

# CPC COOPERATIVE PATENT CLASSIFICATION

## B PERFORMING OPERATIONS; TRANSPORTING

(NOTES omitted)

### SHAPING

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

(NOTES omitted)

#### 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

- In this subclass, groups designating parts of machine tools cover machine tools characterised by constructional features of such parts.
- 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.
  - "Machine tool" means a mechanical working machine that removes material from a workpiece with a mechanical cutting edge to perform a shaping operation, essentially through drilling, milling, turning or cutting, e.g. sawing. The workpiece is generally made of metal, wood or plastic and is not a human body, food or clothes.
- Attention is drawn to the Notes following the title of class [B23](#).

##### WARNING

In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.

1/00	<b>Members which are comprised in the general build-up of a form of machine, particularly relatively large fixed members (<a href="#">B23Q 37/00</a> takes precedence {; positioning supports for measuring arrangements <a href="#">G01B 5/0004</a>; motorised alignment for optical elements <a href="#">G02B 7/005</a>; handling of mask or wafer <a href="#">G03F 7/70691</a>; adjusting or compensating devices for optical apparatuses <a href="#">G12B 5/00</a>; piezoelectric or electrostrictive positioners <a href="#">H10N 30/20</a>)</b>	1/0063	. {Connecting non-slidable parts of machine tools to each other}
		1/0072	. . {using a clamping opening for receiving an insertion bolt or nipple}
		1/0081	. . {using an expanding clamping member insertable in a receiving hole}
		1/009	. . . {the receiving hole being cylindrical or conical}
		1/01	. Frames, beds, pillars or like members; Arrangement of ways
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 <a href="#">B23Q 5/54</a> )}	1/012	. . {Portals}
		1/015	. . {Frames, beds, pillars}
		1/017	. . {Arrangements of ways}
1/0018	. . {comprising hydraulic means}	1/03	. Stationary work or tool supports ( <a href="#">B23Q 1/70</a> takes precedence; auxiliary tables <a href="#">B23Q 1/74</a> ; tailstocks <a href="#">B23B 23/00</a> )
1/0027	. . . {between moving parts between which an uninterrupted energy-transfer connection is maintained}	1/032	. . {characterised by properties of the support surface}
1/0036	. . . . {one of those parts being a tool}	1/035	. . {with an array of longitudinally movable rods defining a reconfigurable support surface}
1/0045	. . {Control panels or boxes}	1/037	. . {comprising series of support elements whose relative distance is adjustable}
1/0054	. {Means for adjusting the position of a machine tool with respect to its supporting surface ( <a href="#">B23Q 1/262</a> takes precedence)}	1/25	. Movable or adjustable work or tool supports

1/26	. . characterised by constructional features relating to the co-operation of relatively movable members; Means for preventing relative movement of such members ( <a href="#">bearings for linearly moving parts F16C 29/00</a> )	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}
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 <a href="#">B23Q 1/30</a> )}	1/46	. . . with screw pairs
1/265	. . . . {between rotating members}	1/48	. . . with sliding pairs and rotating pairs ( <a href="#">B23Q 1/46 takes precedence</a> )
1/267	. . . {with means to prevent skewness between the relatively slidable members}	1/4804	. . . . {a single rotating pair followed perpendicularly by a single sliding pair}
1/28	. . . Means for securing sliding members in any desired position	1/4809	. . . . {followed perpendicularly by a single rotating pair}
1/282	. . . . {co-operating with means to adjust the distance between the relatively slidable members}	1/4814	. . . . {followed parallelly by a single rotating pair}
1/285	. . . . {for securing two or more members simultaneously or selectively}	1/4819	. . . . {followed perpendicularly by a single sliding pair}
1/287	. . . . {using a hydraulically controlled membrane acting directly upon a sliding member}	1/4823	. . . . {followed parallelly by a single sliding pair}
1/30	. . . controlled in conjunction with the feed mechanism	1/4828	. . . . {a single rotating pair followed parallelly by a single sliding pair}
1/32	. . . Relative movement obtained by co-operating spherical surfaces, e.g. ball-and-socket joints	1/4833	. . . . {followed perpendicularly by a single rotating pair}
1/34	. . . Relative movement obtained by use of deformable elements, e.g. piezoelectric, magnetostrictive, elastic or thermally-dilatable elements ( <a href="#">sensitive elements capable of producing movement or displacement for purposes not limited to measurement G12B 1/00</a> )	1/4838	. . . . {followed parallelly by a single rotating pair}
1/36	. . . . Springs	1/4842	. . . . {followed perpendicularly by a single sliding pair}
1/38	. . . using fluid bearings or fluid cushion supports	1/4847	. . . . {followed parallelly by a single sliding pair}
1/385	. . . . {in which the thickness of the fluid-layer is adjustable}	1/4852	. . . . {a single sliding pair followed perpendicularly by a single rotating pair}
1/40	. . . using ball, roller or wheel arrangements	1/4857	. . . . {followed perpendicularly by a single rotating pair}
1/42	. . . using T-, V-, dovetail-section or like guides ( <a href="#">B23Q 1/40 takes precedence</a> )	1/4861	. . . . {followed parallelly by a single rotating pair}
1/44	. . using particular mechanisms ( <a href="#">B23Q 1/26 takes precedence</a> )	1/4866	. . . . {followed perpendicularly by a single sliding pair}
	<b>NOTES</b>	1/4871	. . . . {followed parallelly by a single sliding pair}
	1. In this group, the following expressions are used with the meaning indicated:	1/4876	. . . . {a single sliding pair followed parallelly by a single rotating pair}
	• "sliding pair" means a pair consisting of two elements operating in such a way that only straight line movement between both elements is possible;	1/488	. . . . {followed perpendicularly by a single rotating pair}
	• "rotating pair" means a pair consisting of two elements operating in such a way that only rotary movement between both elements is possible;	1/4885	. . . . {followed parallelly by a single rotating pair}
	• "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.	1/489	. . . . {followed perpendicularly by a single sliding pair}
	2. In this group, 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.	1/4895	. . . . {followed parallelly by a single sliding pair}
		1/50	. . . with rotating pairs only (, the rotating pairs being the first two elements of the mechanism)
		1/52	. . . . a single rotating pair
		1/522	. . . . {which is perpendicular to the working surface}
		1/525	. . . . {which is parallel to the working surface}
		1/527	. . . . {with a ring or tube in which a workpiece is fixed coaxially to the degree of freedom}
		1/54	. . . . two rotating pairs only
		1/5406	. . . . {a single rotating pair followed perpendicularly by a single rotating pair ( <a href="#">B23Q 1/545 takes precedence</a> )}
		1/5412	. . . . . {followed perpendicularly by a single rotating pair}
		1/5418	. . . . . {followed parallelly by a single rotating pair}

