

## SECTION B — PERFORMING OPERATIONS; TRANSPORTING

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

**B23B TURNING; BORING** (using an electrode which takes the place of a tool B23H, e.g. making holes B23H 9/14; working by laser beam B23K 26/00; arrangements for copying or controlling B23Q)

#### Subclass index

#### TURNING

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#### BORING, DRILLING

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DEVICES FOR ATTACHMENT TO ANY MACHINE TOOL.....43/00

#### Turning

<b>1/00</b>	<b>Methods for turning or working essentially requiring the use of turning-machines; Use of auxiliary equipment in connection with such methods</b>	3/16	• Turret lathes for turning individually-chucked workpieces
<b>3/00</b>	<b>General-purpose turning-machines or devices, e.g. centre lathes with feed rod and lead screw; Sets of turning-machines</b>	3/18	• • with horizontal working-spindle
3/02	• Small lathes, e.g. for toolmakers (specially designed for watchmakers G04D 3/00)	3/20	• • with vertical working-spindle
3/04	• Turning-machines in which the workpiece is rotated by means at a distance from the headstock	3/22	• Turning-machines or devices with rotary tool heads
3/06	• Turning-machines or devices characterised only by the special arrangement of constructional units (B23Q 37/00 takes precedence; structural features of details, <u>see</u> the relevant groups; such features of general applicability B23Q)	3/24	• • the tools of which do not perform a radial movement; Rotary tool heads therefor
3/08	• Turning-machines characterised by the use of faceplates	3/26	• • the tools of which perform a radial movement; Rotary tool heads thereof
3/10	• • with the faceplate horizontal, i.e. vertical boring and turning machines	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)
3/12	• • with the faceplate vertical, i.e. face lathes	3/30	• Turning-machines with two or more working-spindles, e.g. in fixed arrangement
3/14	• • Mountings or drives of faceplates	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, chucking or guiding stock for turning machines**

- 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)

<b>27/00</b>	<b>Tools for turning or boring machines</b> (for drilling machines B23B 51/00); <b>Tools of a similar kind in general; Accessories therefor</b>	<b>Note(s)</b> Group B23B 31/12 takes precedence over groups B23B 31/103-B23B 31/117.
27/02	• Cutting tools with straight main part and cutting edge at an angle (B23B 27/04-B23B 27/08 take precedence)	31/103 • • • Retention by pivotal elements, e.g. catches, pawls [5]
27/04	• Cutting-off tools (B23B 27/08 takes precedence)	31/107 • • • Retention by laterally-acting detents, e.g. pins, screws, wedges; Retention by loose elements, e.g. balls [5]
27/06	• Profile cutting tools, i.e. forming-tools	
27/08	• Cutting tools with blade- or disc-like main parts	31/11 • • • Retention by threaded connection [5]
27/10	• Cutting tools with special provision for cooling	31/113 • • • Retention by bayonet connection [5]
27/12	• • with a continuously-rotated circular cutting edge; Holders therefor	31/117 • • • Retention by friction only, e.g. using springs, resilient sleeves, tapers [5]
27/14	• Cutting tools of which the bits or tips are of special material	31/12 • • • Chucks with simultaneously-acting jaws, whether or not also individually adjustable
27/16	• • with exchangeable cutting bits, e.g. able to be clamped	31/14 • • • • involving the use of centrifugal force
27/18	• • with cutting bits or tips rigidly mounted, e.g. by brazing	31/16 • • • • moving radially
27/20	• • with diamond bits	31/163 • • • • • actuated by one or more spiral grooves [5]
27/22	• Cutting tools with chip-breaking equipment	31/165 • • • • • actuated by screw-and-nut mechanisms [5]
27/24	• Knurling tools	31/167 • • • • • actuated by oblique racks [5]
<b>29/00</b>	<b>Holders for non-rotary cutting tools</b> (B23B 27/12 takes precedence); <b>Boring bars or boring heads; Accessories for tool holders</b>	31/169 • • • • • actuated by toothed gearing (B23B 31/167 takes precedence) [5]
29/02	• Boring bars	31/171 • • • • • actuated by a cam surface in a radial plane [5]
29/03	• Boring heads	31/173 • • • • • actuated by coaxial conical surfaces (B23B 31/177 takes precedence) [5]
29/034	• • with tools moving radially, e.g. for making chamfers or undercuttings [4]	31/175 • • • • • actuated by levers moved by a coaxial control rod [5]
29/04	• Tool holders for a single cutting tool	31/177 • • • • • actuated by the oblique surfaces of a coaxial control rod (B23B 31/167 takes precedence) [5]
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	31/18 • • • • • pivotally movable in planes containing the axis of the chuck
29/10	• • • with adjustable counterbase for the cutting tool	31/19 • • • • • moving parallel to the axis of the chuck
29/12	• • Special arrangements on tool holders	31/20 • • • • • Longitudinally-split sleeves, e.g. collet chucks
29/14	• • • affording a yielding support of the cutting tool, e.g. by spring clamping	31/22 • • • • • Jaws in the form of balls
29/16	• • • for supporting the workpiece in a backrest	31/24 • • characterised by features relating primarily to remote control of the gripping means
29/18	• • • for retracting the cutting tool	31/26 • • • using mechanical transmission through the working-spindle
29/20	• • • for placing same by shanks in sleeves of a turret	31/28 • • • using electric or magnetic means in the chuck
29/22	• • • for tool adjustment by means of shims or spacers	31/30 • • • using fluid-pressure means in the chuck
29/24	• Tool holders for a plurality of cutting tools, e.g. turrets	31/32 • • with jaws carried by diaphragm
29/26	• • Tool holders in fixed position	31/34 • • with means enabling the workpiece to be reversed or tilted
29/28	• • Turrets manually adjustable about a vertical pivot	31/36 • • with means for adjusting the chuck with respect to the working-spindle
29/30	• • Turrets manually adjustable about a horizontal pivot	31/38 • • with overload clutches
29/32	• • Turrets adjustable by power drive, i.e. turret heads	31/39 • • Jaw changers [5]
29/34	• • Turrets equipped with triggers for releasing the cutting tools	31/40 • Expansion mandrels
<b>31/00</b>	<b>Chucks; Expansion mandrels; Adaptations thereof for remote control</b> (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)	31/42 • • characterised by features relating primarily to remote control of the gripping means
31/02	• Chucks	<b>33/00 Drivers; Driving centres; Nose clutches, e.g. lathe dogs</b>
31/06	• • Features relating to the removal of tools or work; Accessories therefor	<b>Boring; Drilling [3]</b>
31/07	• • • Ejector wedges [5]	<b>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</b>
31/08	• • holding tools or work yieldably	
31/10	• • characterised by the retaining or gripping devices or their immediate operating means	

- 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
- 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