B23C

MILLING (broaching B23D; broach-milling in making gears B23F; arrangement for copying or controlling B23Q)

Definition statement

This place covers:

Milling machines, milling tools, milling methods and milling devices able to be attached to a machine tool other than a milling machine for milling metal and metal-like workpieces.

Milling should be interpreted as the removal of material in the form of chips from a workpiece by a rotating tool with a geometrically defined cutting edge wherein the main cutting force is generated as a result of the rotation of the tool in order to produce a shaped surface on the workpiece.

Relationships with other classification places

Cutting inserts, which are suitable for both milling and turning or for which no particular application is given are classified in B23B 27/14.

Milling of threads and tools for milling threads are classified in B23G.

Milling of gears is classified in B23F. Some gear milling tools may be classified in B23C as well if the disclosure is relevant for the general field of milling.

There is overlap with the circular sawing field (B23D 61/02) as some tools can be used as either milling cutters or saws.

References

Limiting references

This place does not cover:

Milling threads, tools for milling threads	B23G
Making particular items using non-specified or well-known milling techniques	B23P 15/00 or classed with product
Making milling tools other than by milling	B23P 15/28
Multi stage processes involving milling and also other operations classed in B23B, B23D, B23F and B23G, making particular items.	B23P 23/00
Details of machine tools and accessories not related to the operation being performed including:	B23Q
Clamping systems for workpiece tables	B23Q 3/00 & B25B
- tool changing	B23Q 3/155
- conveying workpiece into and from machine	B23Q 7/00
- evacuation of swarf,	B23Q 11/0042
- guarding & protective coverings	B23Q 11/08
Adaptive control and/or computer controls for milling processes	B23Q 15/00, G05B 15/02
- measuring or sensing	B23Q 17/00
Milling of wood	B27C
Milling of stone and glass	B28D 1/18

Cutting inserts characterised only by the composition of the hard metal material	C22C
Cutting inserts characterised only by the composition of the diamond cutting material	C23C 16/00
Cutting inserts characterised only by the composition of the coating	C23C 30/00

Informative references

Attention is drawn to the following places, which may be of interest for search:

Cleaning	B08B
Production by reshaping	B21J
Sintering	B22F
Turning/boring/drilling	B23B
Broaching/sawing/planing	B23D
Shearing of metals	B23D
Sawing	B23D
Production of gears	B23F
Making gears	B23F
Thread cutting	B23G
Making particular objects	B23P 15/00
Details of machine tools	B23Q
Copying mechanisms	B23Q 35/00
Grinding and production of lenses.	B24
Cutting of non-metals by severing	B26
Working of plastics	B29C
Ceramic products	C04B
Hard metal, composition of CBN compacts	C22C
Diamonds	C23C 16/00
Coatings	C23C 30/00
Keys	E05B
Numerical control	G05B
Optical recognition system	G06K
Motors	H02K

Special rules of classification

The use of Indexing Codes within the series B23C is widespread in the subclass. Indexing Codes should be allocated at every opportunity. When classifying milling cutters and milling inserts particular attention should be paid to the Indexing Codes. Indexing Codes should also be added routinely to give details of the workpiece or tool configuration, when this is not implicit in the classification system. For example a document showing a particular tool using machining of a crankshaft may be given a class for inventive information only for the details of the milling cutter. Such a document should also be allocated Indexing Codes relating to the workpiece type, the method of milling and/or further details of the milling cutter itself to allow easy retrieval.

The number of 200 series Indexing Codes is too high to list individually. Where the allocation of Indexing Code is compulsory, this is indicated in the templates for the main-group at the sub-group level.

- An set of drawings is provided under the definition statement for each main group. These drawings illustrate by example the content of the most widely used groups in this sub-class. Each of the drawings is taken from a document within from the group.

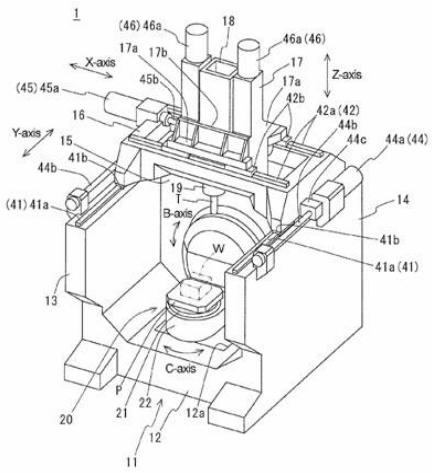
B23C 1/00

Milling machines not designed for particular work or special operations

Definition statement

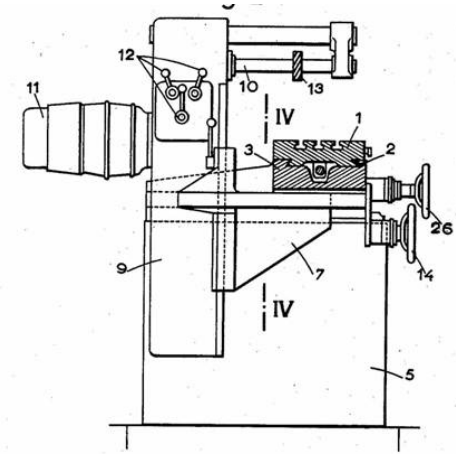
This place covers:

machines designed primarily for milling metallic materials.



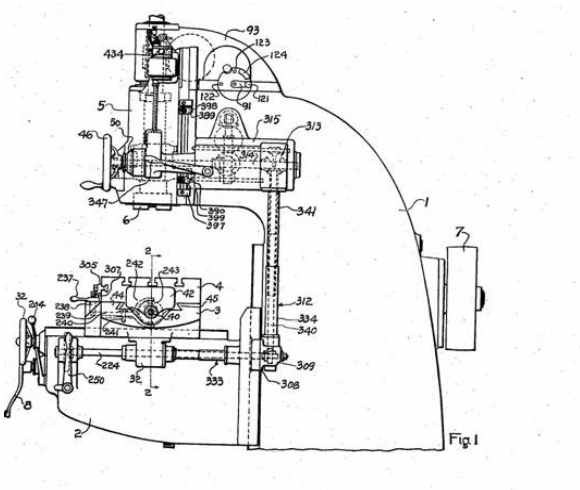
B23C 1/002

Gantry milling device (note also B23Q 1/012 portal machines)



B23C 1/027

Milling machine with adjustable working spindle



B23C 1/06

vertical milling machine

Relationships with other classification places

This group does not cover multi-purpose machines (e.g. jig borers, horizontal borers etc) that can perform drilling, milling and other operations. These types of machine are classified in B23Q with details of their constructional details.

Special rules of classification

Classification is generally per literal interpretation of the group and sub-group headings.

Further details of subgroups

Subgroup B23C 1/14 is not used. Refer to B23Q 1/00

Subgroups B23C 1/16 and B23C 1/18 are not used. Refer to B23Q 35/00

B23C 1/20 refers to portable milling devices. Note routers (which may be translated from German as "milling machines") are classed in B27C 5/10.

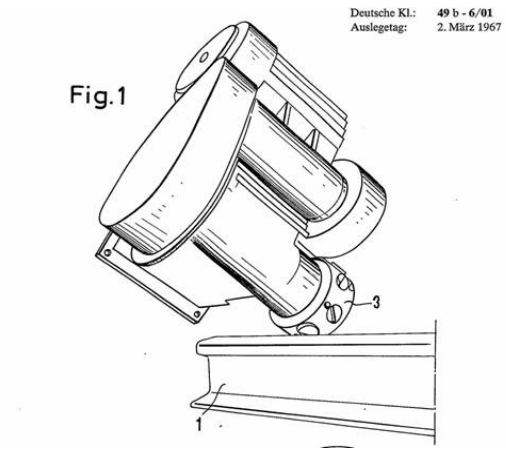
B23C 3/00

Milling particular work; Special milling operations; Machines therefor (milling gear-teeth B23F, {heat assisted machining B23P 25/00})

Definition statement

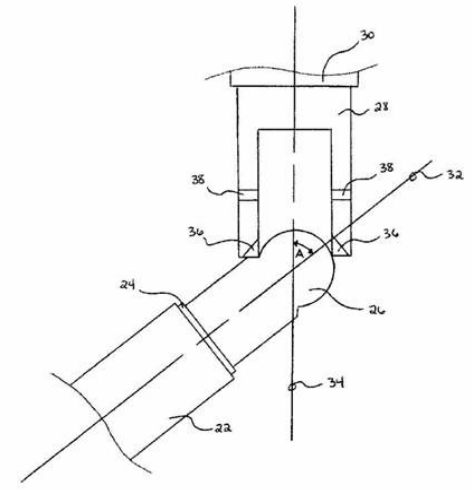
This place covers:

Milling particular work.



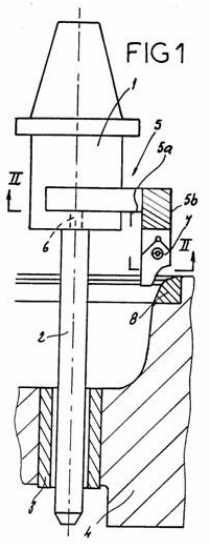
B23C 3/005

Rail milling device



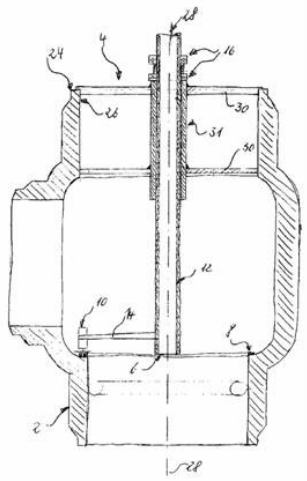
B23C 3/023

Milling spherical surfaces



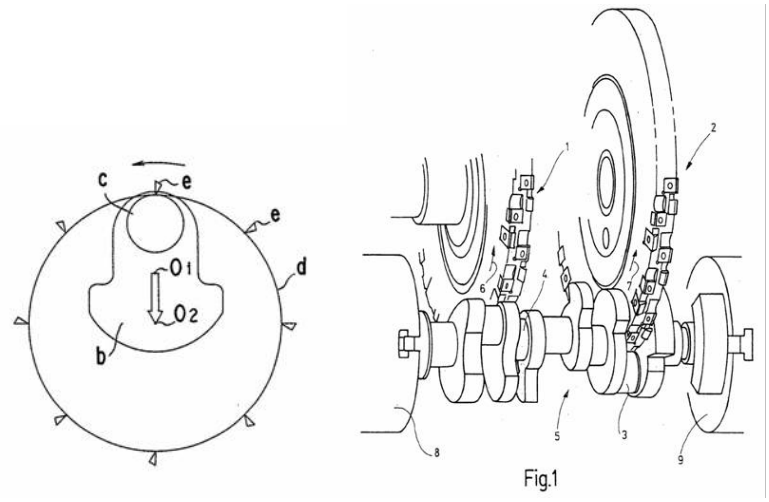
B23C 3/055

Engine valve seat milling tool



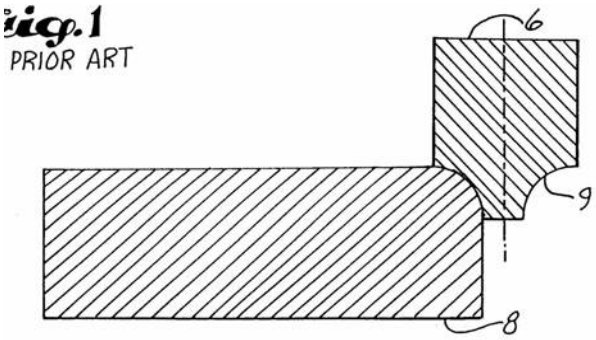
B23C 3/056

Seat milling tool for valve seat in a valve



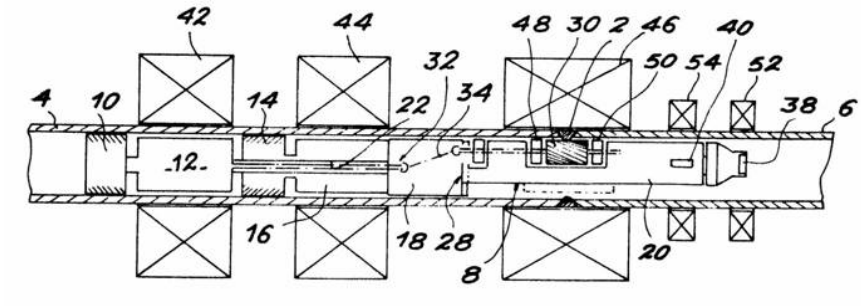
[B23C 3/06](#)