- 1/5425 . . . . . {followed perpendicularly by a single sliding pair}
- 1/5431 . . . . . {followed parallelly by a single sliding pair}
- 1/5437 . . . . . {and in which the degree of freedom, which belongs to the working surface, is perpendicular to this surface}
- 1/5443 . . . . . {and in which the degree of freedom, which belongs to the working surface, is parallel to this surface}
- 1/545 . . . . . {comprising spherical surfaces}
- 1/5456 . . . . . {with one supplementary rotating pair}
- 1/5462 . . . . . {with one supplementary sliding pair}
- 1/5468 . . . . . {a single rotating pair followed parallelly by a single rotating pair}
- 1/5475 . . . . . {followed perpendicularly by a single rotating pair}
- 1/5481 . . . . . {followed parallelly by a single rotating pair}
- 1/5487 . . . . . {followed perpendicularly by a single sliding pair}
- 1/5493 . . . . . {followed parallelly by a single sliding pair}
- 1/56 . . . with sliding pairs only {, the sliding pairs being the first two elements of the mechanism}
- 1/58 . . . . a single sliding pair
- 1/585 . . . . {perpendicular to the working surface}
- 1/60 . . . . two sliding pairs only {, the sliding pairs being the first two elements of the mechanism}
- 1/601 . . . . . {a single sliding pair followed parallelly by a single sliding pair}
- 1/603 . . . . . {followed perpendicularly by a single rotating pair}
- 1/605 . . . . . {followed parallelly by a single rotating pair}
- 1/606 . . . . . {followed perpendicularly by a single sliding pair}
- 1/608 . . . . . {followed parallelly by a single sliding pair}
- 1/62 . . . . . with perpendicular axes, e.g. cross-slides
- 1/621 . . . . . {a single sliding pair followed perpendicularly by a single sliding pair}
- 1/623 . . . . . {followed perpendicularly by a single rotating pair}
- 1/625 . . . . . {followed parallelly by a single rotating pair}
- 1/626 . . . . . {followed perpendicularly by a single sliding pair}
- 1/628 . . . . . {followed parallelly by a single sliding pair}
- 1/64 . . characterised by the purpose of the movement ([indexing equipment B23Q 16/02](#))
- 1/66 . . . Worktables interchangeably movable into operating positions
- 1/68 . . . for withdrawing tool or work during reverse movement
- 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](#))
- 1/703 . . {Spindle extensions}
- 1/706 . . {Movable members, e.g. swinging arms}
- 1/72 . Auxiliary arrangements; Interconnections between auxiliary tables and movable machine elements ([independent of machine tool B23Q 3/105](#))
- 1/74 . . Auxiliary tables
- 1/76 . . Steadies; Rests ([B23B 13/126 takes precedence; steadies combined with cutting tool holders B23B 29/16](#))
- 1/763 . . . {Rotating steadies or rests}
- 1/766 . . . {Steadies or rests moving together with the tool support}
- 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](#) {; food cutting boards [A47J 47/00](#); workpiece support for dies [B21D 37/02](#)); 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](#) {; drawbars in spindles [B23B 31/261](#); for electrical discharge machining [B23H 11/003](#); for welding [B23K 37/04](#); means for securing grinding wheels [B24B 45/00](#); mountings for abrasive wheels [B24D 5/16](#)); tools or bench devices for fastening, connecting, disengaging or holding [B25B](#) {; chucks for percussive tools [B25D 17/084](#); work benches for manual work [B25H 1/00](#); devices for securing circular saw blades [B27B 5/32](#); for assembling or manufacturing aircrafts [B64F 5/10](#); for holding semiconductors or wafers [H01L 21/67](#); devices for holding circuit boards [H05K 13/0061](#))
- 3/002 . {Means to press a workpiece against a guide}
- 3/005 . {Guides for workpieces}
- 3/007 . . {provided with measuring means allowing the positioning of the guides}
- 3/02 . for mounting on a work-table, tool-slide, or analogous part ([B23Q 3/15 takes precedence](#))
- 3/04 . . adjustable in inclination
- 3/06 . . Work-clamping means
- 3/061 . . . {adapted for holding a plurality of workpieces}
- 3/062 . . . {adapted for holding workpieces having a special form or being made from a special material}
- 3/063 . . . . {for holding turbine blades}
- 3/064 . . . . {for holding elongated workpieces, e.g. pipes, bars or profiles}
- 3/065 . . . . {for holding workpieces being specially deformable, e.g. made from thin-walled or elastic material}
- 3/066 . . . {Bench vices}
- 3/067 . . . {Blocks with collet chucks}
- 3/068 . . . . {fluid-operated}
- 3/069 . . . {for pressing workpieces against a work-table}
- 3/08 . . . other than mechanically-actuated ([B23Q 3/061](#), [B23Q 3/066](#), and [B23Q 3/067 take precedence](#))
- 3/082 . . . . {hydraulically actuated}
- 3/084 . . . . {using adhesive means}
- 3/086 . . . . {using a solidifying liquid, e.g. with freezing, setting or hardening means}
- 3/088 . . . . {using vacuum means}

- 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](#))}
- 3/101 . . . {for supporting a workpiece during its transport to or from a tool holder}
- 3/102 . . . {for fixing elements in slots}
- 3/103 . . . {Constructional elements used for constructing work holders}
- 3/104 . . . {V-blocks}
- 3/105 . . . {Auxiliary supporting devices independent of the machine tool}
- 3/106 . . . {extendable members, e.g. extension members}
- 3/107 . . . . {with positive adjustment means}
- 3/108 . . . . {with non-positive adjustment means}
- 3/12 . . for securing to a spindle in general ([B23Q 3/152](#) takes precedence; chucks [B23B 31/02](#))
- 3/14 . . Mandrels in general (expansion mandrels [B23B 31/40](#))
- 3/15 . . Devices for holding work using magnetic or electric force acting directly on the work
- 3/152 . . Rotary devices
- 3/154 . . Stationary devices
- 3/1543 . . . {using electromagnets}
- 3/1546 . . . {using permanent magnets}
- 3/155 . . Arrangements for automatic insertion or removal of tools {, e.g. combined with manual handling ([B23Q 7/046](#) takes precedence)}
- 3/15503 . . {Processes characterized by special sequencing of operations or the like, e.g. for optimizing tool changing time or capacity in tool storage}
- 3/15506 . . {the tool being inserted in a tool holder directly from a storage device (without transfer device)}
- 3/15513 . . {the tool being taken from a storage device and transferred to a tool holder by means of transfer devices}
- 3/1552 . . {parts of devices for automatically inserting or removing tools}
- 3/15526 . . . {Storage devices; Drive mechanisms therefor}
- NOTE**
- {When classifying in this group or one of its subgroups the usage of indexing codes [B23Q 2003/15527](#) – [B23Q 2003/15532](#), [B23Q 2003/15537](#) is obligatory.}
- 2003/15527 . . . . {the storage device including means to latch tools}
- 2003/15528 . . . . {the storage device including means to project tools therefrom, e.g. for transferring them}
- 2003/1553 . . . . . {by rectilinear projection}
- 2003/15531 . . . . . {by pivoting projection movement}
- 2003/15532 . . . . {the storage device including tool pots, adaptors or the like}
- 3/15533 . . . . {combined with manual tool transfers}
- 3/15534 . . . . {Magazines mounted on the spindle}
- 3/15536 . . . . {Non-rotary fixed racks}
- 2003/15537 . . . . {Linearly moving storage devices}
- 3/15539 . . . . {Plural magazines, e.g. involving tool transfer from one magazine to another (involving manual operation [B23Q 3/15533](#))}
- 3/1554 . . . . {Transfer mechanisms, e.g. tool gripping arms; Drive mechanisms therefore}
- NOTE**
- {When classifying in this group the usage of indexing codes [B23Q 2003/155404](#) – [B23Q 2003/155456](#) is obligatory.}
- 2003/155404 . . . . {the transfer mechanism comprising a single gripper}
- 2003/155407 . . . . . {linearly movable}
- 2003/155411 . . . . . {pivotable}
- 2003/155414 . . . . {the transfer mechanism comprising two or more grippers}
- 2003/155418 . . . . . {the grippers moving together}
- 2003/155421 . . . . . {the grippers moving independently from each other}
- 2003/155425 . . . . . {pivotable}
- 2003/155428 . . . . . {about a common axis}
- 2003/155432 . . . . . {about different axes}
- 2003/155435 . . . . . {and linearly movable}
- 2003/155439 . . . . . {along the pivoting axis}
- 2003/155442 . . . . . {radially to the pivoting axis}
- 2003/155446 . . . . . {with translation of the pivoting axis}
- 2003/155449 . . . . . {linearly movable only}
- 2003/155453 . . . . . {including different gripper configurations for holding differently-configured tools}
- 2003/155456 . . . . {using separate transfer mechanisms for each tool in the magazine}
- 3/15546 . . . . {Devices for recognizing tools in a storage device, e.g. coding devices}
- 3/15553 . . . . {Tensioning devices or tool holders, e.g. grippers (driving working-spindles and adjusting or stopping them in a predetermined angular position [B23Q 5/20](#); securing milling cutters to the driving spindle in a given angular position [B23C 5/26](#))}
- 3/1556 . . . {of non-rotary tools (in combination with rotary tools: [B23Q 3/15506](#), [B23Q 3/15513](#))}
- 3/15566 . . . {the tool being inserted in a tool holder directly from a storage device, i.e. without using transfer devices}
- 3/15573 . . . {the tool being taken from a storage device and transferred to a tool holder by means of transfer devices}
- 2003/1558 . . . {involving insertion or removal of other machine components together with the removal or insertion of tools or tool holders}
- 2003/15586 . . . {of tools in turrets}
- 3/157 . . . of rotary tools {(in combination with non-rotary tools [B23Q 3/15506](#), [B23Q 3/15513](#))}
- 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)}
- 3/15713 . . . {a transfer device taking a single tool from a storage device and inserting it in a spindle ([B23Q 3/15793](#) takes precedence)}
- 3/1572 . . . . {the storage device comprising rotating or circulating storing means}
- 3/15722 . . . . . {Rotary discs or drums}
- 3/15724 . . . . . {Chains or belts}
- 3/15726 . . . . . {the storage means rotating or circulating in a plane parallel to the axis of the spindle}

