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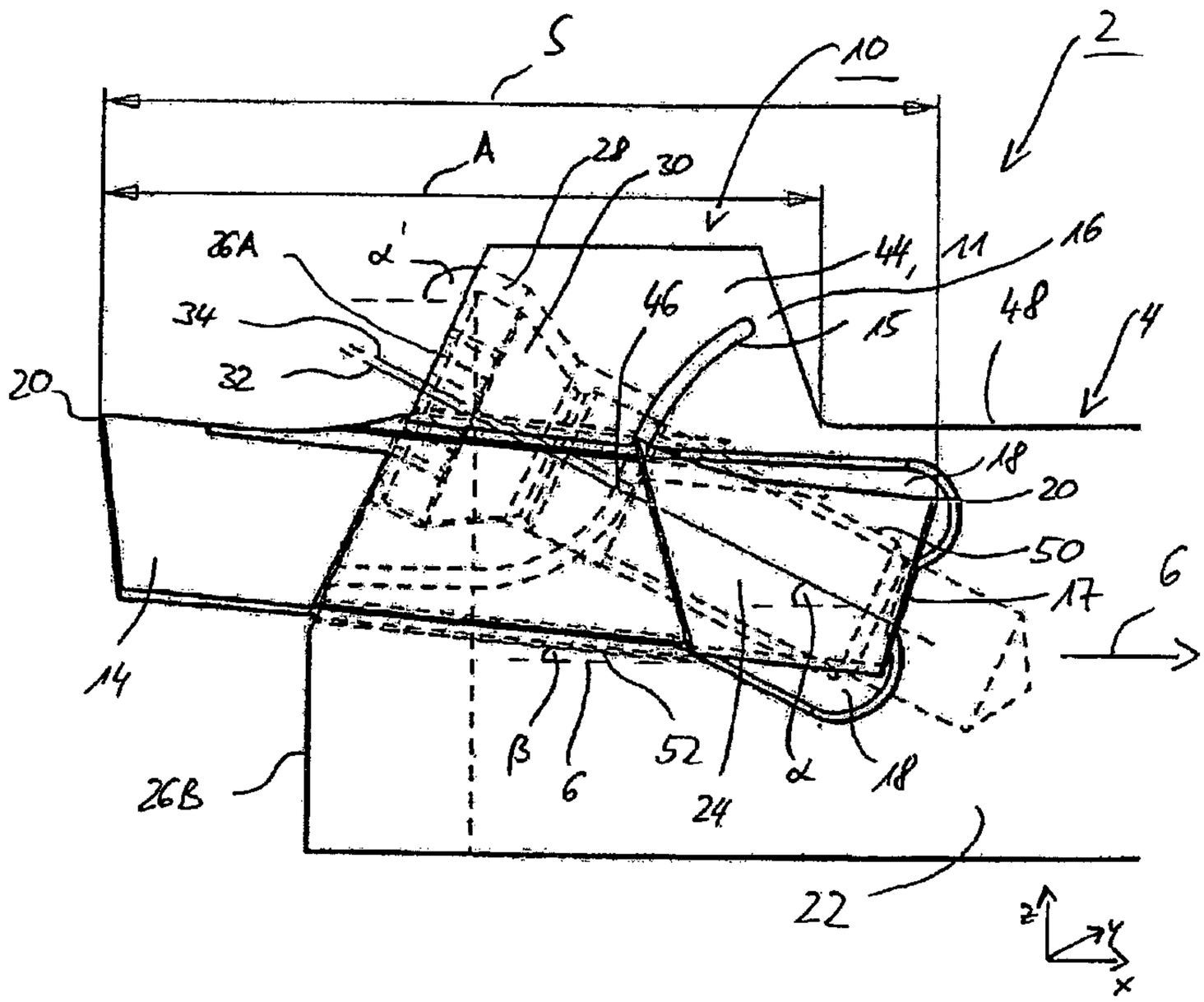
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(54) Titre : PORTE-OUTIL, NOTAMMENT POUR UN OUTIL DE TRONCONNAGE, ET ELEMENT COUPANT POUR UN PORTE-OUTIL

(54) Title: TOOL HOLDER, IN PARTICULAR FOR A GROOVING TOOL AND CUTTING BODY FOR A TOOL HOLDER



(57) Abrégé/Abstract:
In order to enable easy replaceability of a cutting element (14), the invention provides that in a tool holder (2), particularly for a burring tool, the cutting element (14) is held by means of a clamping claw (11) and a tightening screw (24) in a cutting element receptacle (8) in a clamping manner. The tightening screw (24) extends along a center axis (32), which is oriented at a tensioning angle (α) in relation to a holder longitudinal axis (6). The tensioning angle (α) is less than 45°, and particularly less than 30°. In this manner, easy front face accessibility to the tightening screw (24) is ensured, thus enabling easy replacement of the cutting element (14).

Abstract

In order to permit simple exchangeability of a cutting body (14), provision is made in a tool holder (2), in particular for a grooving tool, for the cutting body (14) to be held in a clamping manner in a cutting body receptacle (8) by means of a clamping claw (11) and a tightening screw (24). The tightening screw (24) extends in this case along a center axis (32) which is oriented at a tightening angle (α) relative to a holder longitudinal axis (6). The tightening angle (α) is in this case less than 45° and in particular less than 30°. This provides for good accessibility of the tightening screw (24) at the front end, such that simple exchange of the cutting body (14) is made possible.

Fig. 1

Description

Tool holder, in particular for a grooving tool and cutting body for a tool holder

The invention relates to a tool holder, in particular for a grooving tool, having a parent body which extends along a holder longitudinal axis and which has at the front end a clamping head for accommodating a cutting body, wherein the clamping head has a cutting body receptacle defined by a clamping claw and a bottom bearing surface, and the clamping claw can be tightened in the direction of the bottom bearing surface by means of a tightening element. The invention also relates to a cutting body for such a tool holder.

Such a tool holder can be seen, for example, from DE 101 32 721 C1. Such tool holders are used in particular for grooving and longitudinal turning and for cutting-off operations on a rotating workpiece. The workpiece to be machined normally passes through a plurality of machining stages. In each machining stage, the workpiece is machined with a different tool. To this end, a plurality of tool holders, also different tool holders, which are fitted with different tools, are arranged in a row in a machine mounting, for example a cassette. The workpiece, which rotates during the machining, is then brought alternately into contact with the different tools for the machining.

On account of the machining, the cutting bodies are subjected to wear and therefore have to be exchanged from time to time. In order to keep the downtimes as short as possible during the workpiece machining, as simple an exchange of the individual tools as possible is desired. At the same time, the individual tools, in particular cutting bodies, must be held reliably and free of play in an exact and defined position in the tool holder in order to make possible the desired,

high-precision machining.

The object of the invention is to make possible a simple exchange of a cutting body. The object of the invention is also to specify a cutting body suitable for this purpose.