Milling crankshafts



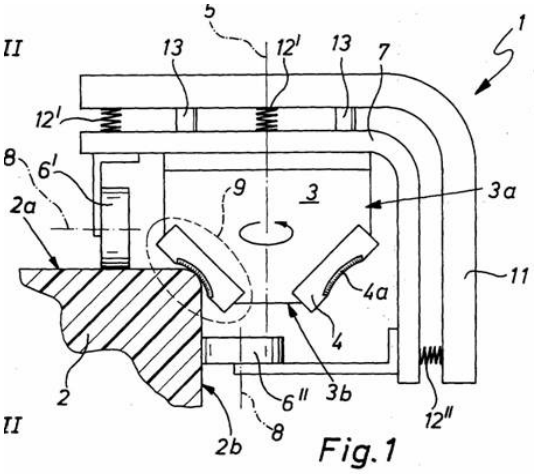
[B23C 3/12](#)

Finishing or trimming edges includes deburring by milling



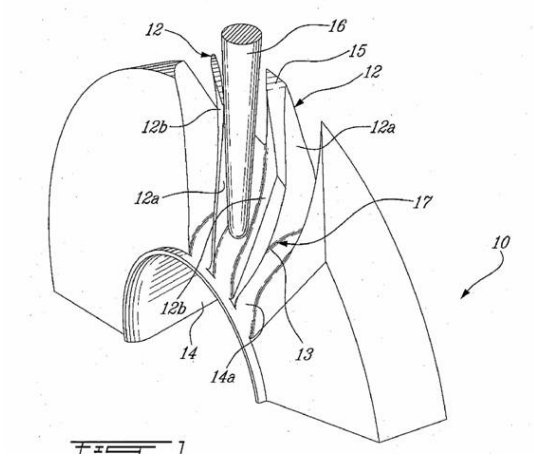
[B23C 3/124](#)

Milling edges off inside of pipe



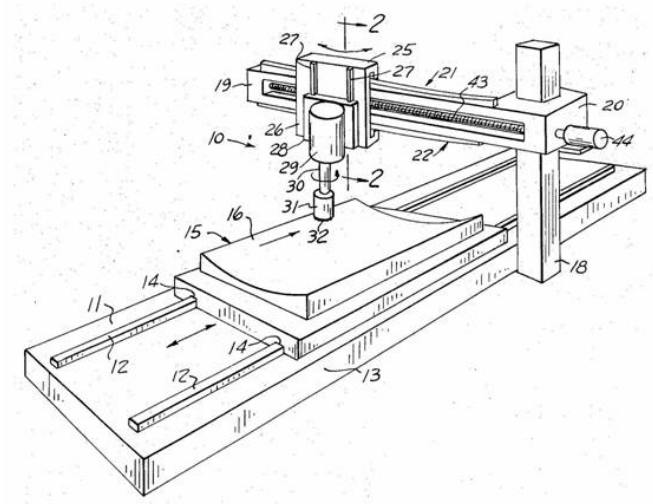
B23C 3/126

Portable device for chamfering edges



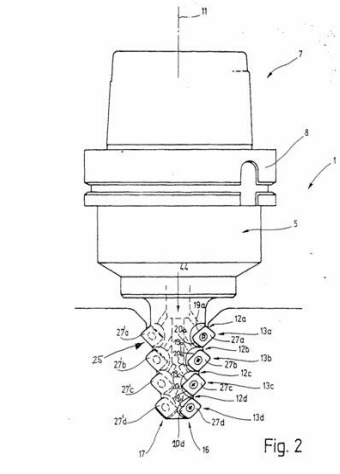
B23C 3/18 (and B23C 2215/44)

Milling turbine blades



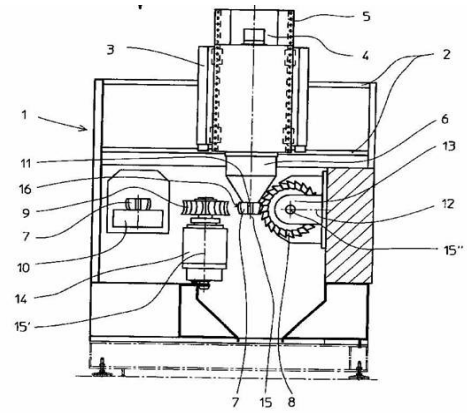
B23C 3/20

Milling dies



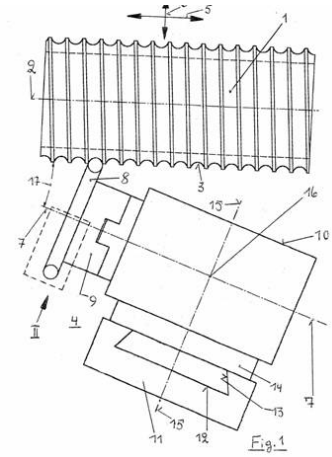
B23C 3/28 (and B23C 2220/366)

Milling grooves for turbine blades



B23C 3/30

Milling straight grooves in CV joint hub (7)



B23C 3/32

Milling helical grooves in cable drum.

Note B23G 1/32 threading by milling.

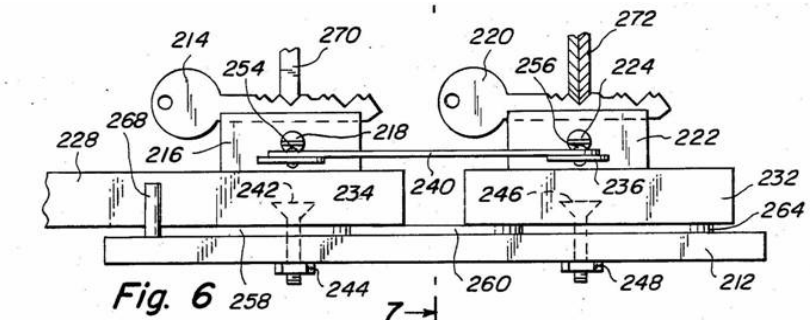


Fig. 6

B23C 3/35

Milling of keys

References

Limiting references

This place does not cover:

The production of items by the use of milling techniques which are known per se.	B23P

Special rules of classification

Classification is generally per literal interpretation of the group and subgroup headings. The following should be noted:

Further details of subgroups

- B23C 3/00: Miscellaneous milling operations for operations not provided in subgroups but where the milling process per se is relevant.
- B23C 3/02: Milling surfaces of revolution including orbital drilling. For orbital drilling, also allocate the Indexing Code B23C 2220/52.
- B23C 3/05: Milling valve seats, includes boring units.
- B23C 3/06, B23C 3/08: Milling crankshafts or camshafts. See also B23B 5/18 (turning) and B23D 37/005 (broaching).
- B23C 3/10: Milling of relief surfaces, including the milling of relief surfaces on tools
- B23C 3/12: Trimming edges (deburring by milling). Note deburring by grinding is classified in B24, deburring by scraping in B23D 79/00, deburring by chamfering drilled hole in B23B 51/10.
- B23C 3/16 Within this subgroup the terms "scrubbing" and "peeling" are synonyms for "milling". The important qualifier in this subgroup is the ingot (or similar workpiece).
- B23C 3/18: Milling curved surfaces of turbine blades etc. Note production of turbine blades B23P 15/02 and B23P 15/04.
- B23C 3/28: Milling grooves, including retaining grooves in turbine blades etc.
- B23C 3/35: Milling keys. Keys in this groups are the devices that fit in locks, not devices to prevent rotation between two objects. Optical recognition systems G06K. Keys per se E05B 19/00. Note the particular Indexing Codes B23C 2235/00 - B23C 2235/48.

B23C 3/355 should be interpreted as holders for both the master key and the key forming the workpiece being cut.

B23C 3/36 milling of milling cutters. Note that making of milling cutters by multi-stage processes (whether or not including milling) is classed in B23P 15/34. B23C 3/36 relates to the details of the process of milling milling cutters wherein the milling in itself is of interest.

B23C 5/00

Milling-cutters (for cutting gear-teeth B23F 21/12)

Special rules of classification

Classification is generally per literal interpretation of the group and subgroup headings.

Allocation of Indexing Codes from the section "Details of milling cutters" B23C 2210/00 is mandatory in B23C 5/00.

B23C 5/04

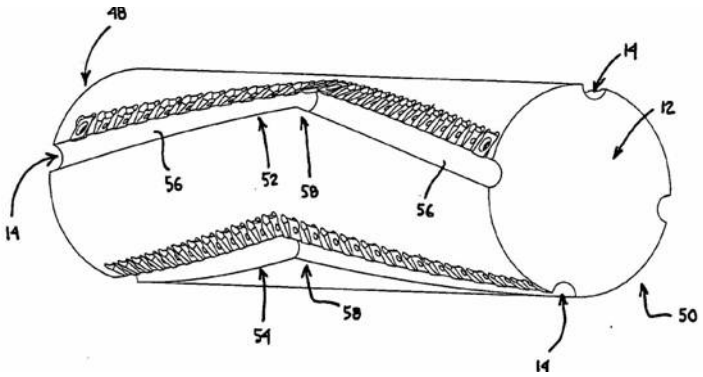
Plain cutters, i.e. having essentially a cylindrical or tapered cutting surface of substantial length (B23C 5/10 takes precedence)

Definition statement

This place covers:

Plain cutters having a generally long (in relation to diameter) circumferential cutting surface. Generally no cutting on end surfaces.

Plain milling cutter:



References

Limiting references

This place does not cover:

Shank-type cutters, i.e. with an integral shaft	B23C 5/10

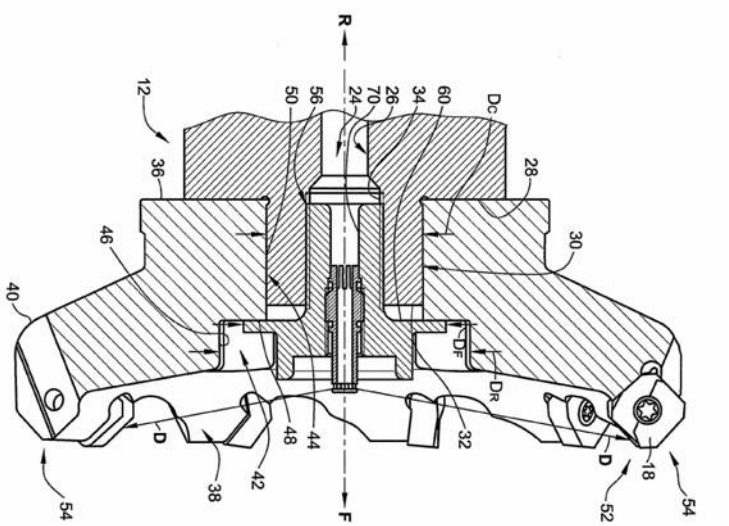
B23C 5/06

Face-milling cutters, i.e. having only or primarily a substantially flat cutting surface

Definition statement

This place covers:

Face-milling cutters used for producing flat surfaces that are at right angles to the axis of rotation of the cutter. Generally, the cutters cut a limited depth on the circumferential surface of the tool.



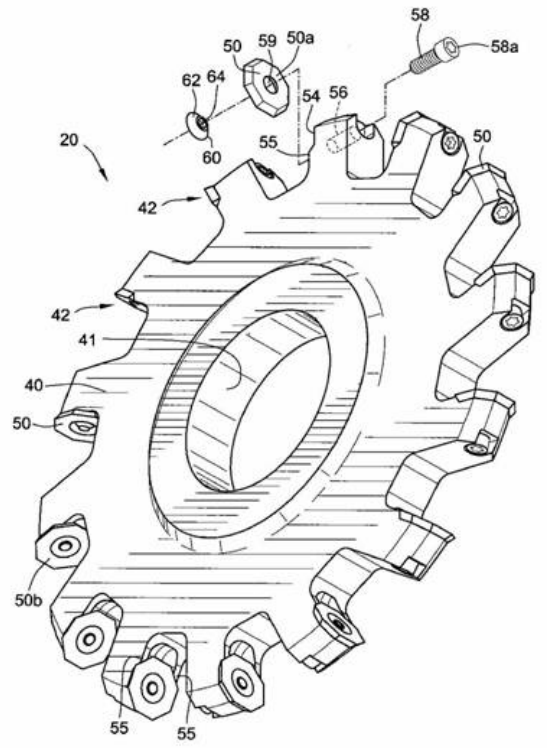
B23C 5/08

Disc-type cutters

Definition statement

This place covers:

Cutters having a cutter body with the general configuration of a disc, i.e. a thin, flat, round shape, for cutting grooves or slots into the workpiece. Also known as side cutter or side-and-face cutter.