3/15733	. . . . . {the axis of the stored tools being arranged in the rotating or circulating plane of the storage means}	5/145	. . . . . {fluid-operated}
3/1574	. . . . . {the axis of the stored tools being arranged perpendicularly to the rotating or circulating plane of the storage means}	5/147	. . . . . {electrically-operated}
3/15746	. . . . . {the storage means comprising pivotable tool storage elements}	5/16	. . . . . infinitely-variable
3/15753	. . . . . {the storage means rotating or circulating in a plane perpendicular to the axis of the spindle}	5/162	. . . . . {mechanically-operated}
3/1576	. . . . . {the axis of the stored tools being arranged in the rotating or circulating plane of the storage means}	5/165	. . . . . {fluid-operated}
3/15766	. . . . . {the axis of the stored tools being arranged perpendicularly to the rotating or circulating plane of the storage means}	5/167	. . . . . {electrically-operated}
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}	5/18	. . . . . Devices for preselecting speed of working-spindle
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}	5/20	. . . . Adjusting or stopping working-spindles in a predetermined position
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}	5/22	. . . . Feeding members carrying tools or work
3/15793	. . . . {a transfer device simultaneously taking a plurality of tools and inserting them simultaneously in a plurality of spindles}	5/225	. . . . {not mechanically connected to the main drive, e.g. with separate motors (connected to main drive through servomotors <a href="#">B23Q 5/36</a> )}
3/16	. . . . controlled in conjunction with the operation of the tool	5/26	. . . . Fluid-pressure drives
3/18	. . . . for positioning only	5/261	. . . . {for spindles}
3/183	. . . . {Centering devices}	5/263	. . . . {with means to control the feed rate by controlling the fluid flow}
3/186	. . . . {Aligning devices}	5/265	. . . . . {this regulation depending upon the position of the tools or work}
<b>5/00</b>	<b>Driving or feeding mechanisms; Control arrangements therefor</b> (automatic control <a href="#">B23Q 15/00</a> ; copying <a href="#">B23Q 33/00</a> , <a href="#">B23Q 35/00</a> ; specially adapted for boring or drilling machines <a href="#">B23B 39/10</a> , <a href="#">B23B 47/00</a> ; {numerical programme-control of machine tools <a href="#">G05B 19/18</a> })	5/266	. . . . {with means to control the feed rate by controlling the fluid flow}
2005/005	. . . . {Driving or feeding mechanisms with a low and a high speed mode}	5/268	. . . . {depending upon the position of the tool or work}
5/02	. . . . Driving main working members	5/28	. . . . Electric drives
5/027	. . . . reciprocating members	5/32	. . . . Feeding working-spindles (feeding working-spindle supports <a href="#">B23Q 5/34</a> )
5/033	. . . . driven essentially by fluid pressure	5/323	. . . . {cam-operated}
5/04	. . . . rotary shafts, e.g. working-spindles	5/326	. . . . {screw-operated}
5/041	. . . . {Spindle-reversing devices}	5/34	. . . . Feeding other members supporting tools or work, e.g. saddles, tool-slides, through mechanical transmission
5/043	. . . . {Accessories for spindle drives}	5/341	. . . . {cam-operated}
5/045	. . . . . {Angle drives}	5/342	. . . . . {Cam followers (see also <a href="#">B23Q 35/26</a> )}
5/046	. . . . . {Offset spindle drives}	5/344	. . . . . {Cams (see also <a href="#">B23Q 35/42</a> )}
5/048	. . . . . {Speed-changing devices}	5/345	. . . . . {Cam assembly (see also <a href="#">B23Q 35/46</a> )}
5/06	. . . . driven essentially by fluid pressure or pneumatic power	5/347	. . . . . {controlled in conjunction with tool or work indexing means}
5/08	. . . . . electrically controlled	5/348	. . . . . {by means of clutches}
5/10	. . . . driven essentially by electrical means	5/36	. . . . in which a servomotor forms an essential element
5/12	. . . . Mechanical drives with means for varying the speed ratio	5/38	. . . . feeding continuously
5/14	. . . . step-by-step	5/385	. . . . . {using a gear and rack mechanism or a friction wheel co-operating with a rail}
5/142	. . . . . {mechanically-operated}	5/40	. . . . . by feed shaft, e.g. lead screw
		5/402	. . . . . {in which screw or nut can both be driven}
		5/404	. . . . . {Screw bearings therefor}
		5/406	. . . . . {with means for meshing screw and nut}
		5/408	. . . . . {Nut bearings therefor}
		5/42	. . . . . Mechanism associated with headstock
		5/44	. . . . . Mechanism associated with the moving member
		5/46	. . . . . with variable speed ratio
		5/48	. . . . . by use of toothed gears
		5/50	. . . . feeding step-by-step
		5/52	. . . . Limiting feed movement {( <a href="#">B23Q 11/04</a> takes precedence)}
		5/54	. . . . Arrangements or details not restricted to group <a href="#">B23Q 5/02</a> or group <a href="#">B23Q 5/22</a> respectively {, e.g. control handles}
		5/56	. . . . Preventing backlash
		5/58	. . . . Safety devices {(protecting the operator <a href="#">B23Q 11/0089</a> )}

