

CPC**COOPERATIVE PATENT CLASSIFICATION****B23Q**

DETAILS, COMPONENTS, OR ACCESSORIES FOR MACHINE TOOLS, e.g. ARRANGEMENTS FOR COPYING OR CONTROLLING ([tools of the kind used in lathes or boring machines B23B 27/00](#)); **MACHINE TOOLS IN GENERAL CHARACTERISED BY THE CONSTRUCTION OF PARTICULAR DETAILS OR COMPONENTS; COMBINATIONS OR ASSOCIATIONS OF METAL-WORKING MACHINES, NOT DIRECTED TO A PARTICULAR RESULT**

NOTES

1. In this subclass, groups designating parts of machine tools cover machine tools characterised by constructional features of such parts.
2. In this subclass, the following terms or expressions are used with the meanings indicated:
 - "controlling" means influencing a variable in any way, e.g. changing its direction or its value (including changing it to or from zero), maintaining it constant, limiting its range of variation;
 - "regulation" means maintaining a variable automatically at a desired value or within a desired range of values. The desired value or range may be fixed, or manually varied, or may vary with time according to a predetermined "programme" or according to variation of another variable. Regulation is a form of control;
 - "automatic control" is often used in the art as a synonym for regulation.
3. Attention is drawn to the Notes following the title of class [B23](#).

B23Q 1/00

Members which are comprised in the general build-up of a form of machine, particularly relatively large fixed members ([B23Q 37/00 takes precedence](#))

B23Q 1/0009

- {Energy-transferring means or control lines for movable machine parts; Control panels or boxes; Control parts ([control handles for driving or feeding mechanisms B23Q 5/54](#))}

B23Q 1/0018

- . {comprising hydraulic means}

B23Q 1/0027

- . . {between moving parts between which an uninterrupted energy-transfer connection is maintained}

B23Q 1/0036

- . . . {one of those parts being a tool}

B23Q 1/0045

- . {Control panels or boxes}

B23Q 1/0054

- {Means for adjusting the position of a machine tool with respect to its supporting surface ([B23Q 1/262 takes precedence](#))}

B23Q 1/0063

- {Connecting non-slidable parts of machine tools to each other}

B23Q 1/0072

- . {using a clamping opening for receiving an insertion bolt or nipple}

B23Q 1/0081

- . {using an expanding clamping member insertable in a receiving hole}

B23Q 1/009

- . . {the receiving hole being cylindrical or conical}

B23Q 1/01

- Frames, beds, pillars or like members; Arrangement of ways

B23Q 1/012

- . {Portals}

B23Q 1/015

- . {Frames, beds, pillars}

- B23Q 1/017 . . {Arrangements of ways}
- B23Q 1/03 . Stationary work or tool supports ([B23Q 1/70](#) takes precedence; auxiliary tables [B23Q 1/74](#); tailstocks [B23B 23/00](#))
- B23Q 1/032 . . {characterised by properties of the support surface}
- B23Q 1/035 . . {with an array of longitudinally movable rods defining a reconfigurable support surface}
- B23Q 1/037 . . {comprising series of support elements whose relative distance is adjustable}
- B23Q 1/25 . Movable or adjustable work or tool supports
- B23Q 1/26 . . characterised by constructional features relating to the co-operation of relatively movable members; Means for preventing relative movement of such members {(bearings for linearly moving parts [F16C 29/00](#))}
- B23Q 1/262 . . . {with means to adjust the distance between the relatively slidable members (if the adjusting means depends on the position of the slidable members [B23Q 1/30](#))}
- B23Q 1/265 {between rotating members}
- B23Q 1/267 . . . {with means to prevent skewness between the relatively slidable members}
- B23Q 1/28 . . . Means for securing sliding members in any desired position
- B23Q 1/282 {co-operating with means to adjust the distance between the relatively slidable members}
- B23Q 1/285 {for securing two or more members simultaneously or selectively}
- B23Q 1/287 {using a hydraulically controlled membrane acting directly upon a sliding member}
- B23Q 1/30 . . . controlled in conjunction with the feed mechanism
- B23Q 1/32 . . . Relative movement obtained by co-operating spherical surfaces, e.g. ball-and-socket joints
- B23Q 1/34 . . . Relative movement obtained by use of deformable elements, e.g. piezo-electric, magnetostrictive, elastic or thermally-dilatable elements (sensitive elements capable of producing movement or displacement for purposes not limited to measurement [G12B 1/00](#))
- B23Q 1/36 Springs
- B23Q 1/38 . . . using fluid bearings or fluid cushion supports
- B23Q 1/385 {in which the thickness of the fluid-layer is adjustable}
- B23Q 1/40 . . . using ball, roller or wheel arrangements
- B23Q 1/42 . . . using T-, V-, dovetail-section or like guides ([B23Q 1/40](#) takes precedence)

NOTES

1. In groups [B23Q 1/44](#) to [B23Q 1/62](#), the following expressions are used with the meaning indicated:
 - "sliding pair" means a pair consisting of two elements operating in such a way that only straight line movement between both elements is possible;
 - "rotating pair" means a pair consisting of two elements operating in such a way that only rotary movement between both elements is possible;

B23Q 1/42
(continued)

- "screw pair" means a pair consisting of two elements operating in such a way as to produce simultaneous rotation and axial translation between both elements.

2. In groups [B23Q 1/44](#) to [B23Q 1/62](#), where more than one pair of elements is provided on the same axis for the same kind of movement, the pairs are regarded as a single pair for the purposes of classification.

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| B23Q 1/44 | . . using particular mechanisms (B23Q 1/26 takes precedence) |
| B23Q 1/445 | . . . {using a first carriage for a smaller workspace mounted on a second carriage for a larger workspace, both carriages moving on the same axes} |
| B23Q 1/46 | . . . with screw pairs |
| B23Q 1/48 | . . . with sliding pairs and rotating pairs (B23Q 1/46 takes precedence) |
| B23Q 1/4804 | {a single rotating pair followed perpendicularly by a single sliding pair} |
| B23Q 1/4809 | {followed perpendicularly by a single rotating pair} |
| B23Q 1/4814 | {followed parallelly by a single rotating pair} |
| B23Q 1/4819 | {followed perpendicularly by a single sliding pair} |
| B23Q 1/4823 | {followed parallelly by a single sliding pair} |
| B23Q 1/4828 | {a single rotating pair followed parallelly by a single sliding pair} |
| B23Q 1/4833 | {followed perpendicularly by a single rotating pair} |
| B23Q 1/4838 | {followed parallelly by a single rotating pair} |
| B23Q 1/4842 | {followed perpendicularly by a single sliding pair} |
| B23Q 1/4847 | {followed parallelly by a single sliding pair} |
| B23Q 1/4852 | {a single sliding pair followed perpendicularly by a single rotating pair} |
| B23Q 1/4857 | {followed perpendicularly by a single rotating pair} |
| B23Q 1/4861 | {followed parallelly by a single rotating pair} |
| B23Q 1/4866 | {followed perpendicularly by a single sliding pair} |
| B23Q 1/4871 | {followed parallelly by a single sliding pair} |
| B23Q 1/4876 | {a single sliding pair followed parallelly by a single rotating pair} |
| B23Q 1/488 | {followed perpendicularly by a single rotating pair} |
| B23Q 1/4885 | {followed parallelly by a single rotating pair} |
| B23Q 1/489 | {followed perpendicularly by a single sliding pair} |
| B23Q 1/4895 | {followed parallelly by a single sliding pair} |
| B23Q 1/50 | . . . with rotating pairs only, {the rotating pairs being the first two elements of the mechanism} |
| B23Q 1/52 | a single rotating pair |
| B23Q 1/522 | {which is perpendicular to the working surface} |
| B23Q 1/525 | {which is parallel to the working surface} |
| B23Q 1/527 | {with a ring or tube in which a workpiece is fixed coaxially to the degree of freedom} |
| B23Q 1/54 | two rotating pairs only |