Relationships with other classification places

When the cutter divides or cuts a metal workpiece into two pieces, the cutter is considered a sawing tool and should be classified in B23D 45/00.

Special rules of classification

Milling cutters used in whirling processes should receive a classification in B23C 2220/68.

Plate-like cutting inserts fitted on a ring or ring segment attached to a separate, main tool body should be classified in the following: B23C 5/2234, B23C 5/226, B23C 5/2291 or B23C 5/2309.

B23C 5/10

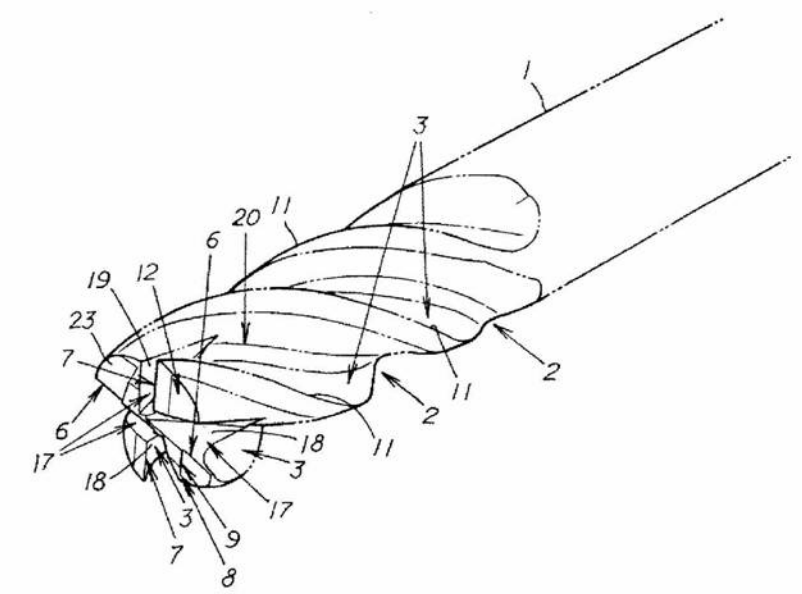
Shank-type cutters, i.e. with an integral shaft

Definition statement

This place covers:

An end mill (also called a slot drill) having a generally cylindrical shank with a cutting portion extending from the shank. The cutting portion is capable of cutting in the axial and radial directions by cutting edges on the circumferential and end surfaces of the cutting portion.

Milling cutter (slot drill) with shank having end cutters extending to cutter axis to enable axial feed:



Milling cutter with head detachable from shaft:

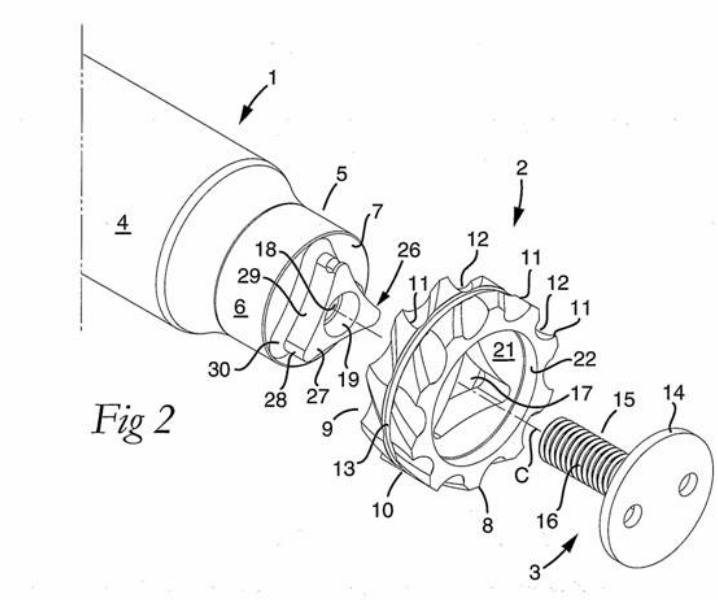
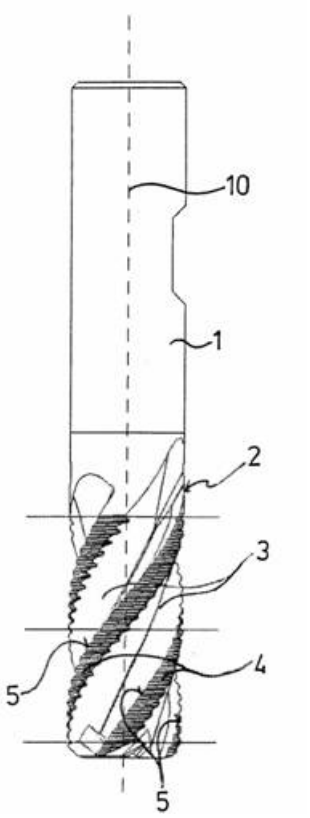


Fig 2

Milling cutter with shaft for roughing:



Relationships with other classification places

Note that milling cutters with shafts that include inventive features related to the securing or placement in the chuck are classified in B23B 31/005 or B23B 31/006, accompanied by Indexing Codes from B23B 2231/02 and subgroups.

Special rules of classification

Note that milling cutters with detachable heads are placed here with the allocation of Indexing codes B23C 2210/02 and/or B23C 2210/03 as appropriate. A detachable head is generally seen as being something attached to the end of the shank that covers the whole of the cross section of the shank.

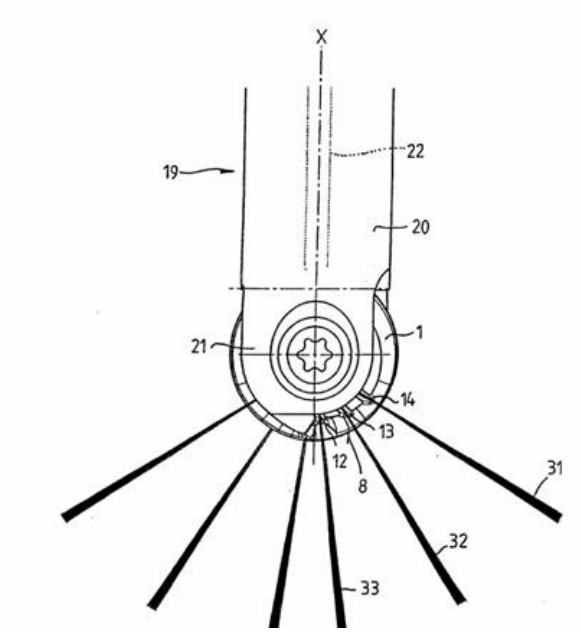
B23C 5/1036

{having a single cutting insert, the cutting edges of which subtend 180 degrees}

Definition statement

This place covers:

Ball nosed milling cutter with removable insert.



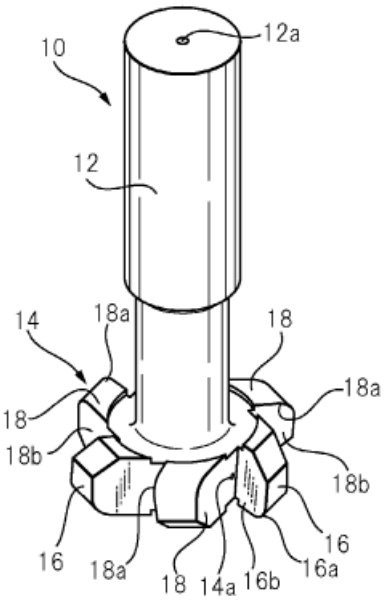
B23C 5/1054

{T slot cutters}

Definition statement

This place covers:

A slot cutter that produces a finished slot in the shape of the letter "T" (also includes inverted letter "T").



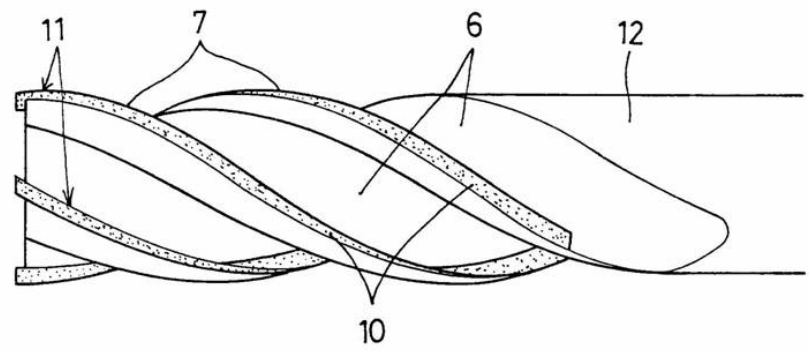
B23C 5/1081

{with permanently fixed cutting inserts (B23C 5/1018 and B23C 5/1063 take precedence)}

Definition statement

This place covers:

Milling cutter with shaft and permanently attached inserts, e.g. via welding or brazing:



References

Limiting references

This place does not cover:

Ball nose end mills with permanently fixed cutting inserts	B23C 5/1018
T slot cutters with permanently fixed cutting inserts	B23C 5/1063

Special rules of classification

Note that milling cutters with permanently attached inserts made of PCD or CBN are placed here with the allocation of Indexing codes B23C 2226/315 for PCD or B23C 2226/125 for CBN.

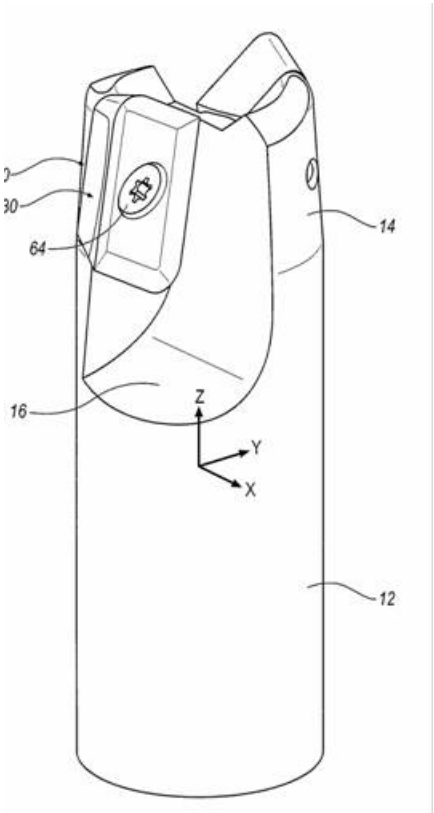
B23C 5/109

{with removable cutting inserts}

Definition statement

This place covers:

Milling cutter with shaft and removable inserts.



Special rules of classification

Note that milling cutters with detachable heads are not classed in B23C 5/109 but in B23C 5/10 with the allocation of Indexing Codes B23C 2210/02 and/or B23C 2210/03 as appropriate. A detachable head is generally seen as being something attached to the end of the shank that covers the whole of the cross section of the shank.

B23C 5/12

Cutters specially designed for producing particular profiles (B23C 5/10 takes precedence)

Definition statement

This place covers:

Cutters for producing a particular profile, i.e. cutting edge shape has a direct correlation to the finished shape of the workpiece.

References

Limiting references

This place does not cover:

Shank-type cutters, i.e. with an integral shaft	B23C 5/10

Special rules of classification

Indexing Codes for chamfering (B23C 2220/16) and turbine blade grooves (B23C 2220/366) should be considered if those profiles are present.