- 5/585 . . . {Preventing the misuse of accessories, e.g. chuck keys}
- 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](#))**
- 7/001 . {Lateral transport of long workpieces}
- 7/002 . {Screw or rotary spiral conveyors ([B23Q 7/1426](#) takes precedence)}
- 7/003 . {Cyclically moving conveyors ([B23Q 7/1426](#) takes precedence)}
- 7/005 . {Lifting devices}
- 7/006 . {Ejectors}
- 7/007 . {Flying working devices}
- 7/008 . {Catching devices ([B23Q 7/12](#) takes precedence)}
- 7/02 . by means of drums or rotating tables or discs
- 7/03 . by means of endless chain conveyors ([B23Q 7/1447](#), [B23Q 7/16](#) take precedence)
- 7/035 . . {on which work holders are fixed}
- 7/04 . by means of grippers ([B23Q 7/1494](#) takes precedence)}
- 7/041 . . {step by step}
- 7/042 . . . {for the axial transport of long workpieces ([B23B 13/022](#) takes precedence)}
- 7/043 . . {Construction of the grippers ([B23Q 7/048](#) takes precedence)}
- 7/045 . . {using a tool holder as a work-transporting gripper}
- 7/046 . . {Handling workpieces or tools}
- 7/047 . . {the gripper supporting the workpiece during machining}
- 7/048 . . {Multiple gripper units}
- 7/05 . by means of roller-ways ([B23Q 7/1468](#), [B23Q 7/16](#) take precedence)
- 7/055 . . {some of the rollers being driven}
- 7/06 . by means of pushers ([B23Q 7/1457](#), [B23Q 7/1489](#), [B23B 13/02](#), [B23B 13/12](#) take precedence)}
- 7/08 . by means of slides or chutes
- 7/10 . by means of magazines
- 7/103 . . {for flat material}
- 7/106 . . {with means to deliver a certain quantity ([B23Q 7/103](#) takes precedence)}
- 7/12 . Sorting arrangements
- 7/14 . co-ordinated in production lines
- 7/1405 . . {with a series disposition of similar working devices}
- 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}
- 7/1415 . . {with a series disposition of working devices not corresponding with the sequence of the working}
- 7/1421 . . {with a parallel disposition of working devices}
- 7/1426 . . {with work holders not rigidly fixed to the transport devices ([B23Q 7/005](#), [B23Q 7/035](#) take precedence)}
- 7/1431 . . . {Work holder changers ([B23Q 7/1442](#) takes precedence)}
- 7/1436 . . . {using self-propelled work holders}
- 7/1442 . . . {using carts carrying work holders}
- 7/1447 . . . {using endless conveyors}
- 7/1452 . . . . {comprising load-supporting surfaces}
- 7/1457 . . . . {comprising an impeller or a series of impellers}
- 7/1463 . . . {using rotary driving means}
- 7/1468 . . . . {comprising rollers or cogwheels, or pinions or the like}
- 7/1473 . . . . {comprising screw conveyors}
- 7/1478 . . . {using a conveyor comprising cyclically-moving means}
- 7/1484 . . . . {with carrier means}
- 7/1489 . . . . {with impeller means}
- 7/1494 . . . {using grippers}
- 7/16 . Loading work on to conveyors; Arranging work on conveyors, e.g. varying spacing between individual workpieces
- 7/165 . . {Turning devices}
- 7/18 . . Orienting work on conveyors
- 9/00 Arrangements for supporting or guiding portable metal-working machines or apparatus ({turning machine for reconditioning wheel sets without removing same from vehicle [B23B 5/32](#);} for tapping pipes {[B23B 41/00](#), [F16L 41/04](#)}; specially designed for drilling {[B23B 45/00](#), [B25H 1/0021](#)})**
- 9/0007 . {Portable machines comprising means for their guidance or support directly on the workpiece}
- 9/0014 . {Portable machines provided with or cooperating with guide means supported directly by the workpiece during action}
- 9/0021 . . {the tool being guided in a circular path}
- 9/0028 . . {the guide means being fixed only on the machine}
- 9/0035 . . . {and being capable of guiding the tool in a circular path}
- 9/0042 . . {the guide means being fixed only on the workpiece}
- 9/005 . . . {angularly adjustable}
- 9/0057 . . . {and being capable of guiding the tool in a circular path}
- 9/0064 . {Portable machines cooperating with guide means not supported by the workpiece during working}
- 9/0071 . . {the guide means being fixed to the machine}
- 9/0078 . . {the guide means being fixed to a support}
- 9/0085 . . . {Angularly adjustable}
- 9/0092 . . . {Workpieces angularly adjustable relative to the support}
- 9/02 . for securing machines or apparatus to workpieces, or other parts, of particular shape, e.g. to beams of particular cross-section
- Accessories**
- 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](#))**
- 11/0003 . {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)}