The object is achieved according to the invention by a tool holder having the features of claim 1. Said tool holder has a normally parallelepiped-shaped parent body which extends along a holder longitudinal axis in the x direction. The parent body has a width extending in the y direction and a height extending in the z direction. At its front end, the tool holder comprises a clamping head for accommodating a cutting body. The clamping head has a cutting body receptacle which is defined at the top by a clamping claw and at the bottom by a bottom bearing surface. A cutting body is clamped in place between the clamping claw and the bearing surface. To this end, a separating slot running between the clamping claw and the bearing surface is provided, such that the clamping claw is held elastically on the parent body. For tightening the cutting body in the cutting body receptacle, a tightening element is provided, by means of which the clamping claw can be tightened on the bottom bearing surface. The tightening element extends over the separating slot and is held in an abutment in the parent body, such that, when the tightening element is being tightened, the clamping claw presses directly against the bearing surface. In order to now make possible simple and problem-free accessibility for the exchange of the cutting body, a center axis of the tightening element encloses a tightening angle < 45° and in particular < 30° relative to the holder longitudinal axis. The center axis of the tightening element is therefore inclined by the tightening angle within the x-z plane relative to the holder longitudinal axis and thus relative to the x direction, such that, overall, the head surface of a

head of the tightening element is oriented very steeply and thus in a readily accessible manner relative to the holder longitudinal axis. Due to the very good accessibility at the front end, an exchange of the cutting body is possible without any problems, even if the tool holder is clamped in place together with a plurality of further tool holders and in a narrow space in a machine mounting. Tests have shown that, on account of the small tightening angle, very good accessibility is provided for and at the same time - despite the small tightening angle - a sufficient clamping force in the normal direction, i.e. essentially in the z direction, can be achieved by means of the tightening element, such that secure and reliable seating of the cutting body in the cutting body receptacle is ensured. In order to ensure a sufficient clamping force, the clamping angle is preferably greater than 10° and in particular greater than 20°-25°.

According to an expedient development, the clamping claw has a countersunk receptacle for accommodating a head of the tightening element, the countersunk receptacle extending along a center line. This center line is arranged offset relative to the centre axis of the tightening element, to be precise offset upward. That is to say, the center axis and the center line have an offset within the x-z plane. Due to this measure, an additional force component is exerted in the clamping direction, i.e. essentially in the z direction, when the tightening element is being tightened. The clamping force is thereby increased. Here, the offset is preferably within the range of between 0.2 and 0.3 mm.

In order to permit simple production of the tool holder, an end face, running next to the cutting body receptacle, of the parent body is preferably formed by at most two flat end faces sections. In an embodiment

variant, the end face is formed by a single end face section which is oriented in particular perpendicularly to the center axis of the tightening element.

If the end face is formed by two end face sections, the top end face section, which accommodates the head of the tightening element, is preferably oriented perpendicularly to the center axis of the tightening element. The second end face section adjoining at the bottom is preferably oriented perpendicularly to the holder longitudinal axis. The orientation perpendicular to the holder longitudinal axis provides for a large free space for the chip disposal. Yet even in the design of the end face having only one inclined end face section, a sufficient free space for the workpiece to be machined is achieved on account of the comparatively steep orientation.

Due to the configuration of the end face sections as a flat surface free of curvature, the end face can be produced, during the production of the tool holder, by very simple machining operations, such as milling for example.

The separating slot which separates the clamping claw from the rest of the parent body except for a bending cross section is provided for tightening the clamping claw relative to the bearing surface. Only a single separating slot is preferably provided. The at least one end face section extends free of edges preferably up to this separating slot. This end face section can therefore be produced in particular by a simple milling operation. On account of the small tightening angle, no curved surface is required here in order to make possible a sufficient free space for the workpiece machining.

According to a preferred development, the separating slot ends within the clamping head, i.e. the bending

cross section lies in the clamping head. The extent of the clamping head in the direction of the holder longitudinal axis is in this case determined by a head region which is raised relative to a top shank surface of the parent body. Since the tightening element used is normally a tightening screw and therefore a thread is required in the parent body for applying the requisite tightening force, said thread being arranged on that side of the separating slot which faces away from the clamping claw, this design makes possible as large a thread length as possible. Due to the arrangement of the separating slot in the clamping body region, there is therefore still a comparatively large thread length, such that as large a force transmission distance as possible is achieved. The thread therefore forms an abutment for the tightening element in the parent body.

The cutting head receptacle preferably extends beyond the head region. This allows the formation of a head region which is as short as possible. This head region, which is as short as possible, is especially advantageous in a multiple arrangement of a plurality of tool holders, for example in a cassette in longitudinal turning automatic lathes. The tool holders are arranged therein next to one another, for example vertically one above the other. The tool holder described here is intended in particular for accommodating an insert for forming a cutting-off tool. Such cutting-off tools, in the multiple arrangement of different tools, are normally those which have the greatest length, the "projecting length". Since the individual cutting edges of all the tools have to be set to a common plane, the cutting-off tool is therefore the limiting factor. In this respect, it is therefore advantageous if the head region of the tool holder can be kept as small as possible, such that the tool holder can be displaced as far to the rear as possible in the cassette.

In order to obtain as large a thread length as possible, the separating slot preferably ends within the raised head region.

Furthermore, in order to make possible the compact configuration, provision is made for the separating slot to run in an S shape and for it to be oriented in its central section approximately perpendicularly to the center axis of the tightening element. In this case, provision is made in particular for the central section to be arranged, with respect to the holder longitudinal axis, in the front region, that is to say approximately in or in front of the center of the clamping head. The separating slot is therefore arranged very close to the end face of the parent body, such that a long force transmission distance for the tightening element remains overall.

According to a preferred configuration, the cutting body receptacle extends along a longitudinal axis which is inclined by a secondary clearance angle relative to the holder longitudinal axis with respect to the x-z plane. That is to say, the longitudinal axis is arranged at a secondary clearance angle relative to the vertical plane extending in the direction of the holder longitudinal axis. Said secondary clearance angle is preferably within a region of less than 2° and in particular within the range of 1° and 1.5°. Since the side faces of the parallelepiped-shaped parent body run parallel to the holder longitudinal axis, the cutting body receptacle is oriented at the secondary clearance angle relative to the one side face of the parent body. This side face normally also defines a zero position relative to the y position, which zero position can be predetermined exactly via the machine control.

As viewed in the direction of the holder longitudinal axis, the cutting body receptacle expediently comprises

a rear stop surface, on which the cutting body is supported in the fitted position. This rear stop surface is in this case oriented at a perpendicular angle to the holder longitudinal axis. This means that the stop surface is additionally inclined relative to the longitudinal axis of the cutting body receptacle by the magnitude of the secondary clearance angle. The stop surface is therefore slightly inclined overall and not at right angles to the longitudinal axis of the cutting body receptacle. Corresponding thereto, a front end of the cutting body is likewise inclined relative to an insert body longitudinal axis by an angle corresponding to the magnitude of the secondary clearance angle, to be precise in such a way that the front end of the cutting body bears flat against the stop surface.

When the cutting body is inserted, a cutting corner of the cutting body is expediently in alignment with this side face of the parent body. Due to this measure, the cutting corner is therefore in the zero position predetermined by the machine mounting, such that the activation is kept simple and no conversion is necessary. This exact orientation of the cutting corner within the plane which forms the defined zero position is made possible in particular by virtue of the fact that very high tolerance requirements are imposed on the parent body, in particular its side dimensions, and are complied with.