B23Q 1/5406	. . . . .	{a single rotating pair followed perpendicularly by a single rotating pair (B23Q 1/545 takes precedence)}
B23Q 1/5412	. . . . .	{followed perpendicularly by a single rotating pair}
B23Q 1/5418	. . . . .	{followed parallelly by a single rotating pair}
B23Q 1/5425	. . . . .	{followed perpendicularly by a single sliding pair}
B23Q 1/5431	. . . . .	{followed parallelly by a single sliding pair}
B23Q 1/5437	. . . . .	{and in which the degree of freedom, which belongs to the working surface, is perpendicular to this surface}
B23Q 1/5443	. . . . .	{and in which the degree of freedom, which belongs to the working surface, is parallel to this surface}
B23Q 1/545	. . . . .	{comprising spherical surfaces}
B23Q 1/5456	. . . . .	{with one supplementary rotating pair}
B23Q 1/5462	. . . . .	{with one supplementary sliding pair}
B23Q 1/5468	. . . . .	{a single rotating pair followed parallelly by a single rotating pair}
B23Q 1/5475	. . . . .	{followed perpendicularly by a single rotating pair}
B23Q 1/5481	. . . . .	{followed parallelly by a single rotating pair}
B23Q 1/5487	. . . . .	{followed perpendicularly by a single sliding pair}
B23Q 1/5493	. . . . .	{followed parallelly by a single sliding pair}
B23Q 1/56	. . .	with sliding pairs only, {the sliding pairs being the first two elements of the mechanism}
B23Q 1/58	. . . . .	a single sliding pair
B23Q 1/585	. . . . .	{perpendicular to the working surface}
B23Q 1/60	. . . . .	two sliding pairs only, {the sliding pairs being the first two elements of the mechanism}
B23Q 1/601	. . . . .	{a single sliding pair followed parallelly by a single sliding pair}
B23Q 1/603	. . . . .	{followed perpendicularly by a single rotating pair}
B23Q 1/605	. . . . .	{followed parallelly by a single rotating pair}
B23Q 1/606	. . . . .	{followed perpendicularly by a single sliding pair}
B23Q 1/608	. . . . .	{followed parallelly by a single sliding pair}
B23Q 1/62	. . . . .	with perpendicular axes, e.g. cross-slides
B23Q 1/621	. . . . .	{a single sliding pair followed perpendicularly by a single sliding pair}
B23Q 1/623	. . . . .	{followed perpendicularly by a single rotating pair}
B23Q 1/625	. . . . .	{followed parallelly by a single rotating pair}
B23Q 1/626	. . . . .	{followed perpendicularly by a single sliding pair}
B23Q 1/628	. . . . .	{followed parallelly by a single sliding pair}
B23Q 1/64	. .	characterised by the purpose of the movement (indexing equipment B23Q 16/02)
B23Q 1/66	. . .	Worktables interchangeably movable into operating positions
B23Q 1/68	. . .	for withdrawing tool or work during reverse movement

- B23Q 1/70
 - Stationary or movable members for carrying working-spindles for attachment of tools or work {(B23Q 1/01 takes precedence; designed to be moved by using particular mechanisms B23Q 1/44)}
- B23Q 1/703
 - • {Spindle extensions}
- B23Q 1/706
 - • {Movable members, e.g. swinging arms}
- B23Q 1/72
 - Auxiliary arrangements; Interconnections between auxiliary tables and movable machine elements {(independent of machine tool B23Q 3/105)}
- B23Q 1/74
 - • Auxiliary tables
- B23Q 1/76
 - • Steadies; Rests {(B23B 13/126 takes precedence; steadies combined with cutting tool holders B23B 29/16)}
- B23Q 1/763
 - • • {Rotating steadies or rests}
- B23Q 1/766
 - • • {Steadies or rests moving together with the tool support}
- B23Q 3/00**

Devices holding, supporting, or positioning work or tools, of a kind normally removable from the machine (work-tables or other parts, e.g. faceplates, normally not incorporating means for securing work B23Q 1/00; automatic position control B23Q 15/00; rotary tool heads for turning-machines B23B 3/24, B23B 3/26; non-driven tool holders B23B 29/00; general features of turrets B23B 29/24; tools or bench devices for fastening, connecting, disengaging or holding B25B)
- B23Q 3/002
 - {Means to press a workpiece against a guide}
- B23Q 3/005
 - {Guides for workpieces}
- B23Q 3/007
 - • {provided with measuring means allowing the positioning of the guides}
- B23Q 3/02
 - for mounting on a work-table, tool-slide, or analogous part (B23Q 3/15 takes precedence)
- B23Q 3/04
 - • adjustable in inclination
- B23Q 3/06
 - • Work-clamping means
- B23Q 3/061
 - • • {adapted for holding a plurality of workpieces}
- B23Q 3/062
 - • • {adapted for holding workpieces having a special form or being made from a special material}
- WARNING**

Subgroups B23Q 3/063 - B23Q 3/065 are not complete, due to a reorganisation in progress; see also B23Q 3/062
- B23Q 3/063
 - • • • {for holding turbine blades}
- B23Q 3/064
 - • • • {for holding elongated workpieces, e.g. pipes, bars or profiles}
- B23Q 3/065
 - • • • {for holding workpieces being specially deformable, e.g. made from thin-walled or elastic material}
- B23Q 3/066
 - • • {Bench vices}
- B23Q 3/067
 - • • {Blocks with collet chucks}
- B23Q 3/068
 - • • • {fluid-operated}
- B23Q 3/069
 - • • {for pressing workpieces against a work-table}
- B23Q 3/08
 - • • other than mechanically-actuated {(B23Q 3/061, B23Q 3/066, and B23Q 3/067 take precedence)}
- B23Q 3/082
 - • • • {hydraulically actuated}
- B23Q 3/084
 - • • • {using adhesive means}

- B23Q 3/086 {using a solidifying liquid, e.g. with freezing, setting or hardening means}
- B23Q 3/088 {using vacuum means}
- B23Q 3/10 . . Auxiliary devices, e.g. bolsters, extension members {(devices for holding usually unilaterally-held tools at a second side, devices supporting a workpiece against cutting forces [B23Q 1/76](#))}
- B23Q 3/101 . . . {for supporting a workpiece during its transport to or from a tool holder}
- B23Q 3/102 . . . {for fixing elements in slots}
- B23Q 3/103 . . . {Constructional elements used for constructing work holders}
- B23Q 3/104 . . . {V-blocks}
- B23Q 3/105 . . . {Auxiliary supporting devices independent of the machine tool}
- B23Q 3/106 . . . {extendable members, e.g. extension members}
- B23Q 3/107 {with positive adjustment means}
- B23Q 3/108 {with non-positive adjustment means}
- B23Q 3/12 . . for securing to a spindle in general ([B23Q 3/152](#) takes precedence; chucks [B23B 31/02](#))
- B23Q 3/14 . . Mandrels in general ([expansion mandrels B23B 31/40](#))
- B23Q 3/15 . . Devices for holding work using magnetic or electric force acting directly on the work
- B23Q 3/152 . . Rotary devices
- B23Q 3/154 . . Stationary devices
- B23Q 3/1543 . . . {using electromagnets}
- B23Q 3/1546 . . . {using permanent magnets}
- B23Q 3/155 . . Arrangements for automatic insertion or removal of tools, {e.g. combined with manual handling ([B23Q 7/046](#) takes precedence)}
- B23Q 3/15506 . . {the tool being inserted in a tool holder directly from a storage device (without transfer device)}
- B23Q 3/15513 . . {the tool being taken from a storage device and transferred to a tool holder by means of transfer devices}
- B23Q 3/1552 . . {parts of devices for automatically inserting or removing tools}
- B23Q 3/15526 . . . {Storage devices; Drive mechanisms therefor}
- B23Q 3/15533 {combined with manual tool transfers}
- B23Q 3/1554 . . . {Transfer mechanisms and their drive mechanism}
- B23Q 3/15546 . . . {Devices for recognizing tools in a storage device (coding devices)}
- B23Q 3/15553 . . . {Tool holder and tensioning device therefor (also bringing the spindle in a given angular position [B23Q 5/20](#), [B23C 5/26](#))}
- B23Q 3/1556 . . {of non-rotary tools (in combination with rotary tools: [B23Q 3/15506](#), [B23Q 3/15513](#))}
- B23Q 3/15566 . . . {the tool being inserted in a tool holder directly from a storage device, i.e. without using transfer devices}
- B23Q 3/15573 . . . {the tool being taken from a storage device and transferred to a tool holder by means of transfer devices}
- B23Q 2003/1558 . . {of multi-spindles}