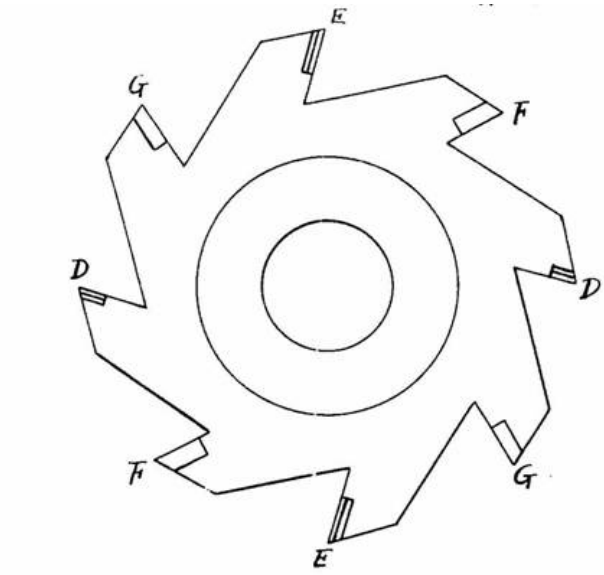
B23C 5/18

with permanently-fixed cutter-bits or teeth

Definition statement

This place covers:

Milling cutter with permanently fixed inserts.



References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Shank-type cutters with permanently fixed cutting inserts	B23C 5/1081

B23C 5/20

with removable cutter bits or teeth {or cutting inserts}

Definition statement

This place covers:

Removable cutting inserts that are generic, i.e. no special shape or special features.

Special rules of classification

Documents classified in B23C 5/20, B23C 5/22 and B23C 5/24 should also receive Indexing Codes from group B23C 2200/00 entitled "Details of milling inserts" when applicable. Indexing Codes should be allocated only for special features of the insert.

For example, if the insert has a fixation hole of a special shape, the appropriate Indexing Code (B23C 2200/361) should be given. This Indexing Code should not, however, be given to every insert having a fixation hole.

An Indexing Code from the group B23C 2200/00 entitled "Details of cutting inserts" takes precedence over an Indexing Code from other groups.

For example, an insert with a curved cutting edge should be allocated the Indexing Code B23C 2200/203. The allocation of B23C 2210/084 is not necessary or desired.

B23C 5/202

{Plate-like cutting inserts with special form (special form related to securing of the insert B23C 5/22)}

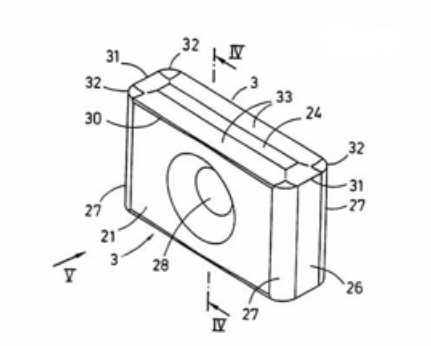
Definition statement

This place covers:

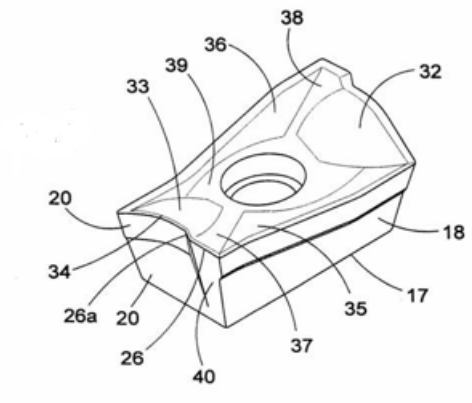
Removable cutting inserts having a special shape. The shape may be considered special by virtue of, inter alia, the overall shape and cutting edge configuration.

Examples:

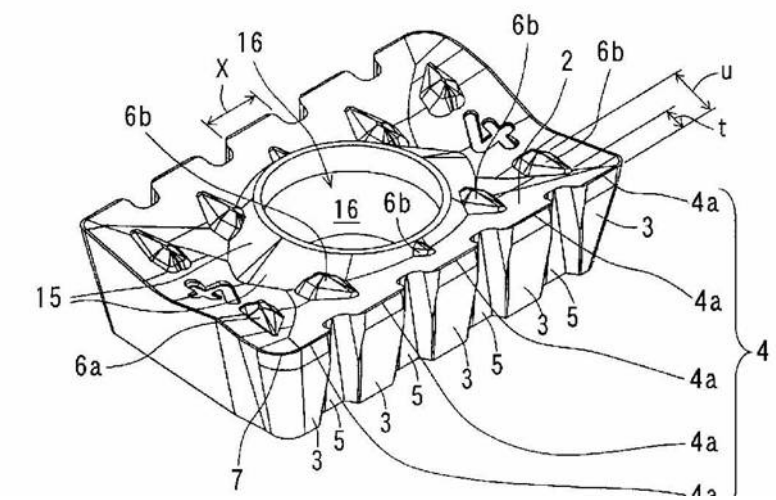
Tangentially mounted milling insert:



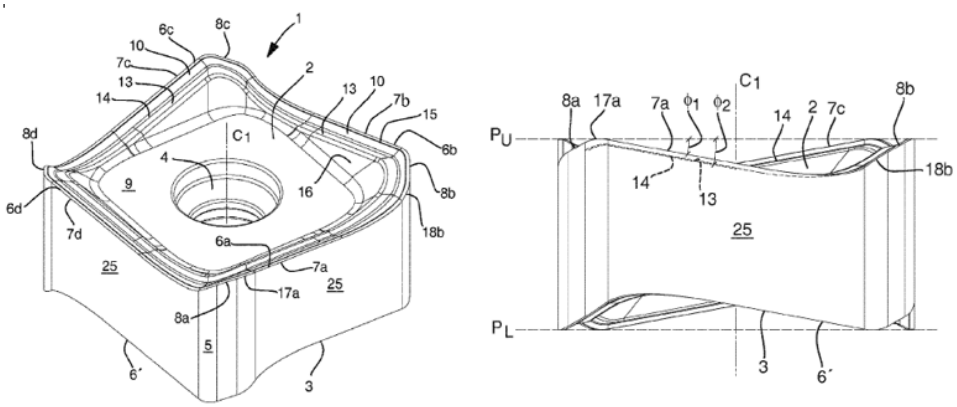
Milling insert with curved cutting edge and wiper:



Milling insert with interrupted cutting edge and chip-breaking projections on the top surface:



Milling insert with sloped cutting edges (6a-d) and rake faces (10) above a central surface (9):



Relationships with other classification places

B23B 27/141, B23B 27/143 and B23B 27/145 are the equivalent subgroups for turning or general-purpose inserts. If the insert can be used for turning and milling only a class in B23B 27/141, B23B 27/143 or B23B 27/145 is given.

Inserts in this subgroup are not classed for composition of inserts (C22C or C04B) or merely for the composition of the coating (see C23C). However inserts where the coating is selectively applied to areas of the insert or having a particular material and a special shape will be classed here.

References

Limiting references

This place does not cover:

Cutting insert having special form related to the securing arrangement within the holder	B23C 5/22

Special rules of classification

Note that end mills with detachable heads are not classified as end mills with cutting inserts in B23C 5/202, but in B23C 5/10 with the Indexing Codes B23C 2210/02 or B23C 2210/03 as appropriate.

Inserts having a special shape by virtue only of the chip-breakers are classed in B23C 5/205.

Cutting inserts having a special shape related to securing the cutting inserts, e.g. locating or clamping the insert within the holder, should be classified in B23C 5/22 or subgroups B23C 5/2204, B23C 5/2208, B23C 5/2239, B23C 5/2243, B23C 5/2265, B23C 5/2269, B23C 5/2295, B23C 5/2298 or B23C 5/2301 according to the clamping mechanism.

Cutting inserts having a special shape that is not related to securing or locating the cutting insert within the tool body and a special shape that is related to securing or locating the cutting insert within the tool body should be classified in B23C 5/202 (or subgroup B23C 5/205) and B23C 5/22 (or subgroups).

B23C 5/205

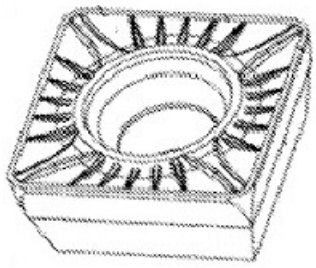
{characterised by chip-breakers of special form}

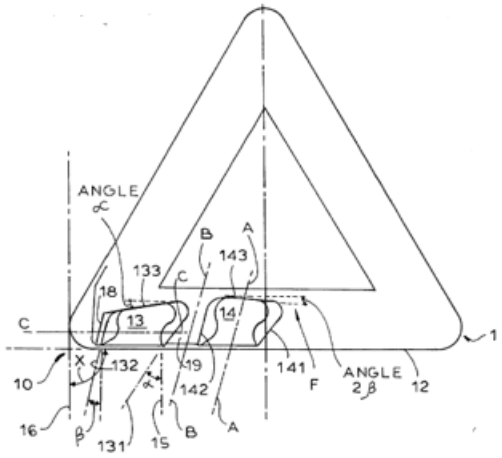
Definition statement

This place covers:

Inserts having a special shape by virtue only of the chip-breakers.

Examples:





B23C 5/22

Securing arrangements for bits or teeth {or cutting inserts}

Definition statement

This place covers:

Special arrangements of how the cutting inserts are fastened to the cutter body.

Special rules of classification

Cutting inserts having a special shape that is not related to securing or locating the cutting insert within the tool body and a special shape that is related to securing or locating the cutting insert within the tool body should be classified in B23C 5/202 (or subgroup B23C 5/205) and one of the following subgroups according to the clamping mechanism: B23C 5/2213, B23C 5/2247, B23C 5/2273 or B23C 5/2304.

Documents classified in B23C 5/20, B23C 5/22 and B23C 5/24 should also receive Indexing Codes from group B23C 2200/00 entitled "Details of milling inserts" when applicable. Indexing Codes should be allocated only for special features of the insert. For example, if the insert has a fixation hole of a special shape, the appropriate Indexing Code (B23C 2200/361) should be given. This Indexing Code should not, however, be given to every insert having a fixation hole.

An Indexing Code from the group B23C 2200/00 entitled "Details of cutting inserts" takes precedence over an Indexing Code from other groups. For example, an insert with a curved cutting edge should be allocated the Indexing Code B23C 2200/203. The allocation of B23C 2210/084 is not necessary or desired.

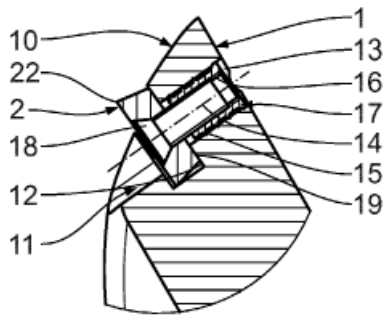
B23C 5/2208

{for plate-like cutting inserts (B23C 5/2226, B23C 5/2234 take precedence)}

Definition statement

This place covers:

Plate-like cutting inserts clamped against walls of the recess in the shank by a clamping member acting upon the wall of a hole in the insert.



References

Limiting references

This place does not cover:

For plate-like cutting inserts fitted on an intermediate carrier, e.g. shank fixed in the cutter body	B23C 5/2226
For plate-like cutting inserts fitted on a ring or ring segment	B23C 5/2234

B23C 5/2213

{having a special shape}

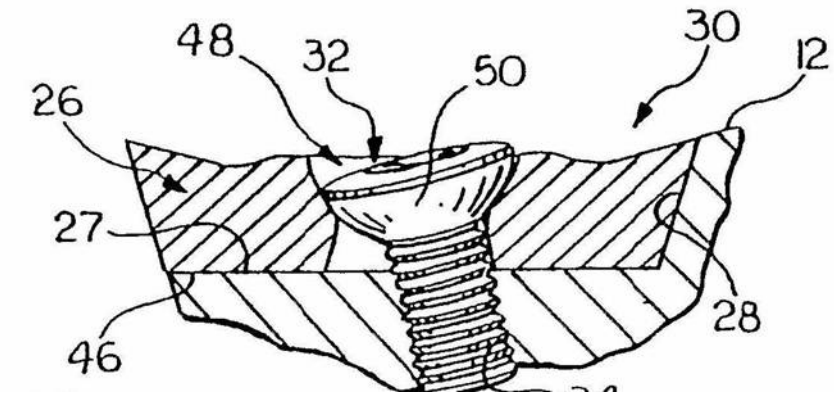
Definition statement

This place covers:

Plate-like cutting inserts of special shape where clamping against the walls of a pocket by means of something acting on the hole in the insert is also important. The shape may be considered special by virtue of, inter alia, the overall shape and cutting edge configuration.