In a development, preferably in addition to the inclination by the secondary clearance angle with respect to the x-z plane, the cutting body receptacle is preferably also arranged inclined by an inclination angle relative to the holder longitudinal axis with respect to the x-y plane. That is to say, the cutting body receptacle is inclined by the inclination angle relative to the horizontal plane. Said inclination angle is within the range of a few degrees, for example

within the range of 3° to 10°, in particular within the region of about 5°. Due to the inclination angle, the cutting body receptacle runs obliquely into the parent body, as a result of which the cutting body receptacle is arranged deeper within the parent body in the rear region. Finally, this measure assists the formation of as short a clamping head as possible, since the cutting body receptacle can extend beyond the clamping head without any problems.

Furthermore, the object is achieved according to the invention by a cutting body for such a tool holder described here. The cutting body extends along an insert longitudinal axis and has a plate-shaped cutting region having a cutting edge at the front end. In a preferred configuration, the cutting region widens in the direction of the insert longitudinal axis from a narrow side toward the cutting edge. The two opposite side faces of the plate-shaped cutting region therefore diverge in the direction of the cutting edge, such that the cutting region widens toward the cutting edge. As a result, an insert secondary clearance angle is formed directly at the cutting body itself. Said insert secondary clearance angle therefore acts in addition to the secondary clearance angle as formed by the inclined arrangement of the cutting body receptacle.

The cutting body is expediently of rotationally symmetrical design about 180° relative to a center rotation axis. The cutting body is therefore designed as a two-sided indexable insert.

The indexable insert in this case preferably comprises a thickened central region. A plate-shaped cutting region adjoins each side of the thickened central region. These two plate-shaped cutting regions are in this case arranged offset and approximately diagonally opposite one another. The outer sides of the plate-shaped cutting regions are in this case largely in

alignment with an outer side of the central region.

In a preferred configuration, the cutting region has an outer cutting corner which is oriented in alignment, that is in line, with an outer edge of the central region. Therefore an outer side face of the cutting region adjoins the central region. At the front end of the cutting region, the cutting corner is formed at the top corner of the outer side face.

It is now especially advantageous that different grooving widths are possible without any problems using the same cutting body receptacle of the tool holder. The grooving width is defined in this case by the length of the cutting edge starting from the cutting corner. On account of the thickened central region, it is possible here to set a variable grooving width at the cutting body. The grooving width in this case, starting from the cutting corner, can extend up to a maximum grooving width which corresponds to the thickness of the central region.

On the opposite side, an end wall acting like a step is in contrast formed in the transition region between the plate-shaped cutting region and the thickened central region. This end wall is preferably arranged inclined relative to the insert longitudinal axis. The inclination angle is in this case selected in such a way that the end wall runs, in the fitted state, parallel to and preferably in alignment with the end face section in the region of the head of the tightening element. In the fitted state, therefore, the end wall preferably forms a continuation of this end face section. The surface normal of the end wall is therefore inclined relative to the insert longitudinal axis within a region < 45° and in particular < 30°. The tightening angle is, for example, 25° and at the same time the entire cutting body receptacle is inclined by an inclination angle of 5° relative to the horizontal

plane; thus the angle between the end wall and the insert longitudinal axis is 20°.

Exemplary embodiments of the invention are explained in more detail below with reference to the figures. In the drawing, in each case in schematic illustrations:

fig. 1 shows a cutaway side view of a tool holder in the region of the clamped head with cutting body clamped in place,

fig. 2 shows a cutaway perspective illustration in the region of the clamping head without cutting body,

figs 3A, 3B show a side view and plan view, respectively, of a tool holder with inserted cutting body,

fig. 4 shows a sectional view along section line E-E according to fig. 3A in the front region of the tool holder,

fig. 5 shows a perspective illustration of the tool holder in the region of the clamping head,

fig. 6 shows a perspective illustration of an alternative configuration in the region of the clamping head,

figs 7A, 7B show two perspective illustrations of a further embodiment variant in the region of the clamping head,

fig. 8A shows a perspective illustration of a cutting body in the direction of view of the underside, and

fig. 8B shows a perspective illustration of the cutting

body shown in fig. 8A in the direction of view of the top side of the cutting body.

Parts having the same effect are provided with the same designations in the figures.

The tool holder 2 according to fig. 1 comprises a parent body 4 which extends in the direction of a holder longitudinal axis 6. The holder longitudinal axis 6 at the same time forms the x direction of a Cartesian coordinate system. In its height, the parent body 4 extends in the z direction of this Cartesian coordinate system. Its width extends in the x direction of the Cartesian coordinate system. In its front end region, the parent body 4 has a clamping head 10 having a cutting body receptacle 8 (cf. in this respect in particular fig. 2). The latter is defined at the top essentially by a clamping claw 11 and at the bottom by a bottom bearing surface 12. The bottom bearing surface 12 and the underside of the clamping claw 11 have a roof-shaped recess for a cutting body 14 (cf. fig. 1), said recess forming a guide and said cutting body 14 engaging in said recess in a positive-locking manner in the fitted position. The clamping claw 11 is formed by incorporating a separating slot 15 in the parent body 4. The separating slot 15 separates the clamping claw 11 from the rest of the parent body 4 except for a remaining bending cross section 16. At its rear end, the cutting body receptacle 8 has a stop surface 17, against which the cutting body 14 is supported in the fitted position. In this case, the stop surface 17 is designed to be inclined, to be precise in such a way that the cutting body 14, with its rear end face, comes to bear flat against the stop surface 17, as can be seen from fig. 1 and fig. 4. As viewed in the z direction, recessed portions 18, each forming a free space, adjoin the stop surface 17. The respective corner regions of the cutting body 14, designed as a two-sided indexable insert, come to lie in these

recessed portions 18 in the fitted end position. As a result, damage in particular to the cutting edges 20 of the cutting body 14 is avoided.

The cutting body receptacle 8 is designed to be open to a side face 22 of the parent body and is not defined in this region by a wall.

To fasten the cutting body 14, said cutting body 14 is fastened in a clamping manner by a tightening element designed as a tightening screw 24 in the exemplary embodiment. To this end, the tightening screw 24, starting from a front first end face section 26A, runs inclined relative to the holder longitudinal axis 6 into the parent body 4. In this case, a countersunk receptacle 28 is formed in the region of the clamping head 10, a head 30 of the tightening screw coming to rest in said countersunk receptacle 28 in the fitted position. The tightening screw 24 extends along a center axis 32, relative to which the tightening screw is designed to be rotationally symmetrical. A center line 34 of the countersunk receptacle 28 runs parallel to the center axis 32, but not congruently. The center line 34 and the center axis 32 therefore have an offset relative to one another, which in particular is within the range of between 0.2 and 0.3 mm.

As can be seen from fig. 4, the separating slot 15, starting at the bottom end region of the first end face section 26A, runs from the front end of the parent body 4 first of all horizontally in order to then extend in a roughly S-shaped bend into a head region 44 of the clamping claw 11. In this case, the separating slot 15 has a central section 46 which is oriented essentially perpendicularly to the center axis 32 of the tightening screw 24.