- 11/0007 . . {by compensating occurring thermal dilations ([B23Q 15/18](#) takes precedence)}
- 11/001 . {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](#))}
- 11/0014 . . {using static reinforcing elements, e.g. pre-stressed ties}
- 11/0017 . . {compensating the weight of vertically moving elements, e.g. by balancing liftable machine parts ([B23B 47/26](#) takes precedence)}
- 11/0021 . . . {the elements being rotating or pivoting}
- 11/0025 . . . {using resilient means, e.g. springs, hydraulic dampers}
- 11/0028 . . {by actively reacting to a change of the configuration of the machine ([B23Q 15/00](#) takes precedence)}
- 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](#))}
- 11/0035 . . {by adding or adjusting a mass, e.g. counterweights}
- 11/0039 . . {by changing the natural frequency of the system or by continuously changing the frequency of the force which causes the vibration}
- 11/0042 . {Devices for removing chips ([B23Q 11/02](#), [B23Q 11/0875](#) take precedence)}
- 11/0046 . . {by sucking}
- 11/005 . . {by blowing}
- 11/0053 . . {using the gravity force}
- 11/0057 . . {outside the working area}
- 11/006 . . {by sucking and blowing simultaneously}
- 11/0064 . . {by using a magnetic or electric field}
- 11/0067 . . {chip containers located under a machine or under a chip conveyor}
- 11/0071 . . {dust collectors for hand tools}
- 11/0075 . . {for removing chips or coolant from the workpiece after machining}
- 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](#))}
- 11/0082 . . {by determining whether the operator is in a dangerous position ([B23Q 17/2438](#) takes precedence)}
- 11/0085 . . {by determining whether the machine tool is in a dangerous configuration}
- 11/0089 . . {actuating operator protecting means, e.g. closing a cover element, producing an alarm signal}
- 11/0092 . . {actuating braking or stopping means}
- 11/0096 . . {protecting against noise}
- 11/02 . Devices for removing scrap from the cutting teeth of circular {or non-circular} cutters
- 11/04 . Arrangements preventing overload of tools, e.g. restricting load
- 11/06 . Safety devices for circular cutters
- 11/08 . Protective coverings for parts of machine tools; Splash guards
- 2011/0808 . . {Means for maintaining identical distances between relatively movable cover parts}
- 11/0816 . . {Foldable coverings, e.g. bellows}
- 11/0825 . . {Relatively slidable coverings, e.g. telescopic}
- 11/0833 . . . {with a non-rectilinear shifting}
- 11/0841 . . . {with spirally wound coverings}
- 11/085 . . {Flexible coverings, e.g. coiled-up belts}
- 11/0858 . . {using a liquid bath or a liquid curtain}
- 11/0866 . . {using covering means adaptable to the workpieces, e.g. curtains or bristles}
- 11/0875 . . {Wipers for clearing foreign matter from slideways or slidable coverings}
- 11/0883 . . {for spindles, e.g. for their bearings or casings}
- 11/0891 . . {arranged between the working area and the operator}
- 11/10 . Arrangements for cooling or lubricating tools or work
- 11/1007 . . {by submerging the tools or work partially or entirely in a liquid}
- 11/1015 . . {by supplying a cutting liquid through the spindle}
- 11/1023 . . . {Tool holders, or tools in general specially adapted for receiving the cutting liquid from the spindle}
- 11/103 . . . {Rotary joints specially adapted for feeding the cutting liquid to the spindle}
- 11/1038 . . {using cutting liquids with special characteristics, e.g. flow rate, quality}
- 11/1046 . . . {using a minimal quantity of lubricant (spraying apparatus using a carrying fluid [B05B 7/00](#))}
- 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](#))}
- 11/1061 . . . {using cutting liquids with specially selected composition or state of aggregation}
- 11/1069 . . {Filtration systems specially adapted for cutting liquids ([filtration in general B01D 24/00 - B01D 41/00](#))}
- 11/1076 . . {with a cutting liquid nozzle specially adaptable to different kinds of machining operations}
- 11/1084 . . {specially adapted for being fitted to different kinds of machines}
- 11/1092 . . {specially adapted for portable power-driven tools}
- 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](#))}
- 11/121 . . {with lubricating effect for reducing friction ([F16C 33/66](#) and [F16H 57/04](#) take precedence)}
- 11/122 . . . {Lubricant supply devices ([F16N 7/00](#) takes precedence)}
- 11/123 . . . {for lubricating spindle bearings ([F16C 33/66](#) takes precedence)}
- 11/124 . . . {for lubricating linear guiding systems ([F16C 29/005](#) takes precedence)}
- 11/125 . . . {for lubricating ball screw systems}
- 11/126 . . {for cooling only}
- 11/127 . . . {for cooling motors or spindles}
- 11/128 . . . {for cooling frame parts}
- 11/14 . Methods or arrangements for maintaining a constant temperature in parts of machine tools
- 11/141 . . {using a closed fluid circuit for cooling or heating}
- 11/143 . . {comprising heating means}
- 11/145 . . {using a jet of gas or cutting liquid}

- 11/146 . . {by controlling the temperature of a cutting liquid}
- 11/148 . . {by controlling the air temperature}
- 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****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)

- 15/007 . while the tool acts upon the workpiece
- 15/0075 . . {Controlling reciprocating movement, e.g. for planing-machine}
- 15/013 . . Control or regulation of feed movement (B23Q 15/12 takes precedence)
- 15/02 . . . according to the instantaneous size and the required size of the workpiece acted upon (B23Q 15/06 takes precedence)
- 15/04 . . . according to the final size of the previously-machined workpiece (B23Q 15/06 takes precedence)
- 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
- 15/08 . . Control or regulation of cutting velocity (B23Q 15/12 takes precedence)
- 15/10 . . . to maintain constant cutting velocity between tool and workpiece
- 15/12 . . Adaptive control, i.e. adjusting itself to have a performance which is optimum according to a preassigned criterion
- 15/14 . . Control or regulation of the orientation of the tool with respect to the work
- 15/16 . . Compensation for wear of the tool
- 15/18 . . Compensation of tool-deflection due to temperature or force
- 15/20 . before or after the tool acts upon the workpiece
- 15/22 . . Control or regulation of position of tool or workpiece
- 15/225 . . . {in feed control, i.e. approaching of tool or work in successive decreasing velocity steps}
- 15/24 . . . of linear position
- 15/26 . . . of angular position
- 15/28 . . with compensation for tool wear

**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)

- 16/001 . {Stops, cams, or holders therefor}
- 16/002 . . {Stops for use in a hollow spindle}
- 16/003 . {with means to return a tool back, after its withdrawal movement, to the previous working position}
- 16/004 . {positioning by combining gauges of different dimensions from a set of two or more gauges}
- 16/005 . {Equipment for measuring the contacting force or the distance before contacting between two members during the positioning operation}

- 16/006 . {positioning by bringing a stop into contact with one of two or more stops, fitted on a common carrier}
- 16/007 . {Positioning by sine tables}
- 16/008 . {Cushioning the abutting movement}
- 16/02 . Indexing equipment (specially adapted for gear-cutting machines B23F 23/08)
- 16/021 . . {in which only the positioning elements are of importance (B23Q 16/04, B23Q 16/08 take precedence)}
- 16/022 . . {in which only the indexing movement is of importance}
- 16/023 . . . {by converting a reciprocating or oscillating movement into or linear indexing movement}
- 16/024 . . . {and by converting a continuous movement into a linear indexing movement}
- 16/025 . . . {by converting a continuous movement into a rotary indexing movement}
- 16/026 . . . {by converting a reciprocating or oscillating movement into a rotary indexing movement}
- 16/027 . . {with means for adjusting the distance between two successive indexing-points}
- 16/028 . . {with positioning means between two successive indexing-points}
- 16/04 . . having intermediate members, e.g. pawls, for locking the relatively movable parts in the indexed position
- 16/043 . . . {with a reciprocating or oscillating drive (B23Q 16/06 takes precedence)}
- 16/046 . . . {with a continuous drive (B23Q 16/06 takes precedence)}
- 16/06 . . . Rotary indexing
- 16/065 . . . . {with a continuous drive}
- 16/08 . . having means for clamping the relatively movable parts together in the indexed position
- 16/083 . . . {with a reciprocating or oscillating drive (B23Q 16/10 takes precedence)}
- 16/086 . . . {with a continuous drive (B23Q 16/10 takes precedence)}
- 16/10 . . . Rotary indexing
- 16/102 . . . . {with a continuous drive}
- 16/105 . . . . {clamping with a disc brake}
- 16/107 . . . . {clamping with a drum brake}
- 16/12 . . using optics

**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)**

- 2017/001 . {Measurement or correction of run-out or eccentricity}
- 17/002 . {for indicating or measuring the holding action of work or tool holders (B23Q 3/16 takes precedence)}
- 17/003 . . {by measuring a position}
- 17/005 . . {by measuring a force, a pressure or a deformation}
- 17/006 . {for indicating the presence of a work or tool in its holder (B23Q 17/002, B23Q 17/09 take precedence)}
- 17/007 . {for managing machine functions not concerning the tool}
- 17/008 . . {Life management for parts of the machine (tool life management B23Q 17/0995)}