Example:

Insert has a special shape due to the fixation hole being widened at the bottom to permit the inclined orientation of the fastener and the fastener interacts with the sidewall of the hole in the insert.



B23C 5/2226

{for plate-like cutting inserts fitted on an intermediate carrier, e.g. shank fixed in the cutter body}

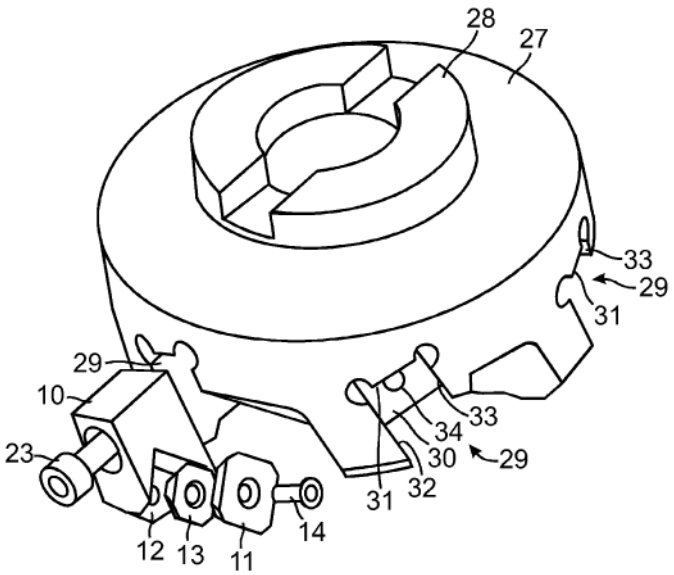
Definition statement

This place covers:

Plate-like cutting insert clamped against walls of the recess in an intermediate carrier of the cutter body by a clamping member acting upon the wall of a hole in the insert.

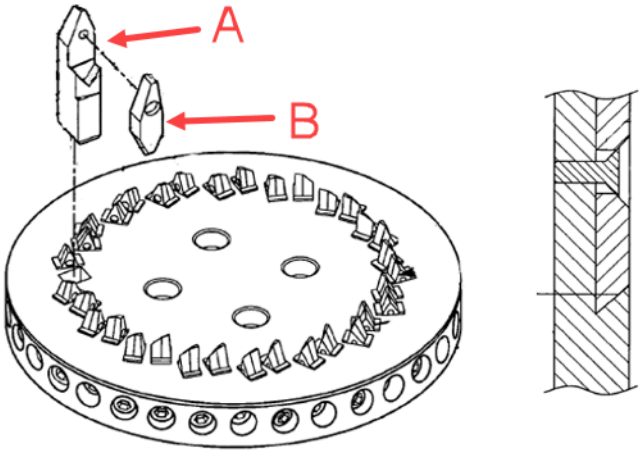
Example:

Intermediate carrier (10) with insert (11)



Example:

Intermediate carrier (A) formed as a shank for insert (B)



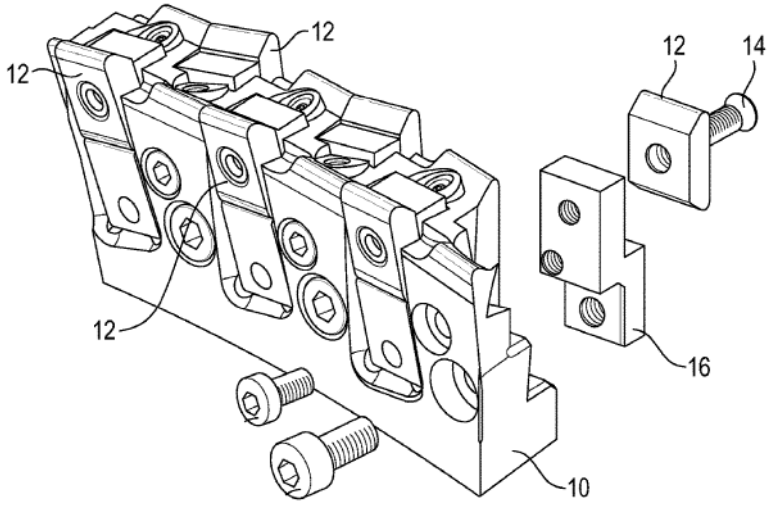
B23C 5/2234

{for plate-like cutting inserts fitted on a ring or ring segment}

Definition statement

This place covers:

Plate-like cutting inserts clamped against walls of the recess in a shank (16) by a clamping member (14) acting upon the wall of a hole in the insert, and fitted on a ring (10):



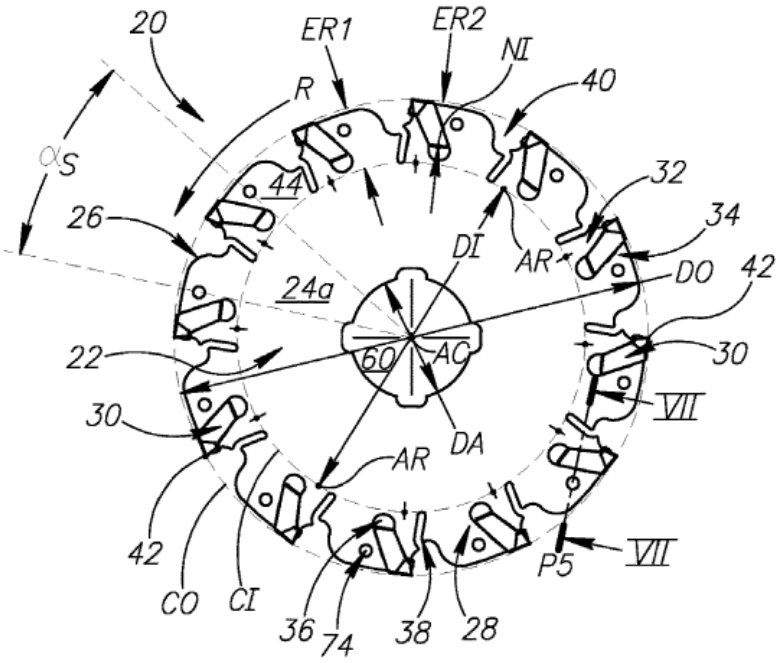
B23C 5/2239

{with cutting inserts clamped by a clamping member acting almost perpendicular on the cutting face}

Definition statement

This place covers:

Plate-like cutting inserts clamped by clamping member (32) acting almost perpendicular on the cutting face:



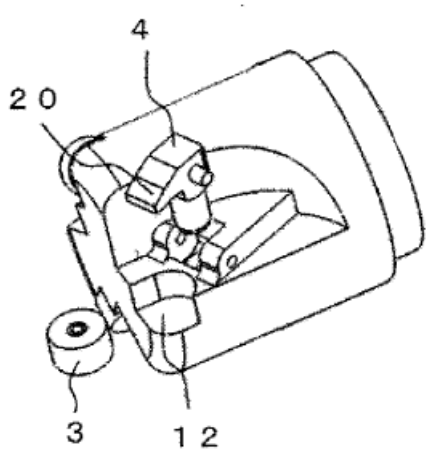
B23C 5/2243

{for plate-like cutting inserts (B23C 5/2252, B23C 5/226 take precedence)}

Definition statement

This place covers:

Plate-like cutting inserts (3) clamped by a clamping member (4) acting almost perpendicular on the cutting face:



References

Limiting references

This place does not cover:

For plate-like cutting inserts fitted on an intermediate carrier, e.g. shank fixed in the cutter body	B23C 5/2252
For plate-like cutting inserts fitted on a ring or ring segment	B23C 5/226

B23C 5/2247

{having a special shape}

Definition statement

This place covers:

Plate-like cutting inserts of special shape clamped by member acting on top surface. The shape may be considered special by virtue of, inter alia, the overall shape and cutting edge configuration.

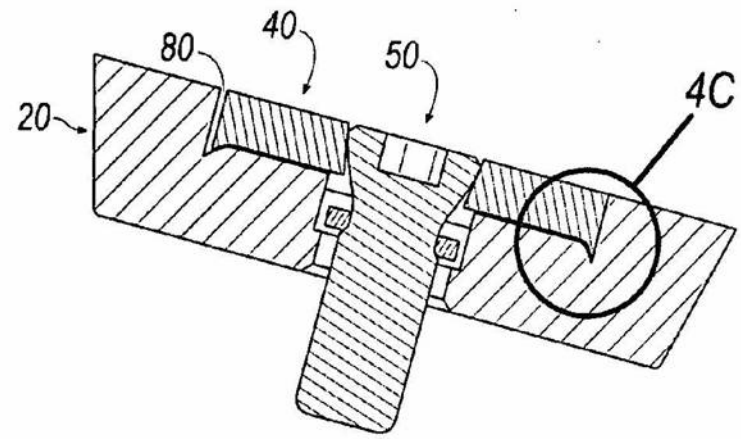
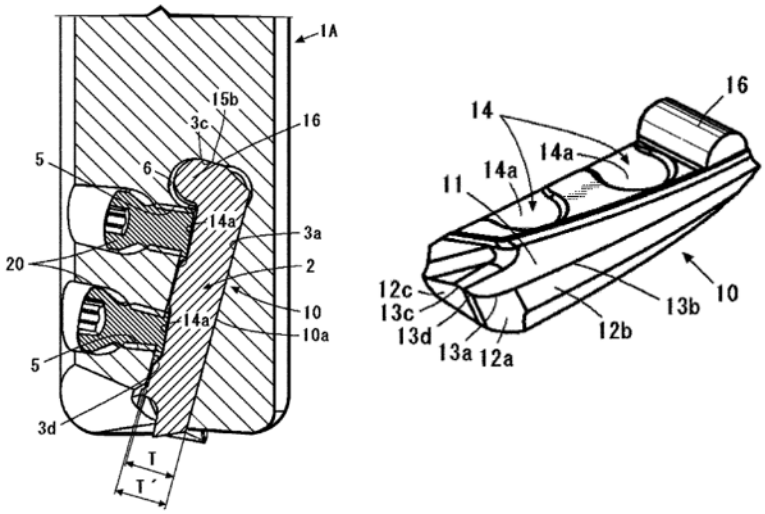


Plate-like cutting insert (10) having a special shape and clamped by clamping member (20) acting almost perpendicular (14) on the cutting face:



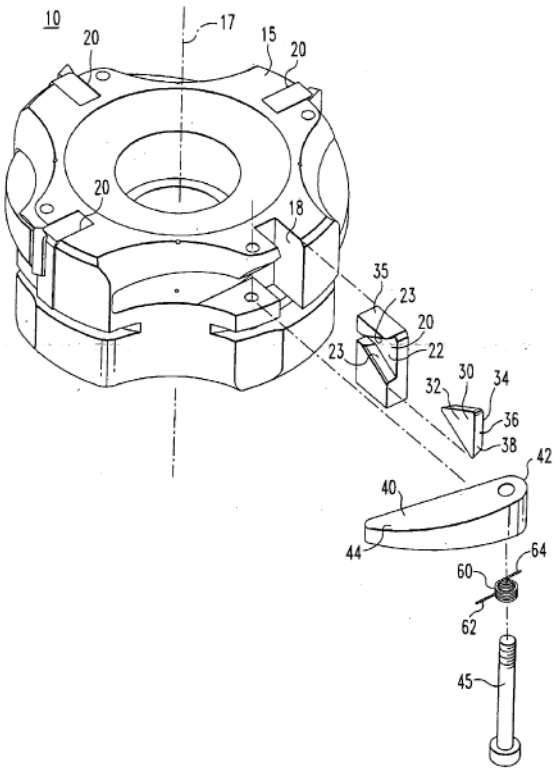
B23C 5/2252

{for plate-like cutting inserts fitted on an intermediate carrier, e.g. shank fixed in the cutter body}

Definition statement

This place covers:

Plate-like cutting inserts (30) clamped by a clamping member (40) acting almost perpendicular on the cutting face, and fitted on an intermediate carrier (20):



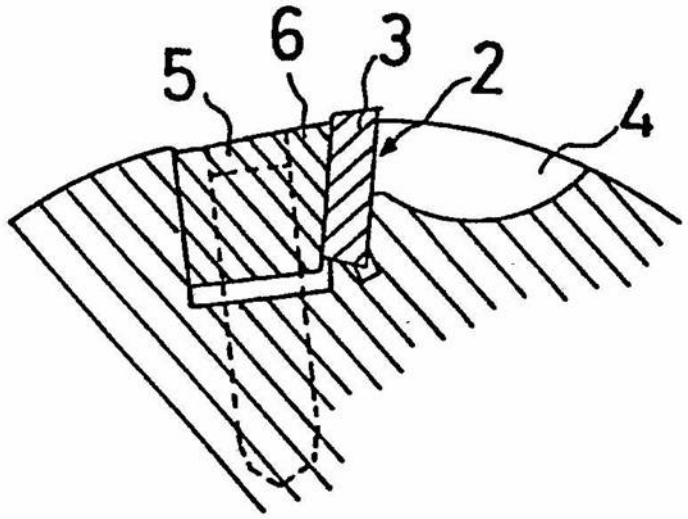
B23C 5/2269

{for plate-like cutting inserts (B23C 5/2278, B23C 5/2291 take precedence)}

Definition statement

This place covers:

Generic, i.e. no special shape or special features, plate-like milling inserts clamped by a wedge.