- B23Q 2003/15586 . . {of tools in turrets}
- B23Q 2003/15593 . . {Optimising tool changing time or capacity in tool storage}
- B23Q 3/157 . . of rotary tools {(in combination with non-rotary tools [B23Q 3/15506](#), [B23Q 3/15513](#))}
- B23Q 3/15706 . . . {a single tool being inserted in a spindle directly from a storage device, i.e. without using transfer devices ([B23Q 3/15786](#) takes precedence)}
- B23Q 3/15713 . . . {a transfer device taking a single tool from a storage device and inserting it in a spindle ([B23Q 3/15793](#) takes precedence)}
- B23Q 3/1572 {the storage device comprising rotating or circulating storage means, e.g. discs, tables, drums, chains, belts}
- B23Q 3/15726 {the storage means rotating or circulating in a plane parallel to the axis of the spindle}
- B23Q 3/15733 {the axis of the stored tools being arranged in the rotating or circulating plane of the storage means}
- B23Q 3/1574 {the axis of the stored tools being arranged perpendicularly to the rotating or circulating plane of the storage means}
- B23Q 3/15746 {the storage means comprising pivotable tool storage elements}
- B23Q 3/15753 {the storage means rotating or circulating in a plane perpendicular to the axis of the spindle}
- B23Q 3/1576 {the axis of the stored tools being arranged in the rotating or circulating plane of the storage means}
- B23Q 3/15766 {the axis of the stored tools being arranged perpendicularly to the rotating or circulating plane of the storage means}
- B23Q 3/15773 . . . {a transfer device taking the tool from a storage device and passing it on to other transfer devices, which insert it in a spindle}
- B23Q 3/1578 . . . {for tool transfer in a machine tool with a horizontal and a vertical spindle; for tool transfer in a machine tool with a spindle having variable orientation}
- B23Q 3/15786 . . . {a plurality of tools being inserted simultaneously in a plurality of spindles directly from a storage device, i.e. without using transfer devices}
- B23Q 3/15793 . . . {a transfer device simultaneously taking a plurality of tools and inserting them simultaneously in a plurality of spindles}
- B23Q 3/16 . . controlled in conjunction with the operation of the tool
- B23Q 3/18 . . for positioning only
- B23Q 3/183 . . {Centering devices}
- B23Q 3/186 . . {Aligning devices}
- B23Q 5/00** **Driving or feeding mechanisms; Control arrangements therefor** (automatic control [B23Q 15/00](#); copying [B23Q 33/00](#), [B23Q 35/00](#); specially adapted for boring or drilling machines [B23B 39/10](#), [B23B 47/00](#); {numerical programme-control of machine tools [G05B 19/18](#)})
- B23Q 2005/005 . . {Driving or feeding mechanisms with a low and a high speed mode}
- B23Q 5/02 . . Driving main working members
- B23Q 5/027 . . . reciprocating members
- B23Q 5/033 driven essentially by fluid pressure

- B23Q 5/04 . . . rotary shafts, e.g. working-spindles
- B23Q 5/041 {Spindle-reversing devices}
- B23Q 5/043 {Accessories for spindle drives}
- B23Q 5/045 {Angle drives}
- B23Q 5/046 {Offset spindle drives}
- B23Q 5/048 {Speed-changing devices}
- B23Q 5/06 driven essentially by fluid pressure or pneumatic power
- B23Q 5/08 electrically controlled
- B23Q 5/10 driven essentially by electrical means
- B23Q 5/12 Mechanical drives with means for varying the speed ratio
- B23Q 5/14 step-by-step
- B23Q 5/142 {mechanically-operated}
- B23Q 5/145 {fluid-operated}
- B23Q 5/147 {electrically-operated}
- B23Q 5/16 infinitely-variable
- B23Q 5/162 {mechanically-operated}
- B23Q 5/165 {fluid-operated}
- B23Q 5/167 {electrically-operated}
- B23Q 5/18 Devices for preselecting speed of working-spindle
- B23Q 5/20 Adjusting or stopping working-spindles in a predetermined position
- B23Q 5/22 . . . Feeding members carrying tools or work
- B23Q 5/225 {not mechanically connected to the main drive, e.g. with separate motors
(connected to main drive through servomotors [B23Q 5/36](#))}
- B23Q 5/26 . . . Fluid-pressure drives
- B23Q 5/261 {for spindles}
- B23Q 5/263 {with means to control the feed rate by controlling the fluid flow}
- B23Q 5/265 {this regulation depending upon the position of the tools or work}
- B23Q 5/266 {with means to control the feed rate by controlling the fluid flow}
- B23Q 5/268 {depending upon the position of the tool or work}
- B23Q 5/28 . . . Electric drives
- B23Q 5/32 . . . Feeding working-spindles ([feeding working-spindle supports B23Q 5/34](#))
- B23Q 5/323 {cam-operated}
- B23Q 5/326 {screw-operated}
- B23Q 5/34 . . . Feeding other members supporting tools or work, e.g. saddles, tool-slides,
through mechanical transmission
- B23Q 5/341 {cam-operated}
- B23Q 5/342 {Cam followers ([see also B23Q 35/26](#))}
- B23Q 5/344 {Cams ([see also B23Q 35/42](#))}
- B23Q 5/345 {Cam assembly ([see also B23Q 35/46](#))}
- B23Q 5/347 {controlled in conjunction with tool or work indexing means}

- B23Q 5/348 . . . {by means of clutches}
 - B23Q 5/36 . . . in which a servomotor forms an essential element
 - B23Q 5/38 . . . feeding continuously
 - B23Q 5/385 {using a gear and rack mechanism or a friction wheel co-operating with a rail}
 - B23Q 5/40 by feed shaft, e.g. lead screw
 - B23Q 5/402 {in which screw or nut can both be driven}
 - B23Q 5/404 {Screw bearings therefor}
 - B23Q 5/406 {with means for meshing screw and nut}
 - B23Q 5/408 {Nut bearings therefor}
 - B23Q 5/42 Mechanism associated with headstock
 - B23Q 5/44 Mechanism associated with the moving member
 - B23Q 5/46 with variable speed ratio
 - B23Q 5/48 by use of toothed gears
 - B23Q 5/50 . . . feeding step-by-step
 - B23Q 5/52 . . Limiting feed movement {(B23Q 11/04 takes precedence)}
 - B23Q 5/54 . Arrangements or details not restricted to group [B23Q 5/02](#) or group [B23Q 5/22](#) respectively, {e.g. control handles}
 - B23Q 5/56 . . Preventing backlash
 - B23Q 5/58 . . Safety devices {(protecting the operator [B23Q 11/0089](#))}
 - B23Q 5/585 . . . {Preventing the misuse of accessories, e.g. chuck keys}
- B23Q 7/00** Arrangements for handling work specially combined with or arranged in, or specially adapted for use in connection with, machine tools, e.g. for conveying, loading, positioning, discharging, sorting (incorporated in working-spindles [B23B 13/00](#))
- B23Q 7/001 . {Lateral transport of long workpieces}
 - B23Q 7/002 . {Screw or rotary spiral conveyers ([B23Q 7/1426](#) takes precedence)}
 - B23Q 7/003 . {Cyclically moving conveyers ([B23Q 7/1426](#) takes precedence)}
 - B23Q 7/005 . {Lifting devices}
 - B23Q 7/006 . {Ejectors}
 - B23Q 7/007 . {Flying working devices}
 - B23Q 7/008 . {Catching devices ([B23Q 7/12](#) takes precedence)}
 - B23Q 7/02 . by means of drums or rotating tables or discs
 - B23Q 7/03 . by means of endless chain conveyers ({[B23Q 7/1447](#),} [B23Q 7/16](#) take precedence)
 - B23Q 7/035 . . {on which work holders are fixed}
 - B23Q 7/04 . by means of grippers {(B23Q 7/1494 takes precedence)}
 - B23Q 7/041 . . {step by step}
 - B23Q 7/042 . . . {for the axial transport of long workpieces ([B23B 13/022](#) takes precedence)}
 - B23Q 7/043 . . {Construction of the grippers ([B23Q 7/048](#) takes precedence)}