- 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](#))
- 17/0904 . . . {before or after machining}
- 17/0909 . . . . {Detection of broken tools}
- 17/0914 . . . . {Arrangements for measuring or adjusting cutting-tool geometry machine tools}
- 17/0919 . . . . {Arrangements for measuring or adjusting cutting-tool geometry in presetting devices}
- 17/0923 . . . . . {Tool length}
- 17/0928 . . . . . {Cutting angles of lathe tools}
- 17/0933 . . . . . {Cutting angles of milling cutters}
- 17/0938 . . . . . {Cutting angles of drills}
- 17/0942 . . . . . {Cutting angles of saws}
- 17/0947 . . . . . {Monitoring devices for measuring cutting angles}
- 17/0952 . . . {during machining}
- 17/0957 . . . . {Detection of tool breakage (detecting failure of drills [B23B 49/001](#))}
- 17/0961 . . . . {by measuring power, current or torque of a motor}
- 17/0966 . . . . {by measuring a force on parts of the machine other than a motor}
- 17/0971 . . . . {by measuring mechanical vibrations of parts of the machine (arrangements for measuring vibrations [B23Q 17/12](#))}
- 17/0976 . . . . . {Detection or control of chatter ([B23Q 15/12](#) takes precedence)}
- 17/098 . . . . {by measuring noise}
- 17/0985 . . . . {by measuring temperature}
- 17/099 . . . . {by measuring features of the machined workpiece (arrangements for measuring workpiece characteristics [B23Q 17/20](#))}
- 17/0995 . . . {Tool life management}
- 17/10 . . . for indicating or measuring cutting speed or number of revolutions
- 17/12 . . . for indicating or measuring vibration
- 17/20 . . . for indicating or measuring workpiece characteristics, e.g. contour, dimension, hardness
- 17/22 . . . for indicating or measuring existing or desired position of tool or work {([B23Q 16/005](#) takes precedence)}
- 17/2208 . . . {Detection or prevention of collisions}
- 17/2216 . . . {for adjusting the tool into its holder ([B23Q 17/0923](#) - [B23Q 17/0942](#) takes precedence)}
- 17/2225 . . . . {with the toolholder as reference-element}
- 17/2233 . . . . {for adjusting the tool relative to the workpiece}
- 17/2241 . . . . {Detection of contact between tool and workpiece}
- 17/225 . . . . {of a workpiece relative to the tool-axis}
- 17/2258 . . . . . {the workpiece rotating during the adjustment relative to the tool axis}
- 17/2266 . . . . {of a tool relative to a workpiece-axis}
- 17/2275 . . . . {of a tool-axis relative to a workpiece-axis}
- 17/2283 . . . . {for adjusting the distance between coaxially rotating tools}
- 17/2291 . . . . {for adjusting the workpiece relative to the holder thereof}
- 17/24 . . . using optics {or electromagnetic waves}
- 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](#))}
- 17/2409 . . . . {Arrangements for indirect observation of the working space using image recording means, e.g. a camera}
- 17/2414 . . . . {for indicating desired positions guiding the positioning of tools or workpieces ([B25H 1/0092](#) takes precedence)}
- 17/2419 . . . . . {by projecting a single light beam}
- 17/2423 . . . . . {by projecting crossing light beams}
- 17/2428 . . . . {for measuring existing positions of tools or workpieces}
- 17/2433 . . . . {Detection of presence or absence}
- 17/2438 . . . . . {of an operator or a part thereof}
- 17/2442 . . . . . {of a tool}
- 17/2447 . . . . . {of a workpiece}
- 17/2452 . . . . {for measuring features or for detecting a condition of machine parts, tools or workpieces ([B23Q 17/2428](#), [B23Q 17/2433](#) take precedence)}
- 17/2457 . . . . . {of tools}
- 17/2461 . . . . . . {Length}
- 17/2466 . . . . . . {Diameter}
- 17/2471 . . . . . {of workpieces}
- 17/2476 . . . . . {of clamping devices, e.g. work or tool holders}
- 17/248 . . . . {using special electromagnetic means or methods}
- 17/2485 . . . . . {using interruptions of light beams}
- 17/249 . . . . . {using image analysis, e.g. for radar, infrared or array camera images}
- 17/2495 . . . . . {using interferometers}
- 23/00** . . . **Arrangements for compensating for irregularities or wear, e.g. of ways, of setting mechanisms (automatic control [B23Q 15/00](#))**
- 27/00** . . . **Geometrical mechanisms for the production of work of particular shapes, not fully provided for in another subclass**
- 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}
- 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](#)

**33/00** **Methods for copying**

<b>35/00</b>	<b>Control systems or devices for copying directly from a pattern or a master model; Devices for use in copying manually</b> <a href="#">{(copy milling classified also in B27C 5/003)}</a>	35/32	. . . . . in which the feeler makes and breaks an electrical contact or contacts, e.g. with brush-type tracers
35/005	. {Copying by a curve composed of arcs of circles}	35/34	. . . . . in which the feeler varies an electrical characteristic in a circuit, e.g. capacity, frequency
35/02	. Copying discrete points from the pattern, e.g. for determining the position of holes to be drilled	35/36	. . . . . for control of a hydraulic or pneumatic copying system
35/04	. using a feeler or the like travelling along the outline of the pattern, model or drawing; Feelers, patterns, or models therefor	35/38	. . . . . designed for sensing the pattern, model, or drawing without physical contact <a href="#">(sensing by means of a fluid jet B23Q 35/36)</a>
35/06	. . specially adapted for controlling successive operations, e.g. separate cuts, on a workpiece	35/40	. . . . . involving optical or photoelectrical systems
35/08	. . Means for transforming movement of the feeler or the like into feed movement of tool or work	35/42	. . Patterns; Masters models
35/10	. . . mechanically only	35/44	. . . provided with means for adjusting the contact face, e.g. comprising flexible bands held by set-screws
35/101	. . . . . {with a pattern composed of one or more lines used simultaneously for one tool}	35/46	. . . Supporting devices therefor
35/102	. . . . . {of one line}	35/48	. using a feeler or the like travelling to-and-fro between opposite parts of the outline of the pattern, model or drawing
35/103	. . . . . {which turns continuously}		
35/104	. . . . . {with coaxial tool and feeler}		
35/105	. . . . . {of two lines}		
35/106	. . . . . {with a single tool and two feelers rotating about parallel axis}		
35/107	. . . . . {tool and feelers being coaxial}		
35/108	. . . . . {of three or more lines}		
35/109	. . . . . {with a continuously turning pattern <a href="#">(B23Q 35/101 takes precedence)</a> }		
35/12	. . . involving electrical means <a href="#">(programme recording for copying purposes in a separate apparatus G05, G11)</a>		
35/121	. . . . . using mechanical sensing		
35/122	. . . . . the feeler opening or closing electrical contacts	37/002	. {Convertible machines, e.g. from horizontally working into vertically working <a href="#">(B27B 5/165: convertible sawing devices)</a> }
35/123	. . . . . the feeler varying the impedance in a circuit	37/005	. {Modular base frames}
35/124	. . . . . varying resistance	37/007	. {Modular machining stations designed to be linked to each other}
35/125	. . . . . varying capacitance		
35/126	. . . . . varying inductance	<b>39/00</b>	<b>Metal-working machines incorporating a plurality of sub-assemblies, each capable of performing a metal-working operation</b> <a href="#">(B23Q 33/00, B23P 23/00 take precedence)</a>
35/127	. . . . . using non-mechanical sensing	2039/002	. {Machines with twin spindles}
35/128	. . . . . Sensing by using optical means	2039/004	. {Machines with tool turrets}
35/129	. . . . . Sensing by means of electric discharges	2039/006	. {Machines with multi-spindles}
35/13	. . . . . Sensing by using magnetic means	2039/008	. {Machines of the lathe type}
35/14	. . . . . controlling one or more electromotors	39/02	. the sub-assemblies being capable of being brought to act at a single operating station
35/16	. . . . . controlling fluid motors	39/021	. . {with a plurality of toolheads per workholder, whereby the toolhead is a main spindle, a multispindle, a revolver or the like}
35/18	. . . involving fluid means <a href="#">(B23Q 35/16 takes precedence)</a>	39/022	. . . {with same working direction of toolheads on same workholder}
35/181	. . . . . {with a pattern composed of one or more lines used simultaneously}	39/023	. . . . . {simultaneous working of toolheads}
35/183	. . . . . {of one line}	39/024	. . . . . {consecutive working of toolheads}
35/185	. . . . . {turning continuously}	39/025	. . . . . {with different working directions of toolheads on same workholder}
35/186	. . . . . {of two lines}	39/026	. . . . . {simultaneous working of toolheads}
35/188	. . . . . {with a continuously turning pattern <a href="#">(B23Q 35/181 takes precedence)</a> }	39/027	. . . . . {consecutive working of toolheads}
35/20	. . . with special means for varying the ratio of reproduction	39/028	. . {with a plurality of workholder per toolhead in operating position <a href="#">(with only one workholder in operating position B23Q 1/66)</a> }
35/22	. . . specially adapted for compensating for wear of the tool	39/029	. . . {with a twin table for alternatively working on one of the tables}
35/24	. . Feelers; Feeler units		
35/26	. . . designed for a physical contact with a pattern or a model		
35/28	. . . . . for control of a mechanical copying system		
35/30	. . . . . for control of an electrical or electro-hydraulic copying system		