References

Limiting references

This place does not cover:

For plate-like cutting inserts fitted on an intermediate carrier, e.g. shank fixed in the cutter body	B23C 5/2278
For plate-like cutting inserts fitted on a ring or ring segment	B23C 5/2291

B23C 5/2291

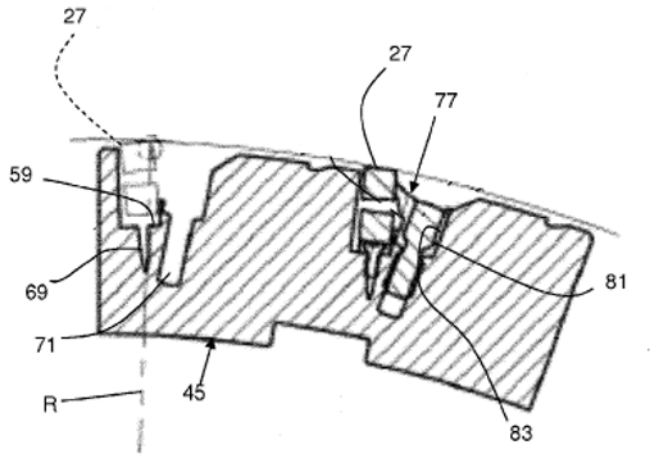
{for plate-like cutting inserts fitted on a ring or ring segment}

Definition statement

This place covers:

Example:

Plate-like cutting insert (27) fitted on a ring segment (45) and secured by a wedge (77).



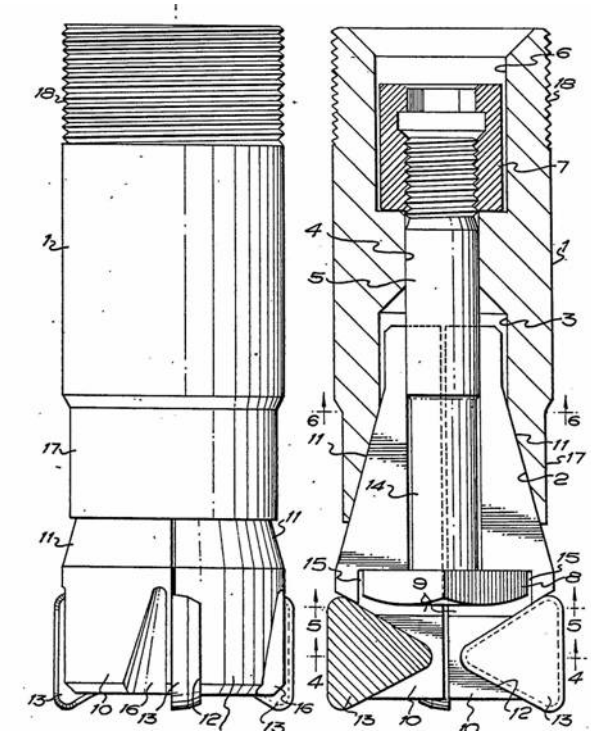
B23C 5/2295

{the cutting elements being clamped simultaneously}

Definition statement

This place covers:

Simultaneous clamping of all cutting inserts.



B23C 5/2309

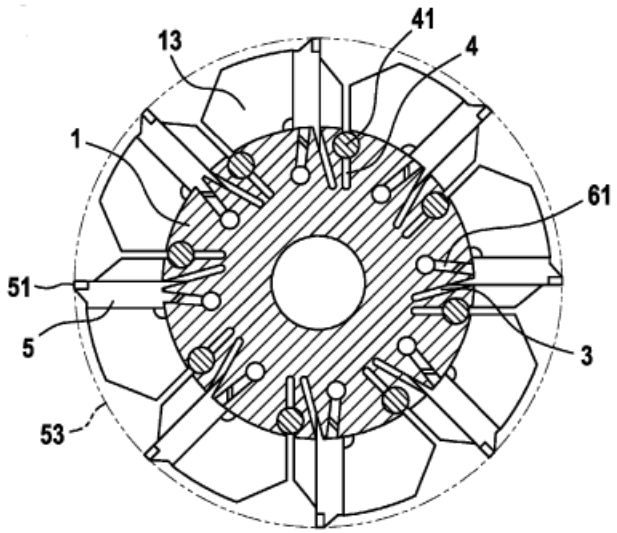
{for plate-like cutting inserts fitted on a ring or ring segment}

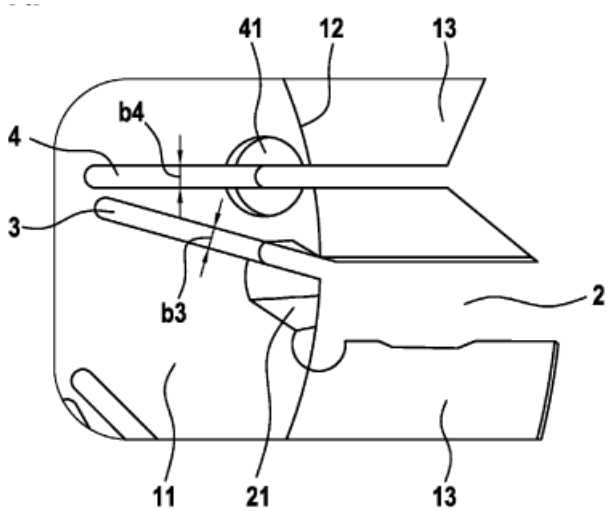
Definition statement

This place covers:

Example:

Plate-like cutting insert (5, 51) fitted on a ring segment (13) and secured by resilient/flexible means (3, 4).





B23C 5/24

adjustable

Definition statement

This place covers:

Features relative to the adjustment of the insert relative to the cutter body.

Special rules of classification

Documents classified in B23C 5/20, B23C 5/22 and B23C 5/24 should also receive Indexing Codes from group B23C 2200/00 entitled "Details of milling inserts" when applicable. Indexing Codes should be allocated only for special features of the insert.

For example, if the insert has a fixation hole of a special shape, the appropriate Indexing Code (B23C 2200/361) should be given. This Indexing Code should not, however, be given to every insert having a fixation hole.

An Indexing Code from the group B23C 2200/00 entitled "Details of cutting inserts" takes precedence over an Indexing Code from other groups.

For example, an insert with a curved cutting edge should be allocated the Indexing Code B23C 2200/203. The allocation of B23C 2210/084 is not necessary or desired.

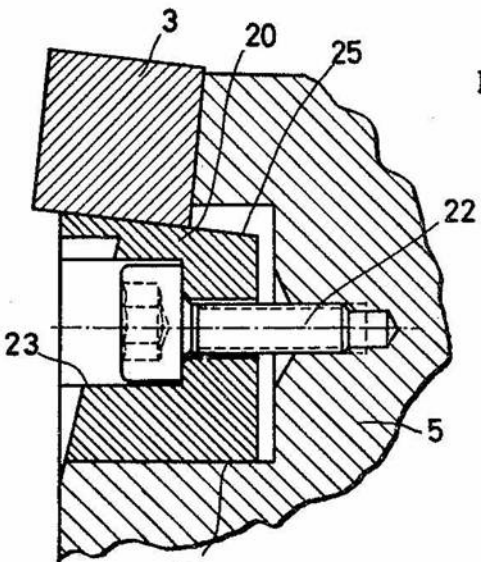
B23C 5/2462

{the adjusting means being oblique surfaces}

Definition statement

This place covers:

Adjustment of insert position by oblique surfaces.



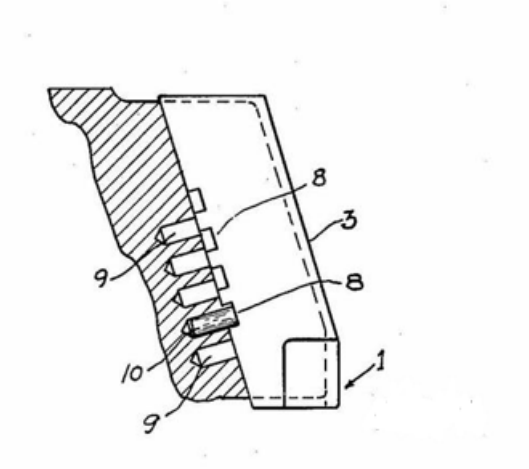
B23C 5/2465

{the adjusting means being notches}

Definition statement

This place covers:

Adjustment of position of insert by notches.



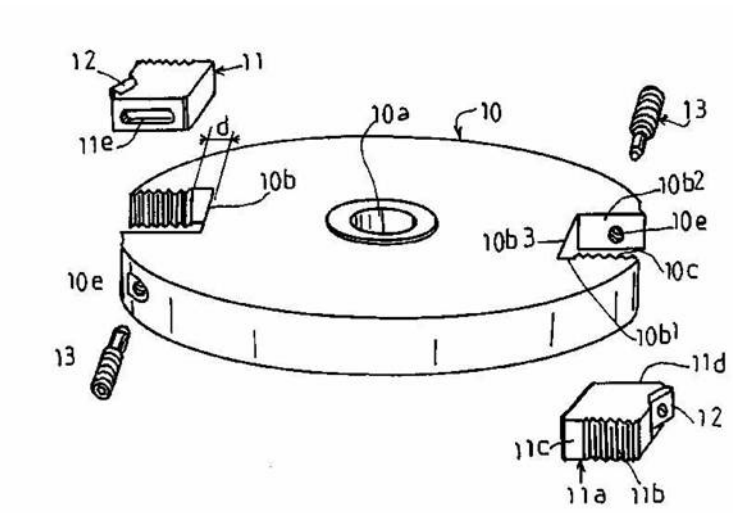
B23C 5/2468

{the adjusting means being serrations}

Definition statement

This place covers:

Adjustment of insert position by means of serrations



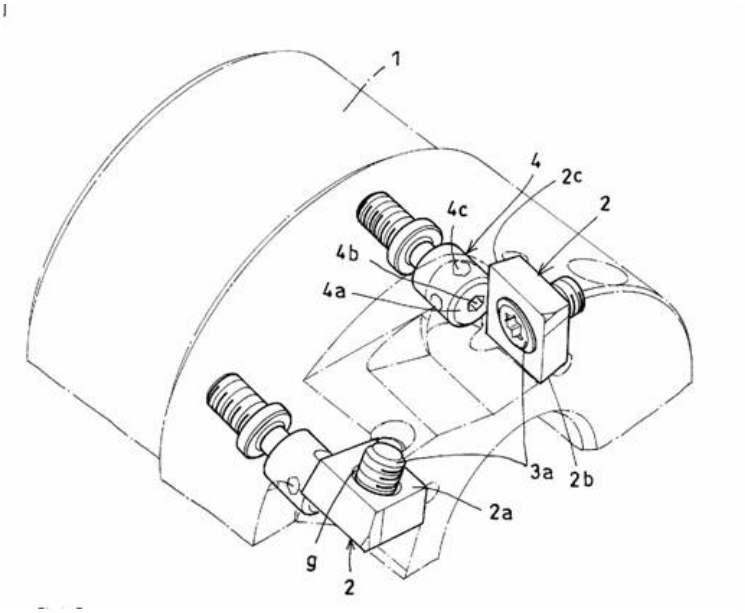
B23C 5/2472

{the adjusting means being screws}

Definition statement

This place covers:

Adjustment of insert position by means of screws.