The head region 44 of the clamping head 10 is in this case defined by a bead-like prominence relative to a

top shank surface 48 of the parent body 4. In the exemplary embodiment, this prominence is designed like a trapezoid. It is especially important that the separating slot 15 ends above this top boundary side 48 and inside the head region 44. This makes possible a very short head region 44 overall. A thread 50, which is incorporated in the parent body 4 such as to follow the separating slot 15, can therefore have a sufficiently large length, such that large forces can be transmitted to the clamping claw 11 and thus to the cutting body 14 via the tightening screw 24.

As can also be seen from fig. 1, the cutting body receptacle 8 extends beyond the head region 44. The cutting body length S is therefore larger overall than a projecting length A. The cutting body length S is in this case defined by the largest extent of the cutting body 8 in its longitudinal direction. The projecting length A is defined by the distance between the bend region in which the head region 44 merges into the shank surface 48 and the position in which the cutting edge 20 is located in the fitted position.

The center axis 32 of the tightening screw 24 is arranged inclined within the vertical plane relative to the holder longitudinal axis 6 by a tightening angle α. The vertical plane is in this case established by the x-z plane. In the exemplary embodiment, the tightening angle α is about 25°. Corresponding thereto, the first end face section 26A oriented perpendicularly to the center axis 32 is oriented at an angle α' to the holder longitudinal axis 6, where the relationship is $\alpha' = 90° + \alpha$.

Due to this small tightening angle α, the tightening screw 24 runs into the parent body 4 with a very gentle inclination. As a result, the first end face section 26A is arranged comparatively steeply and therefore offers good accessibility of the tightening screw 24 at

the front end. The latter can therefore be readily actuated from the front end without any problems. This permits simple and quick exchange of the cutting body 14 when required, if said cutting body 14 is worn for example. It is therefore not necessary for the entire tool holder 2 to be removed from the receptacle on the machine side. For this would mean considerable effort, since the tool holder is normally oriented in a highly precise manner inside the machine holder or inside a cassette. In particular with the arrangement of a plurality of tool holders 2 having different tools next to and above one another, simple exchangeability and good accessibility is achieved by the small tightening angle α.

In order to achieve reliable clamping and as high a clamping force as possible on the cutting body 14 in the direction of the bottom bearing surface 12, a plurality of measures are provided, which can be used individually but preferably lead in combination with one another to especially reliable clamping. This is firstly the offset between the center axis 32 and the center line 34 in such a way that the center axis 32 is arranged below the center line 34 in the z direction. Due to this eccentric arrangement of the two lines 32, 34, an additional force component is produced in the direction of the bottom bearing surface 12, thereby increasing the clamping force.

Furthermore, in order to produce a sufficiently high clamping force, the arrangement and configuration of the separating slot 15 is especially important. In particular, as long a thread length of the thread 50 as possible is achieved as a result. Furthermore, a comparatively large accommodating length of the cutting body 14 inside the parent body 4 is achieved by virtue of the fact that the cutting body receptacle 8 extends beyond the head region 44. This is helped, inter alia, by the fact that the cutting body receptacle 8, which

extends along a longitudinal axis 52, is inclined by an inclination angle β relative to the holder longitudinal axis 6. In this case, the longitudinal axis 52 runs parallel to both the bottom bearing surface 12 and the underside of the clamping claw 11. The inclination angle β is preferably within the region of 5°.

In the side view according to fig. 3A, a workpiece 54 to be machined is additionally shown by way of example. As can be seen from fig. 3A, the front end of the tool holder 2 requires no special cutouts, recesses, etc., in order to provide a sufficient free machining space for the workpiece 54. On the contrary, it is sufficient on account of the relatively steep orientation of the front end face in accordance with the angle α' for this front end face to be designed as a flat surface.

As can be seen from the sectional illustration according to fig. 4, the longitudinal axis 52 of the cutting body receptacle 8 is oriented at the second clearance angle γ relative to the holder longitudinal axis 6, to be precise with respect to the vertical plane, i.e. the longitudinal axis 52 is arranged at the secondary clearance angle γ relative to the x-z plane. In the exemplary embodiment, the secondary clearance angle γ is 1.5°. Owing to the fact that the longitudinal axis 52 of the cutting body receptacle 8 does not run parallel to the holder longitudinal axis 6, the cutting body 14 is oriented obliquely in its fitted position. In addition, the cutting body 14 has at its front end a plate-shaped cutting region 56 which widens from a narrow point 58 up to the cutting edge 20. As a result, an insert secondary clearance angle is additionally formed on the cutting body 14, said insert secondary clearance angle being formed between an insert body longitudinal axis 60 and the orientation of the outer side of the cutting region 56. In the fitted position, the insert body longitudinal axis 60 and the longitudinal axis 52 of the cutting body receptacle 52

are oriented parallel to one another.

The secondary clearance angle γ, the length of the cutting body 14 and that of the cutting body receptacle 8 are now dimensioned in such a way that an outer cutting corner 61 of the cutting body 14 is in line with the side face 22 of the parent body 4. Since the zero position of the tool holder 2 in the y direction is normally defined via the side face 22, this measure ensures that the cutting corner 61 is also directly located in this zero position.

The rear stop surface 17 is oriented at an angle δ of 90° relative to the holder longitudinal axis 6. Therefore the stop surface 17 is additionally arranged inclined relative to the longitudinal axis 52 by the magnitude of the secondary clearance angle γ. The stop surface 17 is thus inclined relative to the longitudinal axis 52 at an angle of 91.5°. A corresponding angle of the rear end face of the cutting body 14 is thereby corrected. As can be seen from fig. 1, the cutting body 14 bears against the stop surface 17 merely with a central region of the end face adjoining the cutting edge 20. Due to the correction carried out by the angle δ, this end face bears as flat as possible against the stop surface 17. This is because, on account of the secondary clearance angle γ, the cutting edge 20 is likewise oriented at an angle, corresponding to the magnitude of the secondary clearance angle, to the longitudinal axis 52 and thus to the insert body longitudinal axis 60. This measure ensures that the cutting edge 20 is oriented exactly perpendicularly to the holder longitudinal axis 6.

This means, during a machining operation, namely the "grooving operation", that the workpiece surface machined via the cutting edge 20 is oriented perpendicularly to the infeed direction and thus to the holder longitudinal axis 6. The length of the cutting

edge 20 defines in this case the "grooving width" b. The latter, starting from the cutting corner 61, is in principle freely adjustable up to the thickness of the central region 64. By the provision of cutting bodies 14 having different grooving widths b, it is therefore possible, without any problems, to realize different grooving widths b using the same tool holder 2.

The cutting corner 61 preferably lies in line with the outer marginal side of the central region 64. Sufficient freedom of movement of the cutting edge 20 on its outer side is achieved due to the secondary clearance angle γ. On the inner side face 76, opposite the cutting corner 61, of the cutting region 56, the latter has a clearance angle. Due to the inclination of the cutting body 14, said clearance angle is formed as a double clearance angle in order to compensate for the inclination.

Three different embodiment variants of the tool holder 2 are shown in figs 5, 6 and 7A, 7B. In the embodiment variant according to fig. 5, a second, bottom end face section 26B adjoins the top, first end face section 26A and is oriented approximately perpendicularly to the holder longitudinal axis 6. In this case, the separating slot 15 is arranged to run transversely in the bottom fifth of the top, first end face section 26A. An end wall 62 of a thickened central region 64 of the cutting body 14 (for the thickened central region 64, cf., in particular, figs 8A, 8B and fig. 4) is in this case arranged in alignment with the first end face section 26A.