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

<b>37/00</b>	<b>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</b> <a href="#">(features relating to particular metal-working operations, see the relevant subclass, e.g. B23P 23/00)</a>
37/002	. {Convertible machines, e.g. from horizontally working into vertically working <a href="#">(B27B 5/165: convertible sawing devices)</a> }
37/005	. {Modular base frames}
37/007	. {Modular machining stations designed to be linked to each other}
<b>39/00</b>	<b>Metal-working machines incorporating a plurality of sub-assemblies, each capable of performing a metal-working operation</b> <a href="#">(B23Q 33/00, B23P 23/00 take precedence)</a>
2039/002	. {Machines with twin spindles}
2039/004	. {Machines with tool turrets}
2039/006	. {Machines with multi-spindles}
2039/008	. {Machines of the lathe type}
39/02	. the sub-assemblies being capable of being brought to act at a single operating station
39/021	. . {with a plurality of toolheads per workholder, whereby the toolhead is a main spindle, a multispindle, a revolver or the like}
39/022	. . . {with same working direction of toolheads on same workholder}
39/023	. . . . . {simultaneous working of toolheads}
39/024	. . . . . {consecutive working of toolheads}
39/025	. . . . . {with different working directions of toolheads on same workholder}
39/026	. . . . . {simultaneous working of toolheads}
39/027	. . . . . {consecutive working of toolheads}
39/028	. . {with a plurality of workholder per toolhead in operating position <a href="#">(with only one workholder in operating position B23Q 1/66)</a> }
39/029	. . . {with a twin table for alternatively working on one of the tables}