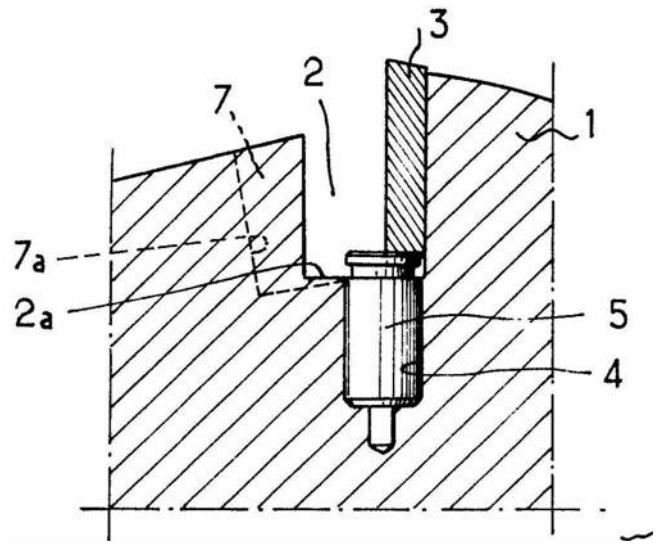
B23C 5/2475

{the adjusting means being distance elements, e.g. shims or washers}

Definition statement

This place covers:

Adjustment of insert position by means of spacers.



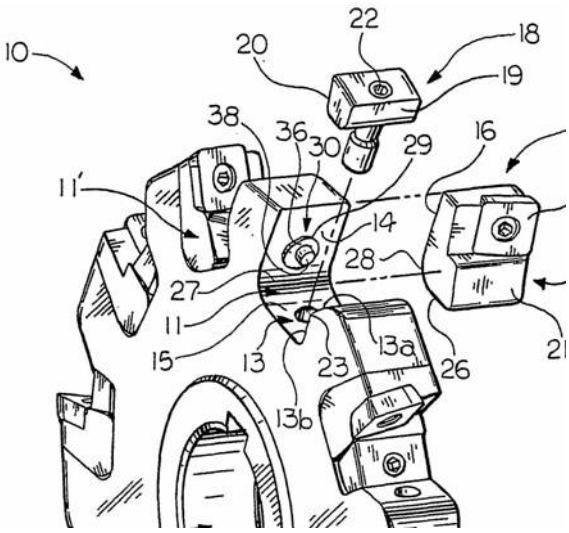
B23C 5/2479

{the adjusting means being eccentrics}

Definition statement

This place covers:

Adjustment of insert position by means of rotating an eccentric, i.e. an object that is not perfectly circular.



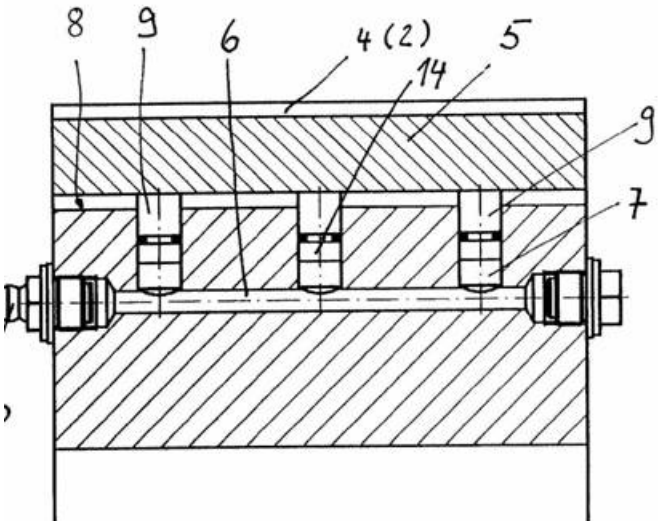
B23C 5/2482

{the adjusting means being hydraulic cylinders}

Definition statement

This place covers:

Adjustment of insert position by means of hydraulics.



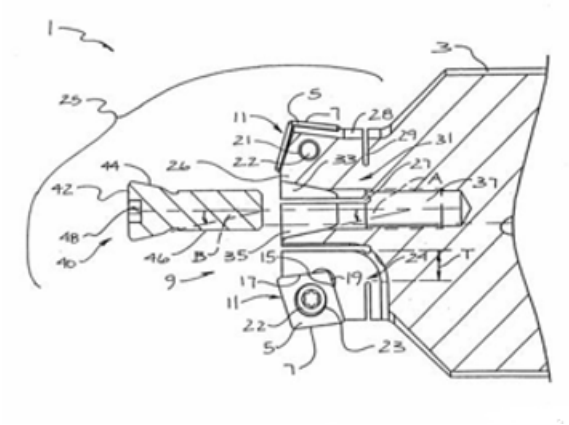
B23C 5/2486

{where the adjustment is made by elastically deforming the toolholders}

Definition statement

This place covers:

Adjustment by means of elastically deforming the tool carrier.



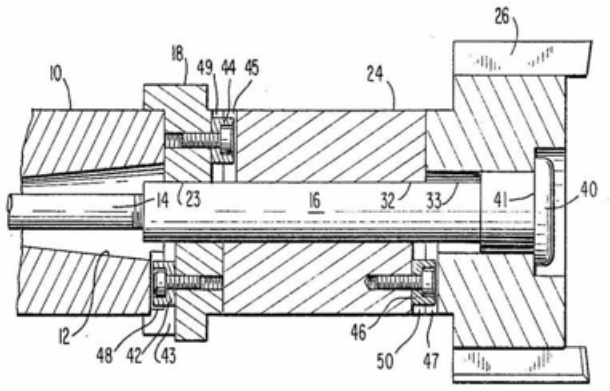
B23C 5/26

Securing milling cutters to the driving spindle

Definition statement

This place covers:

Details of arrangements for securing cutters to the spindle, including details of intermediate connecting members, e.g. arbors.



References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Chucks	B23B 31/00

B23C 5/28

Features relating to lubricating or cooling

Definition statement

This place covers:

Features concerning cooling arrangements within or on the cutter body. This area does not include cooling features of the machine in general.

Relationships with other classification places

See also B23B 27/10, B23B 51/06 and B23D 77/006 for equivalents in turning, drilling & reaming respectively.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Arrangements for cooling or lubricating tools or work, in general	B23Q 11/10

Special rules of classification

Note also the Indexing Code relating to cooling (B23C 2250/12) for non-invention information.

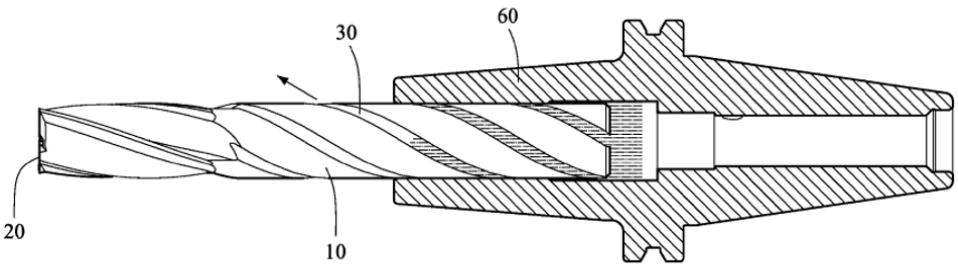
B23C 5/281

{Coolant moving along the outside tool periphery towards the cutting edges}

Definition statement

This place covers:

Milling cutters with means for coolant to move along the outside of the tool periphery toward cutting edges. This area is not meant for coolant outlets that exit from an interior channel into the chip flutes that then guide the coolant toward the cutting edges.



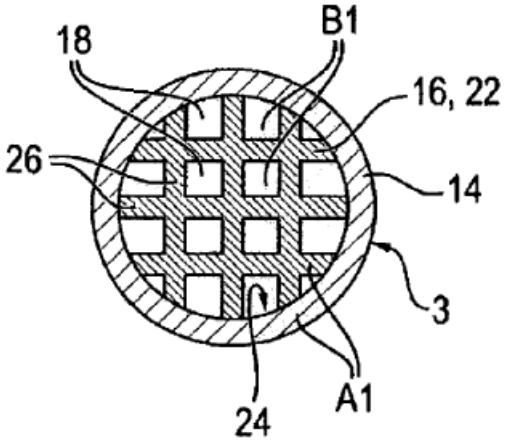
B23C 5/282

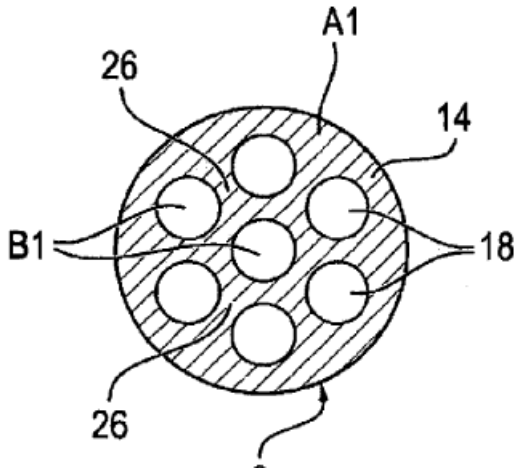
{Coolant channel characterised by its cross-sectional shape}

Definition statement

This place covers:

Special details of the coolant channel(s) cross-sectional shape (cross-section not required to be perpendicular to rotation axis of cutter body). The term "special" means non-generic details of the cross-sectional shape, e.g. mere cross-sections of a single circular nature would be excluded from this sub-class.





B23C 5/283

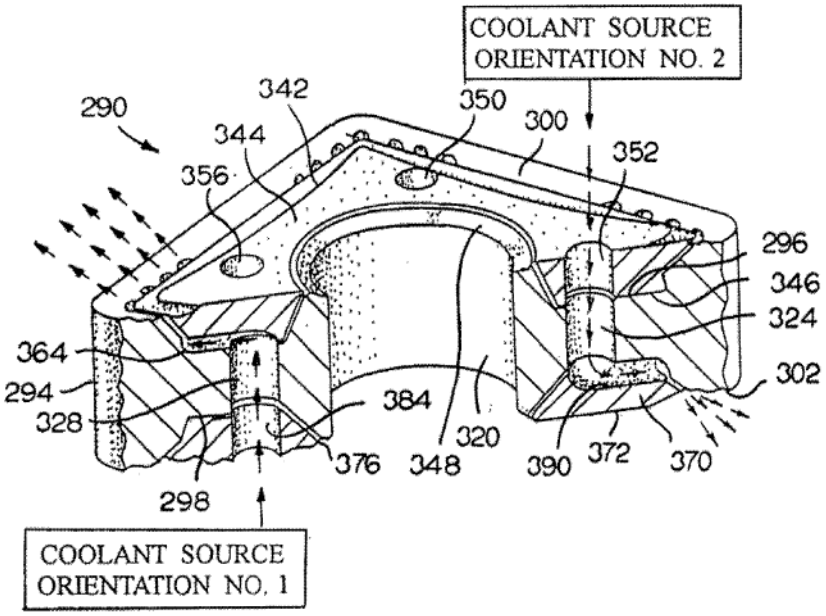
{Cutting inserts with internal coolant channels}

Definition statement

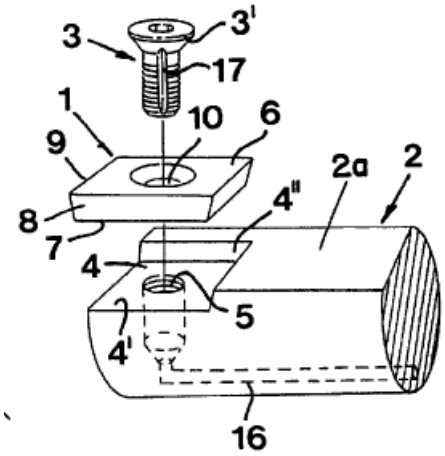
This place covers:

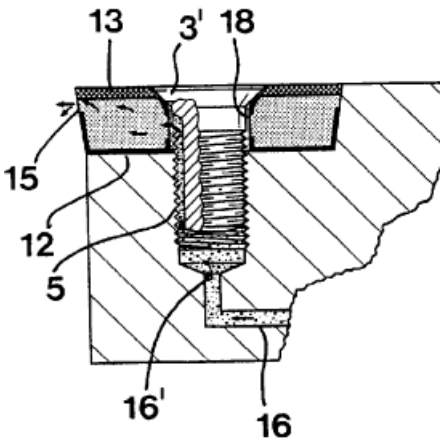
Cutting inserts with interior coolant channels.