- B23Q 7/045 . . {using a tool holder as a work-transporting gripper}
- B23Q 7/046 . . {Handling workpieces or tools}
- B23Q 7/047 . . {the gripper supporting the workpiece during machining}
- B23Q 7/048 . . {Multiple gripper units}
- B23Q 7/05 . . by means of roller-ways ({[B23Q 7/1468](#), [B23Q 7/16](#) take precedence})
- B23Q 7/055 . . {some of the rollers being driven}
- B23Q 7/06 . . by means of pushers ({[B23Q 7/1457](#), [B23Q 7/1489](#), [B23B 13/02](#), [B23B 13/12](#) take precedence})
- B23Q 7/08 . . by means of slides or chutes
- B23Q 7/10 . . by means of magazines
- B23Q 7/103 . . {for flat material}
- B23Q 7/106 . . {with means to deliver a certain quantity ([B23Q 7/103](#) takes precedence)}
- B23Q 7/12 . . Sorting arrangements
- B23Q 7/14 . . co-ordinated in production lines
- B23Q 7/1405 . . {with a series disposition of similar working devices}
- B23Q 7/141 . . {with a series disposition of different working devices and with the axial transport for long workpieces of which a plurality of final products are made}
- B23Q 7/1415 . . {with a series disposition of working devices not corresponding with the sequence of the working}
- B23Q 7/1421 . . {with a parallel disposition of working devices}
- B23Q 7/1426 . . {with work holders not rigidly fixed to the transport devices ([B23Q 7/005](#), [B23Q 7/035](#) take precedence)}
- B23Q 7/1431 . . . {Work holder changers ([B23Q 7/1442](#) takes precedence)}
- B23Q 7/1436 . . . {using self-propelled work holders}
- B23Q 7/1442 . . . {using carts carrying work holders}
- B23Q 7/1447 . . . {using endless conveyers}
- B23Q 7/1452 {comprising load-supporting surfaces}
- B23Q 7/1457 {comprising an impeller or a series of impellers}
- B23Q 7/1463 {using rotary driving means}
- B23Q 7/1468 {comprising rollers or cogwheels, or pinions or the like}
- B23Q 7/1473 {comprising screw conveyers}
- B23Q 7/1478 {using a conveyer comprising cyclically-moving means}
- B23Q 7/1484 {with carrier means}
- B23Q 7/1489 {with impeller means}
- B23Q 7/1494 {using grippers}
- B23Q 7/16 . . Loading work on to conveyers; Arranging work on conveyers, e.g. varying spacing between individual workpieces
- B23Q 7/165 . . {Turning devices}
- B23Q 7/18 . . Orientating work on conveyers

B23Q 9/00	Arrangements for supporting or guiding portable metal-working machines or apparatus (for tapping pipes B23B 41/00 { F16L 41/04 }; specially designed for drilling B23B 45/00 { B25H 1/0021 })
B23Q 9/0007	<ul style="list-style-type: none"> • {Portable machines comprising means for their guidance or support directly on the workpiece}
B23Q 9/0014	<ul style="list-style-type: none"> • {Portable machines provided with or cooperating with guide means supported directly by the workpiece during action}
B23Q 9/0021	<ul style="list-style-type: none"> • . {the tool being guided in a circular path}
B23Q 9/0028	<ul style="list-style-type: none"> • . {the guide means being fixed only on the machine}
B23Q 9/0035	<ul style="list-style-type: none"> • . . {and being capable of guiding the tool in a circular path}
B23Q 9/0042	<ul style="list-style-type: none"> • . {the guide means being fixed only on the workpiece}
B23Q 9/005	<ul style="list-style-type: none"> • . . {angularly adjustable}
B23Q 9/0057	<ul style="list-style-type: none"> • . . {and being capable of guiding the tool in a circular path}
B23Q 9/0064	<ul style="list-style-type: none"> • {Portable machines cooperating with guide means not supported by the workpiece during working}
B23Q 9/0071	<ul style="list-style-type: none"> • . {the guide means being fixed to the machine}
B23Q 9/0078	<ul style="list-style-type: none"> • . {the guide means being fixed to a support}
B23Q 9/0085	<ul style="list-style-type: none"> • . . {Angularly adjustable}
B23Q 9/0092	<ul style="list-style-type: none"> • . . {Workpieces angularly adjustable relative to the support}
B23Q 9/02	<ul style="list-style-type: none"> • for securing machines or apparatus to work-pieces, or other parts, of particular shape, e.g. to beams of particular cross-section

Accessories

B23Q 11/00	Accessories fitted to machine tools for keeping tools or parts of the machine in good working condition or for cooling work {(accessories specially designed for sawing machines or sawing devices B23D 59/00); Safety devices specially combined with or arranged in, or specially adapted for use in connection with, machine tools (in respect of boring or drilling machines B23B 47/32 takes precedence; safety devices in general F16P)}
B23Q 11/0003	<ul style="list-style-type: none"> • {Arrangements for preventing undesired thermal effects on tools or parts of the machine (B23Q 11/10, B23Q 11/12 and B23Q 11/14 take precedence)}
B23Q 11/0007	<ul style="list-style-type: none"> • . {by compensating occurring thermal dilations (B23Q 15/18 takes precedence)}
B23Q 11/001	<ul style="list-style-type: none"> • {Arrangements compensating weight or flexion on parts of the machine (adjustment of the fluid layer in fluid bearings or cushions depending upon the position of a weight B23Q 1/385)}
B23Q 11/0014	<ul style="list-style-type: none"> • . {using static reinforcing elements, e.g. pre-stressed ties}
B23Q 11/0017	<ul style="list-style-type: none"> • . {compensating the weight of vertically moving elements, e.g. by balancing liftable machine parts (B23B 47/26 takes precedence)}
	<u>WARNING</u>
	Subgroups B23Q 11/0017 and B23Q 11/0021 are not complete, due to a reorganisation in progress; see also B23Q 11/001
B23Q 11/0021	<ul style="list-style-type: none"> • . . {the elements being rotating or pivoting}

- B23Q 11/0025 . . . {using resilient means, e.g. springs, hydraulic dampers}
- B23Q 11/0028 . . {by actively reacting to a change of the configuration of the machine (B23Q 15/00 takes precedence)}
- B23Q 11/0032 . {Arrangements for preventing or isolating vibrations in parts of the machine (B23B 29/022, B23D 47/005 take precedence; means for damping or suppressing vibrations, in general F16F)}
- B23Q 11/0035 . . {by adding or adjusting a mass, e.g. counterweights}
- B23Q 11/0039 . . {by changing the natural frequency of the system or by continuously changing the frequency of the force which causes the vibration}
- B23Q 11/0042 . {Devices for removing chips (B23Q 11/02, B23Q 11/0875 take precedence)}
- B23Q 11/0046 . . {by sucking}
- B23Q 11/005 . . {by blowing}
- B23Q 11/0053 . . {using the gravity force}
- B23Q 11/0057 . . {outside the working area}
- B23Q 11/006 . . {by sucking and blowing simultaneously}
- B23Q 11/0064 . . {by using a magnetic or electric field}
- B23Q 11/0067 . . {chip containers located under a machine or under a chip conveyor}
- B23Q 11/0071 . . {dust collectors for hand tools}
- B23Q 11/0075 . . {for removing chips or coolant from the workpiece after machining}
- B23Q 11/0078 . {Safety devices protecting the operator, e.g. against accident or noise (protecting the machine tool B23Q 5/58; protecting people, in general F16P 1/00, F16P 3/00)}

WARNING

Subgroups B23Q 11/0082 - B23Q 11/0089 are not complete, due to a reorganisation in progress; see also B23Q 11/0078