In the embodiment variant according to fig. 6, only one continuous end face section 26A is provided, which is subdivided approximately in its center by the separating slot 15. In the embodiment variant according to figs 7A, 7B, a second, approximately vertically oriented bottom end face section 26B is again provided.

The separating slots 15 is arranged, in this embodiment variant, below the first end face section 26A. In this embodiment, the risk of removed chips jamming in the separating slot 15 is slight, since an enlarged free space is available on account of the vertical orientation of the second end face section 26B. At the same time, a supporting web 66 which additionally supports the cutting body 14 in its central region 64 is drawn out below the cutting body 14.

In the exemplary embodiments shown in figs 2, 5 to 7, the separating slot 15 in each case runs into the head region 44 and has a turning point there at a highest point in order to then run downward in a curved manner. The separating slot 15 is therefore designed like a walking stick in its top and central regions. Due to this measure, the central section 46 is displaced as far as possible in the direction of the front end. At the same time, the separating slot 15 is drawn right up close to the bend region between the head region 44 and the top shank surface 48, such that an especially favorable remaining bending cross section 16 is obtained.

A cutting body 14 intended for use in the tool holder 2 described is shown schematically in figs 8A, 8B. Fig. 8A shows in this case the underside 70 of the cutting body 14, said underside 70 being tightened against the bottom bearing surface 12 in the fitted state. Conversely, fig. 8B shows the top side 72 of the cutting body 14, against which the underside of the clamping claw 11 is tightened. Both the underside 70 and the top side 72 have a roughly roof-shaped prominence which engages in a positive-locking manner in the bottom bearing surface 12 and the underside of the clamping claw 11, respectively.

The cutting body 14 is designed overall like a double-sided indexable insert which is of 180° rotationally

symmetrical design relative to a center rotation axis 68. The cutting body 14 is subdivided overall more or less into three regions. These are the thickened central region 64 and the plate-shaped cutting regions 56 adjoining said central region 64 on both sides. The smallest narrow point 58 of the cutting body 14 is formed directly in the transition region between the thickened central region 64 and the cutting region 56. The cutting region 56 widens from here continuously up to the front cutting edge 20.

Starting from the cutting edge 20, which is formed on the top side 72, the cutting region 56 tapers downward toward the underside 70. At the same time, the top side 72 is also beveled toward the cutting region 56 starting from the thickened central region 64, such that the section of the top side 72 in the cutting region 56 is arranged, in the z direction, slightly below the section of the top side 72 in the thickened central region 64.

Whereas the cutting body 14 has, at its outer side face 74, in the transition region between the central region 64 and the cutting region 56, merely an edge and a slight recess, the end wall 62, which is oriented obliquely to the insert longitudinal axis 60, is arranged at its inner side face 76 in this transition region.

As viewed from the top side 72, the cutting corner 61 lies on a rectilinear extension of the outer side of the central region 64. The cutting corner 61 is therefore in alignment with the outer side of the central region 64 and thus lies with this outer side in the same plane. A front end 78 extends downward starting from the cutting edge 20, said front end 78 enclosing a clearance angle with the cutting edge 20. The front end 78 is trapezoidal, such that the cutting region 56 tapers downward overall. As a result, the

recess already mentioned is formed in the bottom region toward the central region 64. This recess is zero at the top edge, since the cutting corner 61 is in alignment with the outer side of the central region 64. At the same time, the front end 78 is inclined relate to the center rotation axis 68.

Claims

1. A tool holder (2), in particular for a grooving tool, having a parent body (4) which extends along a holder longitudinal axis (6) in the x direction and the width of which extends in the y direction and the height of which extends in the z direction and which has at the front end a clamping head (10) for accommodating a cutting body (14), wherein the clamping head (10) has a cutting body receptacle (8) defined by a clamping claw (11) and a bottom bearing surface (12), wherein a separating slot (15) runs between the clamping claw (11) and the bearing surface (12), and the clamping claw (11) can be tightened in the direction of the bottom bearing surface (12) by means of a tightening element (24) inclined relative to the holder longitudinal axis (6) and extending over the separating slot (15), characterized in that a center axis (32) of the tightening element (24) encloses a tightening angle (α) < 45° and in particular < 30° relative to the holder longitudinal axis (6).

2. The tool holder (2) as claimed in claim 1, characterized in that the clamping claw (11) has a countersunk receptacle (28) for accommodating a head (30) of the tightening element (24), said countersunk receptacle (28) extending along a center line (34), the centre axis (32) of the tightening element (24) being arranged offset from the center line (34) of the countersunk receptacle (28) in the direction of the bottom bearing surface (12).

3. The tool holder (2) as claimed in claim 1 or 2, characterized in that an end face, running next to the cutting body receptacle (8), of the parent body is formed by at most two flat end faces sections (26A, B).

4. The tool holder (2) as claimed in one of the

preceding claims, characterized in that the clamping claw (11) is separated from the parent body (4) by a separating slot (15) except for a bending cross section (16), and in that the parent body (4) has in the region of the tightening element (24) an end face section (26A) which is inclined relative to the holder longitudinal axis (6) and which extends free of edges up to the separating slot (15).

5. The tool holder (2) as claimed in one of the preceding claims, characterized in that the clamping claw (11) is separated from the parent body (4) by the separating slot (15) except for a bending cross section (16), the bending cross section (16) lying within the clamping head (10), the extent of said bending cross section (16) in the direction of the holder longitudinal axis (6) being determined by a head region (44) which is raised relative to a top shank surface (48) of the parent body (4).

6. The tool holder (2) as claimed in claim 5, characterized in that the cutting head receptacle (8) extends in the direction of the holder longitudinal axis (6) beyond the head region (44).

7. The tool holder (2) as claimed in claim 5 or 6, characterized in that the separating slot (15) ends in the raised head region (44).

8. The tool holder (2) as claimed in one of claims 4 to 7, characterized in that the separating slot (15) runs in an S shape and is oriented in a central section (46) approximately perpendicularly to the center axis (32) of the tightening element (24).