Example:



Example:





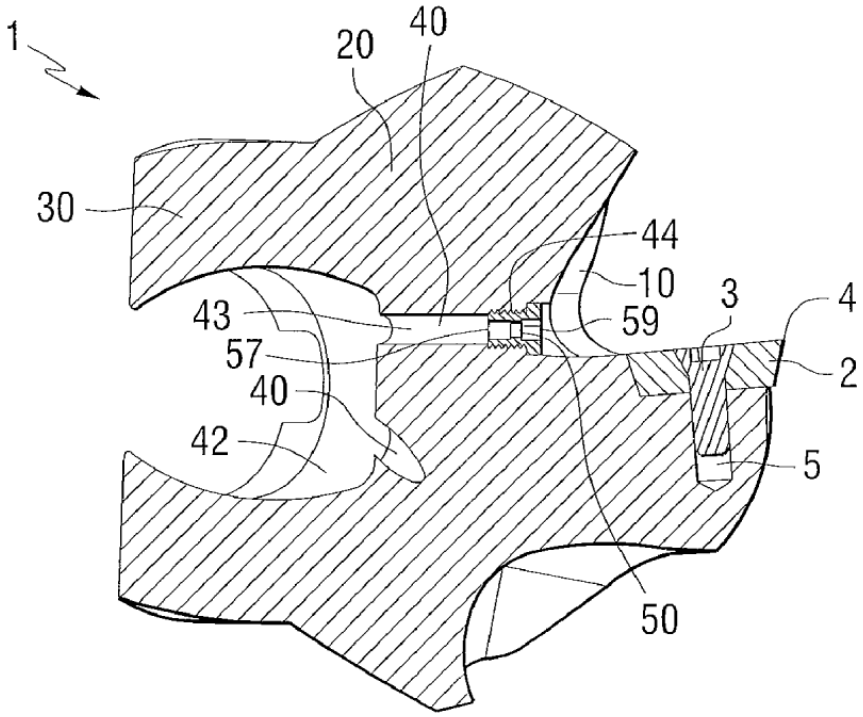
B23C 5/285

{Nozzles}

Definition statement

This place covers:

Nozzles to point or direct the coolant in a desired direction.



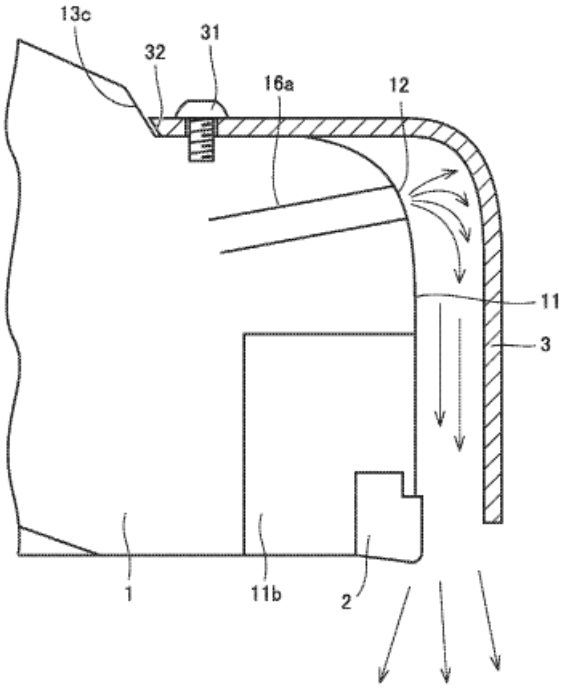
B23C 5/286

{Deflectors}

Definition statement

This place covers:

Deflector to point or direct the coolant in a desired direction.



B23C 5/287

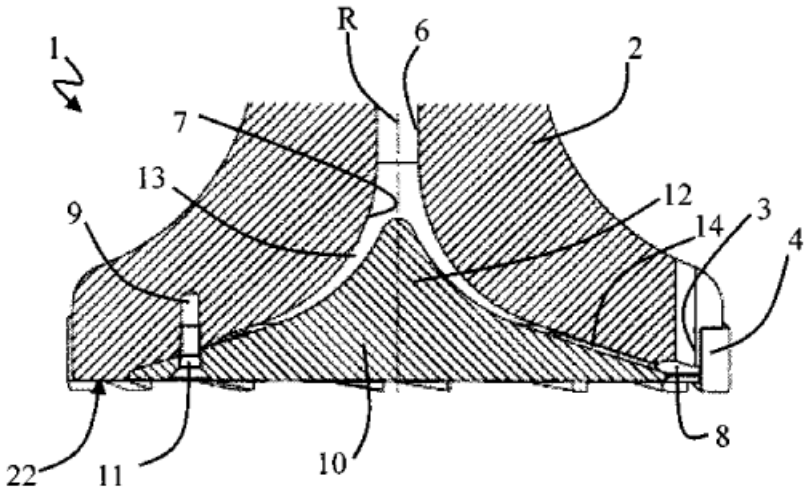
{intersecting the rotational axis}

Definition statement

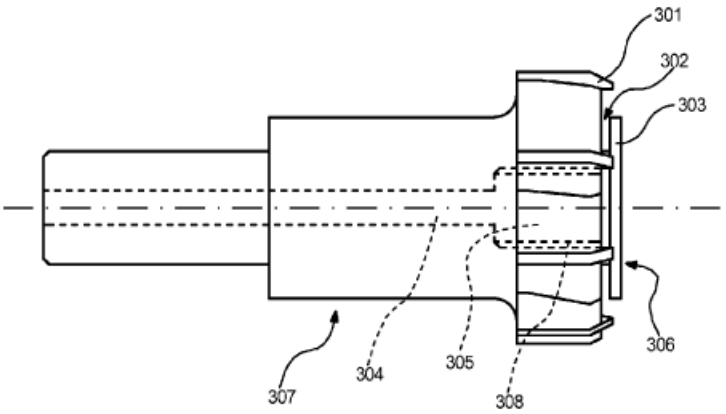
This place covers:

Deflector intersects the rotational axis of the cutter body such that coolant is deflected at the rotational axis.

Example:



Example:



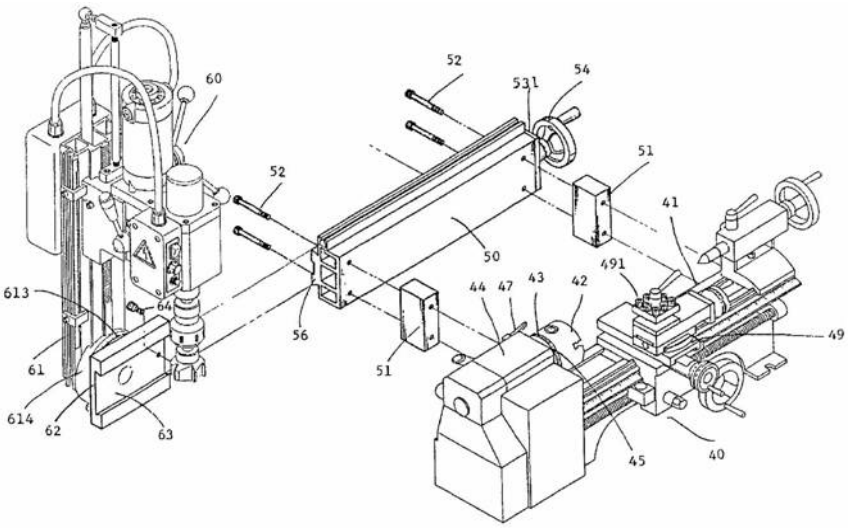
B23C 7/00

Milling devices able to be attached to a machine tool, whether or not replacing an operative portion of the machine tool

Definition statement

This place covers:

Milling devices able to be attached to a machine tool



B23C 7/02

Device attached to a lathe to allow milling

Special rules of classification

Classification is per literal interpretation of the group and subgroup headings. The term "machine tool" should be interpreted as a machine tool not normally capable of performing milling. Devices for attachment into the spindle (speed changers, angled heads, offset heads) are classified in B23Q 5/04. The term "device" should be interpreted as a discrete device, so lathes with provision for performing milling as a result of integrated features will not be classed here.

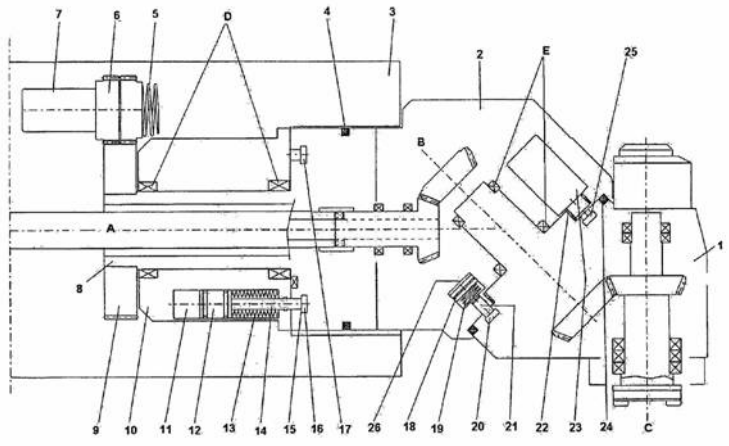
B23C 9/00

Details or accessories so far as specially adapted to milling machines or cutter (drives, control devices, or accessories, in general B23Q)

Definition statement

This place covers:

Details or accessories so far as specially adapted to milling machines or cutters



B23C 9/005

Milling head.

Special rules of classification

Classification is generally per literal interpretation of the group and subgroup headings.

The term "specially adapted to milling machines" should be interpreted narrowly as adapted to machines specifically designed for performing milling operations. Details of machines performing milling and other operations should be classified in B23Q. This group includes milling templates. Obviously with the move towards multi-function machine tools, this group has become less well-used.

Details or accessories of machine tools in general & copying devices are classified in B23Q.

B23C 9/005 Milling heads may mean details of the heads of milling machines including the main spindle of a machine tool or a head able to be attached to a machine tool for the specific purpose of milling. Machining heads used on gantry machines with multiple axes or movement are classified in the relevant subgroup of B23Q 1/25. Machining heads characterised by the mechanisms for driving the spindle or for providing feeding motion ar classified in B23Q 5/00. Detachable heads including speed changers, offset drives or right angled drives for general work are classed in B23Q 5/04.

B23C 2200/081

with projections

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Milling cutting inserts by chip breaking depressions	B23C 2200/323

B23C 2200/168

with features related to indexing

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Lines for indexing round inserts	B23C 2200/363

B23C 2200/323

by chip-breaking projections

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Projections on rake or top surfaces	B23C 2200/081

B23C 2210/16

Fixation of inserts or cutting bits in the tool

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Details of connections of tools or workpieces	B23C 2240/00

B23C 2210/24

Overall form of the milling cutter

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Details of milling cutters being angles	B23C 2210/04
Side or top views of the cutting edge	B23C 2210/08
Cross section of the cutting edge	B23C 2210/12

B23C 2220/28

Finishing

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Roughing and finishing	B23C 2220/605

B23C 2222/32

Details of high-speed steel

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Materials of tools or workpieces composed of steel	B23C 2222/84

B23C 2222/84

Steel

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Materials of tools or workpieces composed of high-speed steel	B23C 2222/32

B23C 2226/45

Glass

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Working stone or stone-like materials by milling, e.g. channelling by means of milling tools	B28D 1/18

B23C 2226/75

Stone, rock or concrete

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Working stone or stone-like materials by milling, e.g. channelling by means of milling tools	B28D 1/18

B23C 2230/00

Details of chip evacuation

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Chip breaking or chip evacuation	B23C 2200/32

B23C 2240/00

Details of connections of tools or workpieces

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Fixation of inserts or cutting bits in the tool	B23C 2210/16

B23C 2250/04

Balancing the cutter

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Damping vibrations during milling	B23C 2250/16

B23C 2250/16

Damping vibrations

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Balancing the cutter during milling	B23C 2250/04

B23C 2260/56

Lasers

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Auxiliary treatment of workpieces, immediately preceding a cutting tool	B23P 25/003

B23C 2270/04

Use of centrifugal force

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Compensating adverse effects of centrifugal force during milling	B23C 2250/08