- B23Q 11/0082 . . {by determining whether the operator is in a dangerous position (B23Q 17/2438 takes precedence)}
- B23Q 11/0085 . . {by determining whether the machine tool is in a dangerous configuration}
- B23Q 11/0089 . . {actuating operator protecting means, e.g. closing a cover element, producing an alarm signal}
- B23Q 11/0092 . . {actuating braking or stopping means}
- B23Q 11/0096 . . {protecting against noise}
- B23Q 11/02 . Devices for removing scrap from the cutting teeth of circular {or non-circular} cutters
- B23Q 11/04 . Arrangements preventing overload of tools, e.g. restricting load
- B23Q 11/06 . Safety devices for circular cutters
- B23Q 11/08 . Protective coverings for parts of machine tools; Splash guards
- B23Q 2011/0808 . . {Means for maintaining identical distances between relatively movable cover parts}
- B23Q 11/0816 . . {Foldable coverings, e.g. bellows}
- B23Q 11/0825 . . {Relatively slidable coverings, e.g. telescopic}
- B23Q 11/0833 . . . {with a non-rectilinear shifting}

- B23Q 11/0841 . . . {with spirally wound coverings}
- B23Q 11/085 . . {Flexible coverings, e.g. coiled-up belts}
- B23Q 11/0858 . . {using a liquid bath or a liquid curtain}
- B23Q 11/0866 . . {using covering means adaptable to the workpieces, e.g. curtains or bristles}
- B23Q 11/0875 . . {Wipers for clearing foreign matter from slideways or slidable coverings}
- B23Q 11/0883 . . {for spindles, e.g. for their bearings or casings}
- B23Q 11/0891 . . {arranged between the working area and the operator}

WARNING

Subgroup [B23Q 11/0891](#) is not complete, due to a reorganisation in progress; see also [B23Q 11/08](#)

- B23Q 11/10 . Arrangements for cooling or lubricating tools or work (incorporated in tools, see the relevant subclass for the tool, {e.g. [B23B 27/10](#), [B23B 51/06](#), [B23C 5/28](#), [B23D 77/006](#); for circular saw blades [B23D 59/02](#), for cooling grinding surfaces [B24B 55/02](#)})
- B23Q 11/1007 . . {by submerging the tools or work partially or entirely in a liquid}
- B23Q 11/1015 . . {by supplying a cutting liquid through the spindle}

WARNING

Subgroups [B23Q 11/1015](#) - [B23Q 11/103](#) are not complete, due to a reorganisation in progress; see also [B23Q 11/10](#)

- B23Q 11/1023 . . . {Tool holders, or tools in general specially adapted for receiving the cutting liquid from the spindle}
- B23Q 11/103 . . . {Rotary joints specially adapted for feeding the cutting liquid to the spindle}
- B23Q 11/1038 . . {using cutting liquids with special characteristics, e.g. flow rate, quality}

WARNING

Subgroups [B23Q 11/1038](#) - [B23Q 11/1061](#) are not complete, due to a reorganisation in progress; see also [B23Q 11/10](#)

- B23Q 11/1046 . . . {using a minimal quantity of lubricant (spraying apparatus using a carrying fluid [B05B 7/00](#))}
- B23Q 11/1053 . . . {using the cutting liquid at specially selected temperatures (controlling the temperature of the cutting liquid for maintaining machine parts at a constant temperature [B23Q 11/146](#))}
- B23Q 11/1061 . . . {using cutting liquids with specially selected composition or state of aggregation}
- B23Q 11/1069 . . {Filtration systems specially adapted for cutting liquids (filtration in general [B01D 24/00](#) - [B01D 41/00](#))}
- B23Q 11/1076 . . {with a cutting liquid nozzle specially adaptable to different kinds of machining operations}

WARNING

Subgroup [B23Q 11/1076](#) is not complete, due to a reorganisation in progress; see also [B23Q 11/10](#)

- B23Q 11/1084 . . {specially adapted for being fitted to different kinds of machines}

- B23Q 11/1092 . . {specially adapted for portable power-driven tools}
- B23Q 11/12 . Arrangements for cooling or lubricating parts of the machine ([B23Q 11/14](#) takes precedence; {movable work or tool supports using fluid bearings or fluid cushion supports [B23Q 1/38](#); cooling or lubricating means used in the working area [B23Q 11/10](#)})
- B23Q 11/121 . . {with lubricating effect for reducing friction ([F16C 33/66](#) and [F16H 57/04](#) take precedence)}
- WARNING**
- Subgroups [B23Q 11/121](#) - [B23Q 11/125](#) are not complete, due to a reorganisation in progress; see also [B23Q 11/12](#)
- B23Q 11/122 . . . {Lubricant supply devices ([F16N 7/00](#) takes precedence)}
- B23Q 11/123 . . . {for lubricating spindle bearings ([F16C 33/66](#) takes precedence)}
- B23Q 11/124 . . . {for lubricating linear guiding systems ([F16C 29/005](#) takes precedence)}
- B23Q 11/125 . . . {for lubricating ball screw systems}
- B23Q 11/126 . . {for cooling only}
- WARNING**
- Subgroups [B23Q 11/121](#) - [B23Q 11/128](#) are not complete, due to a reorganisation in progress; see also [B23Q 11/12](#)
- B23Q 11/127 . . . {for cooling motors or spindles}
- B23Q 11/128 . . . {for cooling frame parts}
- B23Q 11/14 . Methods or arrangements for maintaining a constant temperature in parts of machine tools
- WARNING**
- Subgroups [B23Q 11/141](#) - [B23Q 11/148](#) are not complete, due to a reorganisation in progress; see also [B23Q 11/14](#)
- B23Q 11/141 . . {using a closed fluid circuit for cooling or heating}
- B23Q 11/143 . . {comprising heating means}
- B23Q 11/145 . . {using a jet of gas or cutting liquid}
- B23Q 11/146 . . {by controlling the temperature of a cutting liquid}
- B23Q 11/148 . . {by controlling the air temperature}
- B23Q 13/00** **Equipment for use with tools or cutters when not in operation, e.g. protectors for storage** ([B26B 29/00](#) takes precedence)

Measuring; Indicating; Controlling

- B23Q 15/00** **Automatic control or regulation of feed movement, cutting velocity or position of tool or work** (programme-control [G05B 19/00](#), e.g. numerical programme-control [G05B 19/18](#))
- B23Q 15/007 . while the tool acts upon the workpiece
- B23Q 15/0075 . . {Controlling reciprocating movement, e.g. for planing-machine}
- B23Q 15/013 . . Control or regulation of feed movement ([B23Q 15/12](#) takes precedence)

- B23Q 15/02 . . . according to the instantaneous size and the required size of the workpiece acted upon ([B23Q 15/06 takes precedence](#))
- B23Q 15/04 . . . according to the final size of the previously-machined workpiece ([B23Q 15/06 takes precedence](#))
- B23Q 15/06 . . . according to measuring results produced by two or more gauging methods using different measuring principles, e.g. by both optical and mechanical gauging
- B23Q 15/08 . . Control or regulation of cutting velocity ([B23Q 15/12 takes precedence](#))
- B23Q 15/10 . . . to maintain constant cutting velocity between tool and workpiece
- B23Q 15/12 . . Adaptive control, i.e. adjusting itself to have a performance which is optimum according to a preassigned criterion
- B23Q 15/14 . . Control or regulation of the orientation of the tool with respect to the work
- B23Q 15/16 . . Compensation for wear of the tool
- B23Q 15/18 . . Compensation of tool-deflection due to temperature or force
- B23Q 15/20 . before or after the tool acts upon the workpiece
- B23Q 15/22 . . Control or regulation of position of tool or workpiece
- B23Q 15/225 . . . {in feed control, i.e. approaching of tool or work in successive decreasing velocity steps}
- B23Q 15/24 . . . of linear position
- B23Q 15/26 . . . of angular position
- B23Q 15/28 . . with compensation for tool wear