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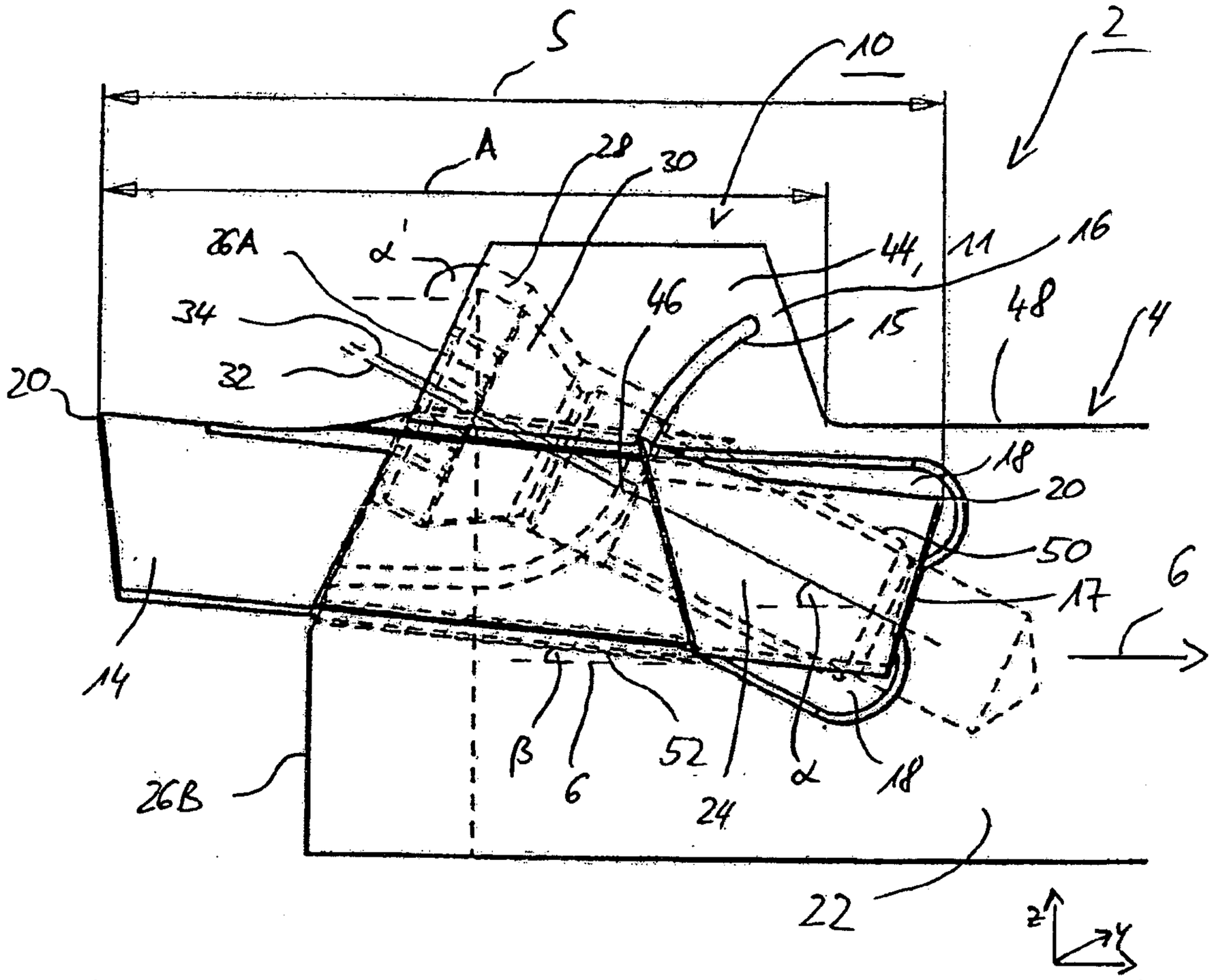

5
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2
A
28
30
26A
α'
44
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48
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β
6
52
α
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26B
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22
z
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Fig 1