39/04	<ul style="list-style-type: none"> <li>the sub-assemblies being arranged to operate simultaneously at different stations, e.g. with an annular work-table moved in steps (<a href="#">associations of machines connected only by work-transferring means B23Q 41/00</a>)</li> </ul>	<b>2701/00</b>	<b>Members which are comprised in the general build-up of a form of the machine</b>
39/042	<ul style="list-style-type: none"> <li>. . {with circular arrangement of the sub-assemblies}</li> </ul>	2701/01	<ul style="list-style-type: none"> <li>Frames or slideways for lathes; Frames for boring machines</li> </ul>
39/044	<ul style="list-style-type: none"> <li>. . . {having at least one tool station cooperating with each work holder, e.g. multi-spindle lathes}</li> </ul>	2701/02	<ul style="list-style-type: none"> <li>Movable or adjustable work or tool supports for milling machines, their drive, control or guiding</li> </ul>
39/046	<ul style="list-style-type: none"> <li>. . . {including a loading and/or unloading station}</li> </ul>	2701/025	<ul style="list-style-type: none"> <li>. . Work-tables rotating around an axis vertical to the surface of the table; this kind of table comprising a divider, indexer or positioning means</li> </ul>
39/048	<ul style="list-style-type: none"> <li>. . {the work holder of a work station transfers directly its workpiece to the work holder of a following work station}</li> </ul>	2701/04	<ul style="list-style-type: none"> <li>Support braces for a milling machine</li> </ul>
<b>41/00</b>	<b>Combinations or associations of metal-working machines not directed to a particular result according to classes <a href="#">B21</a>, <a href="#">B23</a>, or <a href="#">B24</a> (<a href="#">B23Q 37/00</a>, <a href="#">B23Q 39/00</a> take precedence; features relating to operations performed, if the different metal-working operations are of the same kind, <a href="#">see</a> the subclass for the kind of operation, e.g. punching <a href="#">B21D</a>, welding <a href="#">B23K</a>, grinding <a href="#">B24B</a>; features relating to technically specified combinations of different metal-working operations <a href="#">B23P 23/00</a>)</b>	2701/06	<ul style="list-style-type: none"> <li>Tailstock for the spindle of a milling machine</li> </ul>
41/02	<ul style="list-style-type: none"> <li>Features relating to transfer of work between machines (<a href="#">arrangements for handling work for machine tools coordinated in production lines B23Q 7/14</a>)</li> </ul>	<b>2703/00</b>	<b>Work clamping</b>
41/04	<ul style="list-style-type: none"> <li>Features relating to relative arrangements of machines</li> </ul>	2703/02	<ul style="list-style-type: none"> <li>Work clamping means</li> </ul>
41/06	<ul style="list-style-type: none"> <li>Features relating to organisation of working of machines</li> </ul>	2703/04	<ul style="list-style-type: none"> <li>. . using fluid means or a vacuum</li> </ul>
41/08	<ul style="list-style-type: none"> <li>Features relating to maintenance of efficient operation</li> </ul>	2703/06	<ul style="list-style-type: none"> <li>. . Mandrels with non rotatable claws; Mandrels with internal clamping; Clamping elements</li> </ul>
<b>2210/00</b>	<b>Machine tools incorporating a specific component</b>	2703/08	<ul style="list-style-type: none"> <li>. . Devices for clamping a plurality of workpieces</li> </ul>
2210/002	<ul style="list-style-type: none"> <li>Flexures</li> </ul>	2703/10	<ul style="list-style-type: none"> <li>. . Devices for clamping workpieces of a particular form or made from a particular material</li> </ul>
2210/004	<ul style="list-style-type: none"> <li>Torque motors</li> </ul>	2703/105	<ul style="list-style-type: none"> <li>. . . for clamping a crankshaft</li> </ul>
2210/006	<ul style="list-style-type: none"> <li>Curved guiding rails</li> </ul>	2703/12	<ul style="list-style-type: none"> <li>Accessories for attaching</li> </ul>
2210/008	<ul style="list-style-type: none"> <li>Flexible guiding rails</li> </ul>	<b>2705/00</b>	<b>Driving working spindles or feeding members carrying tools or work</b>
<b>2220/00</b>	<b>Machine tool components</b>	2705/005	<ul style="list-style-type: none"> <li>General aspects of driving arrangements in a lathe, e.g. indexing the spindle, devices for keeping the cutting speed constant, braking or reversing devices</li> </ul>
2220/002	<ul style="list-style-type: none"> <li>Tool turrets</li> </ul>	2705/02	<ul style="list-style-type: none"> <li>Driving working spindles</li> </ul>
2220/004	<ul style="list-style-type: none"> <li>Rotary tables</li> </ul>	2705/023	<ul style="list-style-type: none"> <li>. . General aspects of driving a boring spindle</li> </ul>
2220/006	<ul style="list-style-type: none"> <li>Spindle heads</li> </ul>	2705/026	<ul style="list-style-type: none"> <li>. . Main drive for the spindles of milling machines</li> </ul>
2220/008	<ul style="list-style-type: none"> <li>Rotatable tool holders coupled in parallel to a non rotating accessory</li> </ul>	2705/04	<ul style="list-style-type: none"> <li>. . by fluid pressure</li> </ul>
<b>2230/00</b>	<b>Special operations in a machine tool</b>	2705/043	<ul style="list-style-type: none"> <li>. . . for lathes</li> </ul>
2230/002	<ul style="list-style-type: none"> <li>Using the spindle for performing a non machining or non measuring operation, e.g. cleaning, actuating a mechanism</li> </ul>	2705/046	<ul style="list-style-type: none"> <li>. . . for broaching machines</li> </ul>
2230/004	<ul style="list-style-type: none"> <li>Using a cutting tool reciprocating at high speeds, e.g. "fast tool"</li> </ul>	2705/06	<ul style="list-style-type: none"> <li>. . Mechanical drives with means for varying the speed ratio</li> </ul>
2230/006	<ul style="list-style-type: none"> <li>Machining both ends of a workpiece consecutively</li> </ul>	2705/062	<ul style="list-style-type: none"> <li>. . . for lathes</li> </ul>
2230/008	<ul style="list-style-type: none"> <li>Machining the middle part and the ends of a workpiece consecutively</li> </ul>	2705/064	<ul style="list-style-type: none"> <li>. . . . mechanically controlled</li> </ul>
<b>2240/00</b>	<b>Machine tools specially suited for a specific kind of workpiece</b>	2705/066	<ul style="list-style-type: none"> <li>. . . . fluid pressure controlled</li> </ul>
2240/002	<ul style="list-style-type: none"> <li>Flat workpieces</li> </ul>	2705/068	<ul style="list-style-type: none"> <li>. . . . electrically controlled</li> </ul>
2240/005	<ul style="list-style-type: none"> <li>Flexible, deformable workpieces</li> </ul>	2705/08	<ul style="list-style-type: none"> <li>. . Devices for preselecting speed in gear boxes of lathes</li> </ul>
2240/007	<ul style="list-style-type: none"> <li>Elongated workpieces</li> </ul>	2705/10	<ul style="list-style-type: none"> <li>Feeding members carrying tools or work</li> </ul>
		2705/102	<ul style="list-style-type: none"> <li>. . for lathes</li> </ul>
		2705/104	<ul style="list-style-type: none"> <li>. . for milling machines</li> </ul>
		2705/106	<ul style="list-style-type: none"> <li>. . for planing machines</li> </ul>
		2705/108	<ul style="list-style-type: none"> <li>. . for slotting or mortising machines</li> </ul>
		2705/12	<ul style="list-style-type: none"> <li>. . Fluid-pressure drives</li> </ul>
		2705/122	<ul style="list-style-type: none"> <li>. . . for milling machines</li> </ul>
		2705/125	<ul style="list-style-type: none"> <li>. . . for planing machines</li> </ul>
		2705/127	<ul style="list-style-type: none"> <li>. . . for slotting or mortising machines</li> </ul>
		2705/14	<ul style="list-style-type: none"> <li>. . Electric drives</li> </ul>
		2705/145	<ul style="list-style-type: none"> <li>. . . for milling machines</li> </ul>
		2705/16	<ul style="list-style-type: none"> <li>. . Feeding working spindles</li> </ul>
		2705/165	<ul style="list-style-type: none"> <li>. . . General aspects of feeding a boring spindle</li> </ul>
		2705/18	<ul style="list-style-type: none"> <li>. . Feeding other members supporting tools also feeding working spindles supports</li> </ul>
		2705/182	<ul style="list-style-type: none"> <li>. . . in lathes</li> </ul>
		2705/185	<ul style="list-style-type: none"> <li>. . . . Clutches</li> </ul>
		2705/187	<ul style="list-style-type: none"> <li>. . . . Automatic clutches</li> </ul>
		2705/20	<ul style="list-style-type: none"> <li>. . . Gear boxes for thread cutting lathes with a lead screw</li> </ul>
		2705/22	<ul style="list-style-type: none"> <li>. Limiting feed movement of a boring spindle</li> </ul>

## B23Q

- 2705/24 . General aspects of limiting the carriage movement in lathes
- 2705/26 . Stopping the feed in case of overload or a break in a boring machine
  
- 2707/00 Automatic supply or removal of metal workpieces**
- 2707/003 . in a lathe
- 2707/006 . for thread cutting, e.g. bolts or screws
- 2707/02 . Drive
- 2707/025 . . Driving by vibration, shaking or jotting
- 2707/04 . by means of grippers also magnetic or pneumatic gripping
- 2707/05 . by means of roller ways
- 2707/06 . by means of magazines for plates
- 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
  
- 2709/00 Portable machines or devices for the cylindrical bores of valve bodies**
  
- 2716/00 Equipment for precise positioning of tool or work into particular locations**
- 2716/02 . Devices for the axial positioning of the turret in a lathe; Devices for rotating and blocking the turret
- 2716/04 . Indexing devices for boring machines
- 2716/06 . Headstock dividers or devices for dividing in milling machines
- 2716/08 . Holders for tools or work comprising a divider or positioning devices
  
- 2717/00 Arrangements for indicating or measuring**
- 2717/003 . in lathes
- 2717/006 . in milling machines
  
- 2727/00 Lathes or mechanisms for making work with a non-circular section without a model or a shaped tool**
  
- 2735/00 Control systems or devices for copying from a pattern or master model**
- 2735/002 . in a milling machine
- 2735/004 . . the workpiece being immobile during milling
- 2735/006 . . the workpiece rotating during milling
- 2735/008 . in a planing machine
- 2735/02 . Means for transforming movement of the feeler into feed movement of tool or work
- 2735/025 . . in a lathe
- 2735/04 . . mechanically only
- 2735/045 . . . in a milling machine
- 2735/06 . . involving electrical means
- 2735/062 . . . in a lathe
- 2735/065 . . . in a milling machine
- 2735/067 . . . with rotation of the workpiece during milling
- 2735/08 . . involving fluid means
- 2735/082 . . . in a lathe
- 2735/085 . . . in a milling machine
- 2735/087 . . . with rotation of the workpiece during milling