- B23Q 16/00** **Equipment for precise positioning of tool or work into particular locations not otherwise provided for** ([automatic control or regulation of position of tool or work B23Q 15/22](#); [arrangements for indicating or measuring existing or desired position of tool or work B23Q 17/22](#))
- B23Q 16/001 . {Stops, cams, or holders therefor}
- B23Q 16/002 . . {Stops for use in a hollow spindle}
- B23Q 16/003 . {with means to return a tool back, after its withdrawal movement, to the previous working position}
- B23Q 16/004 . {positioning by combining gauges of different dimensions from a set of two or more gauges}
- B23Q 16/005 . {Equipment for measuring the contacting force or the distance before contacting between two members during the positioning operation}
- B23Q 16/006 . {positioning by bringing a stop into contact with one of two or more stops, fitted on a common carrier}
- B23Q 16/007 . {Positioning by sine tables}
- B23Q 16/008 . {Cushioning the abutting movement}
- B23Q 16/02 . Indexing equipment ([specially adapted for gear-cutting machines B23F 23/08](#))
- B23Q 16/021 . . {in which only the positioning elements are of importance ([B23Q 16/04](#), [B23Q 16/08 take precedence](#))}
- B23Q 16/022 . . {in which only the indexing movement is of importance}
- B23Q 16/023 . . . {by converting a reciprocating or oscillating movement into or linear indexing movement}

- B23Q 16/024 . . . {and by converting a continuous movement into a linear indexing movement}
- B23Q 16/025 . . . {by converting a continuous movement into a rotary indexing movement}
- B23Q 16/026 . . . {by converting a reciprocating or oscillating movement into a rotary indexing movement}
- B23Q 16/027 . . {with means for adjusting the distance between two successive indexing-points}
- B23Q 16/028 . . {with positioning means between two successive indexing-points}
- B23Q 16/04 . . having intermediate members, e.g. pawls, for locking the relatively movable parts in the indexed position
- B23Q 16/043 . . . {with a reciprocating or oscillating drive ([B23Q 16/06](#) takes precedence)}
- B23Q 16/046 . . . {with a continuous drive ([B23Q 16/06](#) takes precedence)}
- B23Q 16/06 . . . Rotary indexing
- B23Q 16/065 {with a continuous drive}
- B23Q 16/08 . . having means for clamping the relatively movable parts together in the indexed position
- B23Q 16/083 . . . {with a reciprocating or oscillating drive ([B23Q 16/10](#) takes precedence)}
- B23Q 16/086 . . . {with a continuous drive ([B23Q 16/10](#) takes precedence)}
- B23Q 16/10 . . . Rotary indexing
- B23Q 16/102 {with a continuous drive}
- B23Q 16/105 {clamping with a disc brake}
- B23Q 16/107 {clamping with a drum brake}
- B23Q 16/12 . . using optics

B23Q 17/00

Arrangements for {observing,} indicating or measuring on machine tools (for automatic control or regulation of feed movement, cutting velocity or position of tool or work [B23Q 15/00](#))

- B23Q 2017/001 . {Measurement or correction of run-out or eccentricity}
- B23Q 17/002 . {for indicating or measuring the holding action of work or tool holders ([B23Q 3/16](#) takes precedence)}
- B23Q 17/003 . . {by measuring a position}
- B23Q 17/005 . . {by measuring a force, a pressure or a deformation}
- B23Q 17/006 . {for indicating the presence of a work or tool in its holder ([B23Q 17/002](#), [B23Q 17/09](#) take precedence)}
- B23Q 17/007 . {for managing machine functions not concerning the tool}

WARNING

Subgroups [B23Q 17/007](#) and [B23Q 17/008](#) are not complete, due to a reorganisation in progress; see also [B23Q 17/00](#)

- B23Q 17/008 . . {Life management for parts of the machine (tool life management [B23Q 17/0995](#))}
- B23Q 17/09 . for indicating or measuring cutting pressure or {for determining} cutting-tool condition, e.g. cutting ability, load on tool (arrangements preventing overload of tools [B23Q 11/04](#); devices for indicating failure of drills during boring [B23B 49/00](#))

B23Q 17/0904 . . {before or after machining}

WARNING

Subgroups [B23Q 17/0904](#) - [B23Q 17/0923](#) are not complete, due to a reorganisation in progress; see also [B23Q 17/09](#)

B23Q 17/0909 . . . {Detection of broken tools}

B23Q 17/0914 . . . {Arrangements for measuring or adjusting cutting-tool geometry machine tools}

B23Q 17/0919 . . . {Arrangements for measuring or adjusting cutting-tool geometry in presetting devices}

B23Q 17/0923 {Tool length}

B23Q 17/0928 {Cutting angles of lathe tools}

B23Q 17/0933 {Cutting angles of milling cutters}

B23Q 17/0938 {Cutting angles of drills}

B23Q 17/0942 {Cutting angles of saws}

B23Q 17/0947 {Monitoring devices for measuring cutting angles}

B23Q 17/0952 . . {during machining}

WARNING

Subgroups [B23Q 17/0952](#) - [B23Q 17/0999](#) are not complete, due to a reorganisation in progress; see also [B23Q 17/09](#)

B23Q 17/0957 . . . {Detection of tool breakage (detecting failure of drills [B23B 49/001](#))}

B23Q 17/0961 . . . {by measuring power, current or torque of a motor}

B23Q 17/0966 . . . {by measuring a force on parts of the machine other than a motor}

B23Q 17/0971 . . . {by measuring mechanical vibrations of parts of the machine (arrangements for measuring vibrations [B23Q 17/12](#))}

B23Q 17/0976 {Detection or control of chatter ([B23Q 15/12](#) takes precedence)}

B23Q 17/098 . . . {by measuring noise}

B23Q 17/0985 . . . {by measuring temperature}

B23Q 17/099 . . . {by measuring features of the machined workpiece (arrangements for measuring workpiece characteristics [B23Q 17/20](#))}

B23Q 17/0995 . . {Tool life management}

WARNING

This subgroup is not complete, due to a reorganisation in progress; see also [B23Q 17/09](#)

B23Q 17/10 . . for indicating or measuring cutting speed or number of revolutions

B23Q 17/12 . . for indicating or measuring vibration

B23Q 17/20 . . for indicating or measuring workpiece characteristics, e.g. contour, dimension, hardness

B23Q 17/22 . . for indicating or measuring existing or desired position of tool or work {([B23Q 16/005](#) takes precedence)}

B23Q 17/2208 . . {Detection or prevention of collisions}

- B23Q 17/2216 . . {for adjusting the tool into its holder ([B23Q 17/0923](#) - [B23Q 17/0942](#) takes precedence)}
 - B23Q 17/2225 . . . {with the toolholder as reference-element}
 - B23Q 17/2233 . . {for adjusting the tool relative to the workpiece}
 - B23Q 17/2241 . . . {Detection of contact between tool and workpiece}
 - B23Q 17/225 . . . {of a workpiece relative to the tool-axis}
 - B23Q 17/2258 {the workpiece rotating during the adjustment relative to the tool axis}
 - B23Q 17/2266 . . . {of a tool relative to a workpiece-axis}
 - B23Q 17/2275 . . . {of a tool-axis relative to a workpiece-axis}
 - B23Q 17/2283 . . {for adjusting the distance between coaxially rotating tools}
 - B23Q 17/2291 . . {for adjusting the workpiece relative to the holder thereof}
 - B23Q 17/24 . . using optics {or electromagnetic waves}
 - B23Q 17/2404 . . {Arrangements for improving direct observation of the working space, e.g. using mirrors or lamps ([structural combinations of lighting devices with other articles, not otherwise provided for, F21V 33/00](#))}
 - B23Q 17/2409 . . {Arrangements for indirect observation of the working space using image recording means, e.g. a camera}
- WARNING**
- This subgroup is not complete, due to a reorganisation in progress; see also [B23Q 17/24](#)
- B23Q 17/2414 . . {for indicating desired positions guiding the positioning of tools or workpieces ([B25H 1/0092](#) takes precedence)}
- WARNING**
- Subgroups [B23Q 17/2414](#) - [B23Q 17/2423](#) are not complete, due to a reorganisation in progress; see also [B23Q 17/24](#)
- B23Q 17/2419 . . . {by projecting a single light beam}
 - B23Q 17/2423 . . . {by projecting crossing light beams}
 - B23Q 17/2428 . . {for measuring existing positions of tools or workpieces}
- WARNING**
- This subgroup is not complete, due to a reorganisation in progress; see also [B23Q 17/24](#)
- B23Q 17/2433 . . {Detection of presence or absence}
- WARNING**
- Subgroups [B23Q 17/2438](#) - [B23Q 17/2447](#) are not complete, due to a reorganisation in progress; see also [B23Q 17/24](#)
- B23Q 17/2438 . . . {of an operator or a part thereof}
 - B23Q 17/2442 . . . {of a tool}
 - B23Q 17/2447 . . . {of a workpiece}