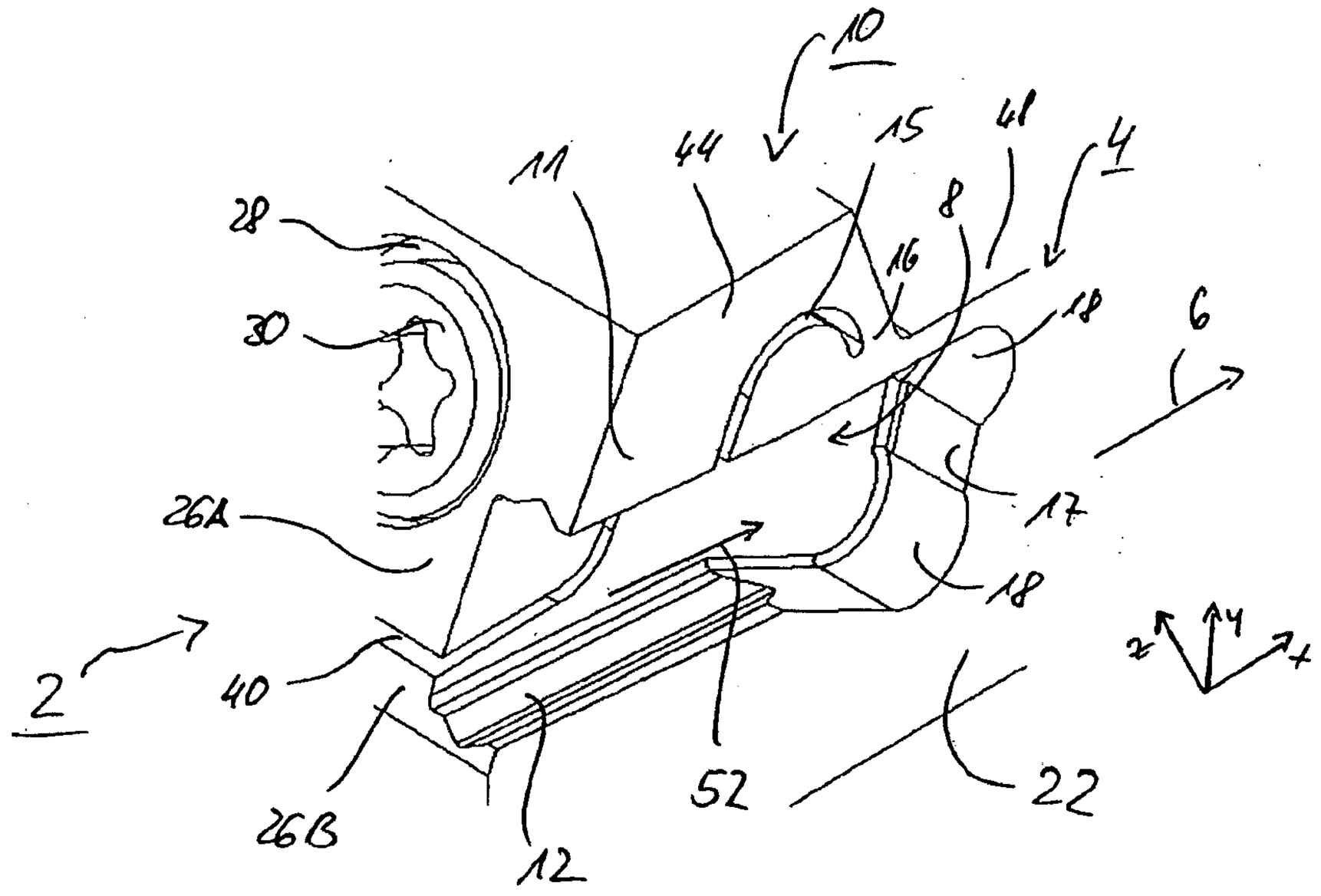

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Fig 2

Fig 4

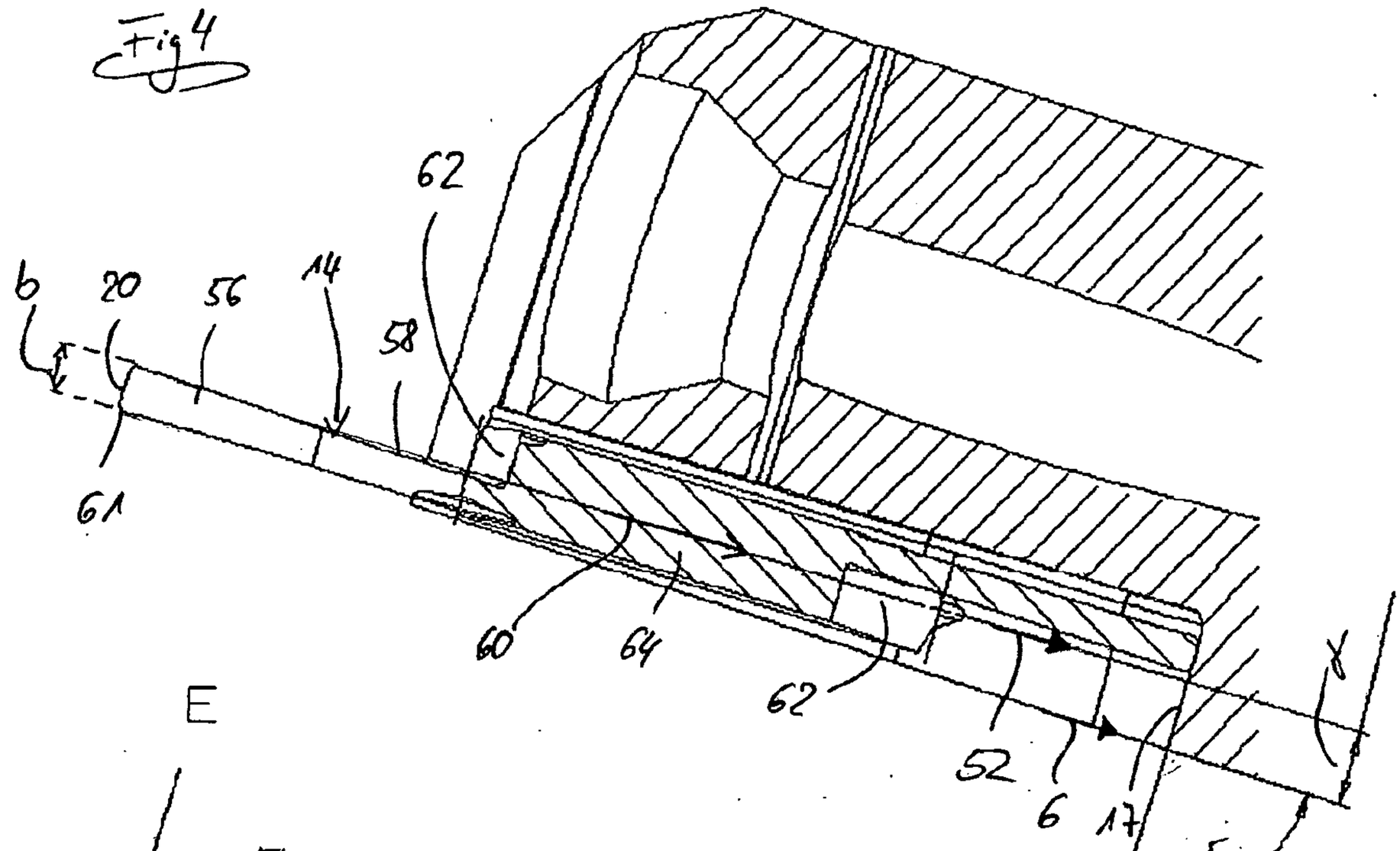


Fig 3A

Fig 3B

