power
- 45/08 . . for drilling rails or profiled stock
- 45/10 . . by using a fiddle bow or a belt
- 45/12 . . by using a ratchet brace
- 45/14 . Means for holding or guiding the drilling device or for securing it to the work (B23B 41/08 takes precedence); Thrust stands
- 45/16 . with superimposed percussive action (portable percussive machines with superimposed rotation B25D 16/00) [3]

### Components or accessories for boring or drilling machines

- 47/00 Constructional features of components specially designed for boring or drilling machines; Accessories therefor** (working-spindles, bearing sleeves therefor B23B 19/02; for machine tools in general B23Q)
- 47/02 . Drives; Gearings (B23B 39/10 takes precedence)

- 47/04 . . for rotating the working-spindle
- 47/06 . . . driven essentially by electrical means
- 47/08 . . . driven essentially by fluid-pressure or pneumatic power
- 47/10 . . . . equipped with turbines or other rotating machines
- 47/12 . . . . equipped with oscillating pistons
- 47/14 . . . Change-speed gearings; Reversing gearings
- 47/16 . . . Belt or chain drives
- 47/18 . . for feeding or retracting tool or work
- 47/20 . . . actuated essentially by electric power
- 47/22 . . . actuated essentially by fluid-pressure or pneumatic power
- 47/24 . . . Stops or feed interruption owing to fracture or overload of the boring or drilling tool
- 47/26 . Liftable or lowerable drill heads or headstocks; Balancing arrangements therefor
- 47/28 . Drill jigs for workpieces (equipment for setting or guiding the drill B23B 49/00)
- 47/30 . Additional gear with one or more working-spindles attachable to the main working-spindle and mounting the additional gear
- 47/32 . Arrangements for preventing the running-out of drills or fracture of drills when getting through
- 47/34 . Arrangements for removing chips out of the holes made; Chip-breaking arrangements attached to the tool
- 49/00 Measuring or gauging equipment on boring machines for positioning or guiding the drill; Devices for indicating failure of drills during boring; Centring devices for holes to be bored** (marking-out equipment B25H 7/00; measuring devices, gauges G01B)
- 49/02 . Boring templates or bushings
- 49/04 . Devices for boring or drilling centre holes in workpieces
- 49/06 . Devices for drilling holes in brake bands or brake linings
- 51/00 Tools for drilling machines**
- 51/02 . Twist drills
- 51/04 . for trepanning
- 51/05 . . for cutting discs from sheet [4]
- 51/06 . Drills with lubricating or cooling equipment
- 51/08 . Drills combined with tool parts or tools for performing additional working
- 51/10 . Bits for countersinking
- 51/12 . Adapters for drills or chucks; Tapered sleeves
- 51/14 . . Adapters for broken drills