- B23Q 17/2452 . . {for measuring features or for detecting a condition of machine parts, tools or workpieces ([B23Q 17/2428](#), [B23Q 17/2433](#) take precedence)}

WARNING

Subgroups [B23Q 17/2452](#) - [B23Q 17/2476](#) are not complete, due to a reorganisation in progress; see also [B23Q 17/24](#)

- B23Q 17/2457 . . . {of tools}

- B23Q 17/2461 {Length}

- B23Q 17/2466 {Diameter}

- B23Q 17/2471 . . . {of workpieces}

- B23Q 17/2476 . . . {of clamping devices, e.g. work or tool holders}

- B23Q 17/248 . . {using special electromagnetic means or methods}

WARNING

Subgroups [B23Q 17/248](#) - [B23Q 17/2495](#) are not complete, due to a reorganisation in progress; see also [B23Q 17/24](#)

- B23Q 17/2485 . . . {using interruptions of light beams}

- B23Q 17/249 . . . {using image analysis, e.g. for radar, infrared or array camera images}

- B23Q 17/2495 . . . {using interferometers}

B23Q 23/00 Arrangement for compensating for irregularities or wear, e.g. of ways, of setting mechanisms ([automatic control B23Q 15/00](#))

B23Q 27/00 Geometrical mechanisms for the production of work of particular shapes, not fully provided for in another subclass

- B23Q 27/003 . {of conical non-circular section manufactured by an apparatus with a first rotational cutting vector and a second linear feed vector, intersecting the first vector}

- B23Q 27/006 . {by rolling without slippage two bodies of particular shape relative to each other}

Copying**NOTE**

In groups [B23Q 33/00](#) or [B23Q 35/00](#), the following term is used with the meaning indicated:

- "copying" covers the derivation of a required shape from a pattern, of the same or a different shape or scale, by a mechanism or equivalent means controlled by a member following the pattern. The pattern may be a model or drawing, or an element such as a cam incorporated in the operating mechanism of a machine. This term does not cover the derivation of a required shape from simple geometrical shapes, e.g. generating a cycloid by a rolling circle, which in general is provided for in group [B23Q 27/00](#)

B23Q 33/00 Methods for copying

B23Q 35/00 Control systems or devices for copying directly from a pattern or a master model; Devices for use in copying manually {(copy milling classified also in [B27C 5/003](#))}

- B23Q 35/005 . {Copying by a curve composed of arcs of circles}

- B23Q 35/02 . Copying discrete points from the pattern, e.g. for determining the position of holes to be drilled
- B23Q 35/04 . using a feeler or the like travelling along the outline of the pattern, model or drawing; Feelers, patterns, or models therefor
- B23Q 35/06 . . specially adapted for controlling successive operations e.g. separate cuts, on a workpiece
- B23Q 35/08 . . Means for transforming movement of the feeler or the like into feed movement of tool or work
- B23Q 35/10 . . . mechanically only
- B23Q 35/101 {with a pattern composed of one or more lines used simultaneously for one tool}
- B23Q 35/102 {of one line}
- B23Q 35/103 {which turns continuously}
- B23Q 35/104 {with coaxial tool and feeler}
- B23Q 35/105 {of two lines}
- B23Q 35/106 {with a single tool and two feelers rotating about parallel axis}
- B23Q 35/107 {tool and feelers being coaxial}
- B23Q 35/108 {of three or more lines}
- B23Q 35/109 {with a continuously turning pattern (B23Q 35/101 takes precedence)}
- B23Q 35/12 . . . involving electrical means (programme recording for copying purposes in a separate apparatus G05, G11)
- B23Q 35/121 using mechanical sensing
- B23Q 35/122 the feeler opening or closing electrical contacts
- B23Q 35/123 the feeler varying the impedance in a circuit
- B23Q 35/124 varying resistance
- B23Q 35/125 varying capacitance
- B23Q 35/126 varying inductance
- B23Q 35/127 using non-mechanical sensing
- B23Q 35/128 Sensing by using optical means
- B23Q 35/129 Sensing by means of electric discharges
- B23Q 35/13 Sensing by using magnetic means
- B23Q 35/14 controlling one or more electromotors
- B23Q 35/16 controlling fluid motors
- B23Q 35/18 . . . involving fluid means (B23Q 35/16 takes precedence)
- B23Q 35/181 {with a pattern composed of one or more lines used simultaneously}
- B23Q 35/183 {of one line}
- B23Q 35/185 {turning continuously}
- B23Q 35/186 {of two lines}
- B23Q 35/188 {with a continuously turning pattern (B23Q 35/181 takes precedence)}
- B23Q 35/20 . . . with special means for varying the ratio of reproduction
- B23Q 35/22 . . . specially adapted for compensating for wear of the tool
- B23Q 35/24 . . Feelers; Feeler units

- B23Q 35/26 . . . designed for a physical contact with a pattern or a model
- B23Q 35/28 for control of a mechanical copying system
- B23Q 35/30 for control of an electrical or electro-hydraulic copying system
- B23Q 35/32 in which the feeler makes and breaks an electrical contact or contacts, e.g. with brush-type tracers
- B23Q 35/34 in which the feeler varies an electrical characteristic in a circuit, e.g. capacity, frequency
- B23Q 35/36 for control of a hydraulic or pneumatic copying system
- B23Q 35/38 . . . designed for sensing the pattern, model, or drawing without physical contact ([sensing by means of a fluid jet B23Q 35/36](#))
- B23Q 35/40 involving optical or photoelectrical systems
- B23Q 35/42 . . Patterns; Masters models
- B23Q 35/44 . . . provided with means for adjusting the contact face, e.g. comprising flexible bands held by set-screws
- B23Q 35/46 . . . Supporting devices therefor
- B23Q 35/48 . using a feeler or the like travelling to-and-fro between opposite parts of the outline of the pattern, model or drawing

Metal-working machines comprising units or sub-assemblies; Associations of metal-working machines or units

- B23Q 37/00** **Metal-working machines, or constructional combinations thereof, built-up from units designed so that at least some of the units can form parts of different machines or combinations; Units therefor in so far as the feature of interchangeability is important** ([features relating to particular metal-working operations, see the relevant subclass, e.g. B23P 23/00](#))
- B23Q 37/002 . {Convertible machines, e.g. from horizontally working into vertically working ([B27B 5/165: convertible sawing devices](#))}
- B23Q 37/005 . {Modular base frames}
- B23Q 37/007 . {Modular machining stations designed to be linked to each other}
- B23Q 39/00** **Metal-working machines incorporating a plurality of sub-assemblies, each capable of performing a metal-working operation** ([B23Q 33/00](#), [B23P 23/00](#) take precedence; if the operations are similar and the kind of operation is essential, see the relevant subclass for the operation)
- B23Q 2039/002 . {Machines with twin spindles}
- B23Q 2039/004 . {Machines with tool turrets}
- B23Q 2039/006 . {Machines with multi-spindles}
- B23Q 2039/008 . {Machines of the lathe type}
- B23Q 39/02 . the sub-assemblies being capable of being brought to act at a single operating station
- B23Q 39/021 . . {with a plurality of toolheads per workholder, whereby the toolhead is a main spindle, a multispindle, a revolver or the like}
- B23Q 39/022 . . . {with same working direction of toolheads on same workholder}
- B23Q 39/023 {simultaneous working of toolheads}

- B23Q 39/024 {consecutive working of toolheads}
- B23Q 39/025 . . . {with different working directions of toolheads on same workholder}
- B23Q 39/026 {simultaneous working of toolheads}
- B23Q 39/027 {consecutive working of toolheads}
- B23Q 39/028 . . {with a plurality of workholder per toolhead in operating position (with only one workholder in operating position [B23Q 1/66](#))}
- B23Q 39/029 . . . {with a twin table for alternatively working on one of the tables}
- B23Q 39/04 . the sub-assemblies being arranged to operate simultaneously at different stations, e.g. with an annular work-table moved in steps (associations of machines connected only by work-transferring means [B23Q 41/00](#))
- B23Q 39/042 . . {with circular arrangement of the sub-assemblies}
- B23Q 39/044 . . . {having at least one tool station cooperating with each work holder, e.g. multi-spindle lathes}
- B23Q 39/046 . . . {including a loading and/or unloading station}
- B23Q 39/048 . . {the work holder of a work station transfers directly its workpiece to the work holder of a following work station}

B23Q 41/00 Combinations or associations of metal-working machines not directed to a particular result according to classes **B21**, **B23**, or **B24** ([B23Q 37/00](#), [B23Q 39/00](#) take precedence; features relating to operations performed, if the different metal-working operations are of the same kind, see the subclass for the kind of operation, e.g. punching [B21D](#), welding [B23K](#), grinding [B24B](#); features relating to technically specified combinations of different metal-working operations [B23P 23/00](#))

- B23Q 41/02 . Features relating to transfer of work between machines (arrangements for handling work for machine tools coordinated in production lines [B23Q 7/14](#))
- B23Q 41/04 . Features relating to relative arrangements of machines
- B23Q 41/06 . Features relating to organisation of working of machines
- B23Q 41/08 . Features relating to maintenance of efficient operation

B23Q 2210/00 Machine tools incorporating a specific component

- B23Q 2210/002 . Flexures
- B23Q 2210/004 . Torque motors
- B23Q 2210/006 . Curved guiding rails
- B23Q 2210/008 . Flexible guiding rails

B23Q 2220/00 Machine tool components

- B23Q 2220/002 . Tool turrets
- B23Q 2220/004 . Rotary tables
- B23Q 2220/006 . Spindle heads
- B23Q 2220/008 . Rotatable tool holders coupled in parallel to a non rotating accessory

B23Q 2230/00 Special operations in a machine tool

- B23Q 2230/002 . Using the spindle for performing a non machining or non measuring operation, e.g. cleaning, actuating a mechanism

B23Q 2230/004	• Using a cutting tool reciprocating at high speeds, e.g. "fast tool"
B23Q 2230/006	• Machining both ends of a workpiece consecutively
B23Q 2230/008	• Machining the middle part and the ends of a workpiece consecutively
B23Q 2240/00	Machine tools specially suited for a specific kind of workpiece
B23Q 2240/002	• Flat workpieces
B23Q 2240/005	• Flexible, deformable workpieces
B23Q 2240/007	• Elongated workpieces
B23Q 2701/00	Members which are comprised in the general build-up of a form of the machine
B23Q 2701/01	• Frames or slideways for lathes; Frames for boring machines
B23Q 2701/02	• Movable or adjustable work or tool supports for milling machines, their drive, control or guiding
B23Q 2701/025	• • Work-tables rotating around an axis vertical to the surface of the table; this kind of table comprising a divider, indexer or positioning means
B23Q 2701/04	• Support braces for a milling machine
B23Q 2701/06	• Tailstock for the spindle of a milling machine
B23Q 2703/00	Work clamping
B23Q 2703/02	• Work clamping means
B23Q 2703/04	• • using fluid means or a vacuum
B23Q 2703/06	• • Mandrels with non rotatable claws; Mandrels with internal clamping; Clamping elements
B23Q 2703/08	• • Devices for clamping a plurality of workpieces
B23Q 2703/10	• • Devices for clamping workpieces of a particular form or made from a particular material
B23Q 2703/105	• • • for clamping a crankshaft
B23Q 2703/12	• Accessories for attaching
B23Q 2705/00	Driving working spindles or feeding members carrying tools or work
B23Q 2705/005	• General aspects of driving arrangements in a lathe, e.g. indexing the spindle, devices for keeping the cutting speed constant, braking or reversing devices
B23Q 2705/02	• Driving working spindles
B23Q 2705/023	• • General aspects of driving a boring spindle
B23Q 2705/026	• • Main drive for the spindles of milling machines
B23Q 2705/04	• • by fluid pressure
B23Q 2705/043	• • • for lathes
B23Q 2705/046	• • • for broaching machines
B23Q 2705/06	• • Mechanical drives with means for varying the speed ratio
B23Q 2705/062	• • • for lathes
B23Q 2705/064	• • • • mechanically controlled
B23Q 2705/066	• • • • fluid pressure controlled

B23Q 2705/068	. . . . electrically controlled
B23Q 2705/08	. . Devices for preselecting speed in gear boxes of lathes
B23Q 2705/10	. Feeding members carrying tools or work
B23Q 2705/102	. . for lathes
B23Q 2705/104	. . for milling machines
B23Q 2705/106	. . for planing machines
B23Q 2705/108	. . for slotting or mortising machines
B23Q 2705/12	. . Fluid-pressure drives
B23Q 2705/122	. . . for milling machines
B23Q 2705/125	. . . for planing machines
B23Q 2705/127	. . . for slotting or mortising machines
B23Q 2705/14	. . Electric drives
B23Q 2705/145	. . . for milling machines
B23Q 2705/16	. . Feeding working spindles
B23Q 2705/165	. . . General aspects of feeding a boring spindle
B23Q 2705/18	. . Feeding other members supporting tools also feeding working spindles supports
B23Q 2705/182	. . . in lathes
B23Q 2705/185	. . . . Clutches
B23Q 2705/187	. . . . . Automatic clutches
B23Q 2705/20	. . . Gear boxes for thread cutting lathes with a lead screw
B23Q 2705/22	. Limiting feed movement of a boring spindle
B23Q 2705/24	. General aspects of limiting the carriage movement in lathes
B23Q 2705/26	. Stopping the feed in case of overload or a break in a boring machine
B23Q 2707/00	Automatic supply or removal of metal workpieces
B23Q 2707/003	. in a lathe
B23Q 2707/006	. for thread cutting, e.g. bolts or screws
B23Q 2707/02	. Drive
B23Q 2707/025	. . Driving by vibration, shaking or jolting
B23Q 2707/04	. by means of grippers also magnetic or pneumatic gripping
B23Q 2707/05	. by means of roller ways
B23Q 2707/06	. by means of magazines for plates
B23Q 2707/16	. Devices for organising or spreading out workpieces on a conveyor; Devices for placing the pieces at predetermined intervals or devices for forming a regular flow of the pieces
B23Q 2709/00	Portable machines or devices for the cylindrical bores of valve bodies
B23Q 2716/00	Equipment for precise positioning of tool or work into particular locations
B23Q 2716/02	. Devices for the axial positioning of the turret in a lathe; Devices for rotating and blocking the turret

- B23Q 2716/04 . Indexing devices for boring machines
- B23Q 2716/06 . Headstock dividers or devices for dividing in milling machines
- B23Q 2716/08 . Holders for tools or work comprising a divider or positioning devices

B23Q 2717/00**Arrangements for indicating or measuring**

- B23Q 2717/003 . in lathes
- B23Q 2717/006 . in milling machines

B23Q 2727/00**Lathes or mechanisms for making work with a non-circular section without a model or a shaped tool****B23Q 2735/00****Control systems or devices for copying from a pattern or master model**

- B23Q 2735/002 . in a milling machine
- B23Q 2735/004 . . the workpiece being immobile during milling
- B23Q 2735/006 . . the workpiece rotating during milling
- B23Q 2735/008 . in a planing machine
- B23Q 2735/02 . Means for transforming movement of the feeler into feed movement of tool or work
- B23Q 2735/025 . . in a lathe
- B23Q 2735/04 . . mechanically only
- B23Q 2735/045 . . . in a milling machine
- B23Q 2735/06 . . involving electrical means
- B23Q 2735/062 . . . in a lathe
- B23Q 2735/065 . . . in a milling machine
- B23Q 2735/067 with rotation of the workpiece during milling
- B23Q 2735/08 . . involving fluid means
- B23Q 2735/082 . . . in a lathe
- B23Q 2735/085 . . . in a milling machine
- B23Q 2735/087 with rotation of the workpiece during milling