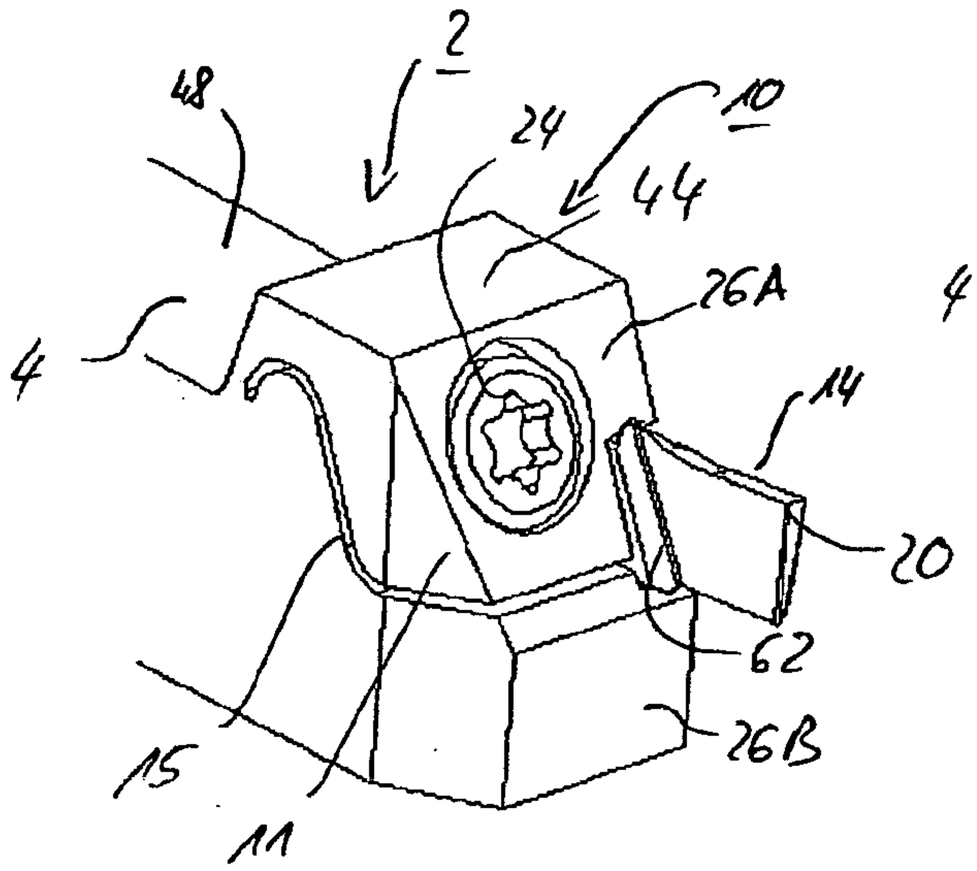


Fig 5

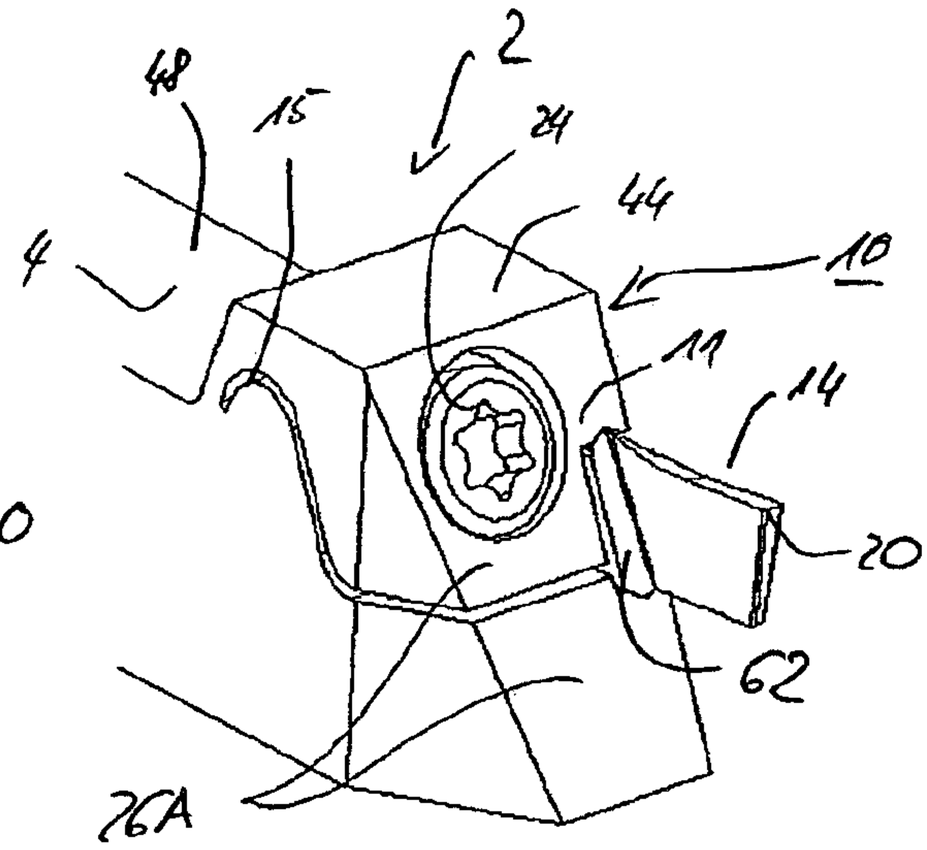


Fig 6

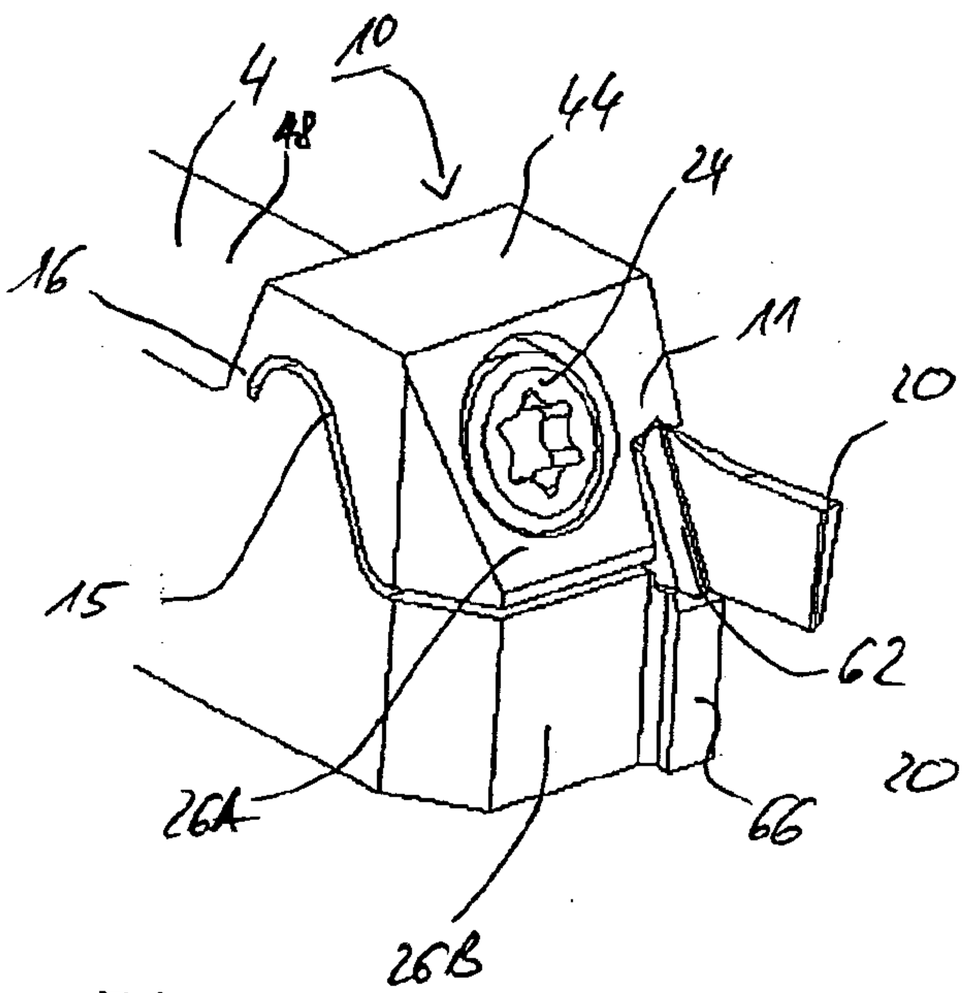


Fig 7A

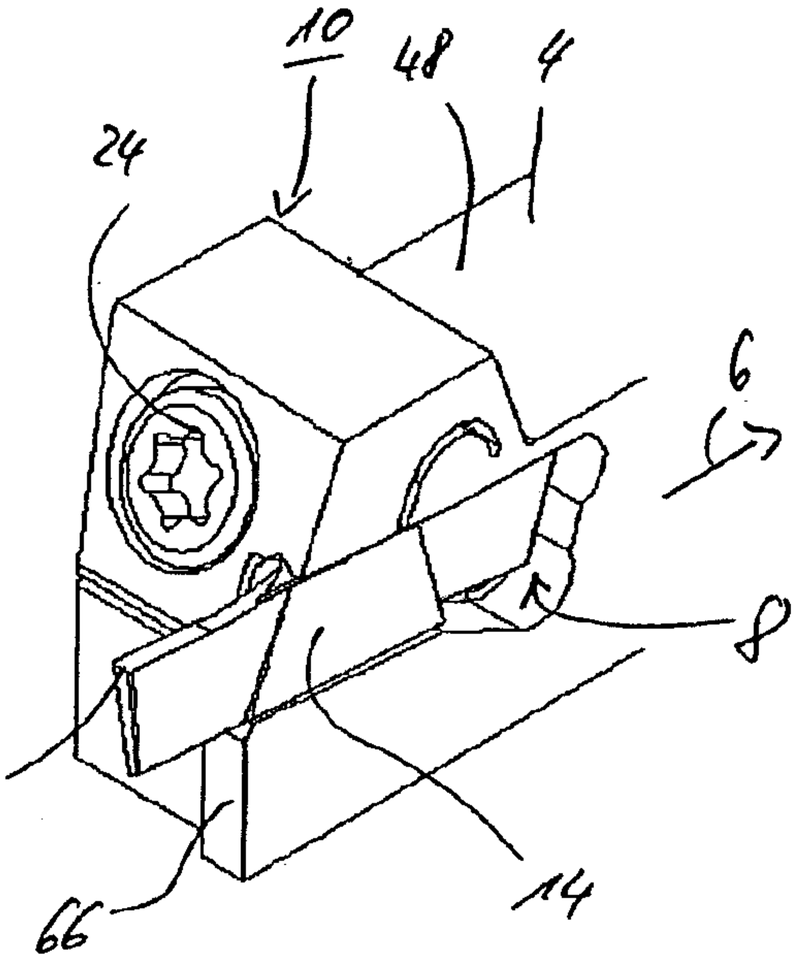


Fig 7B

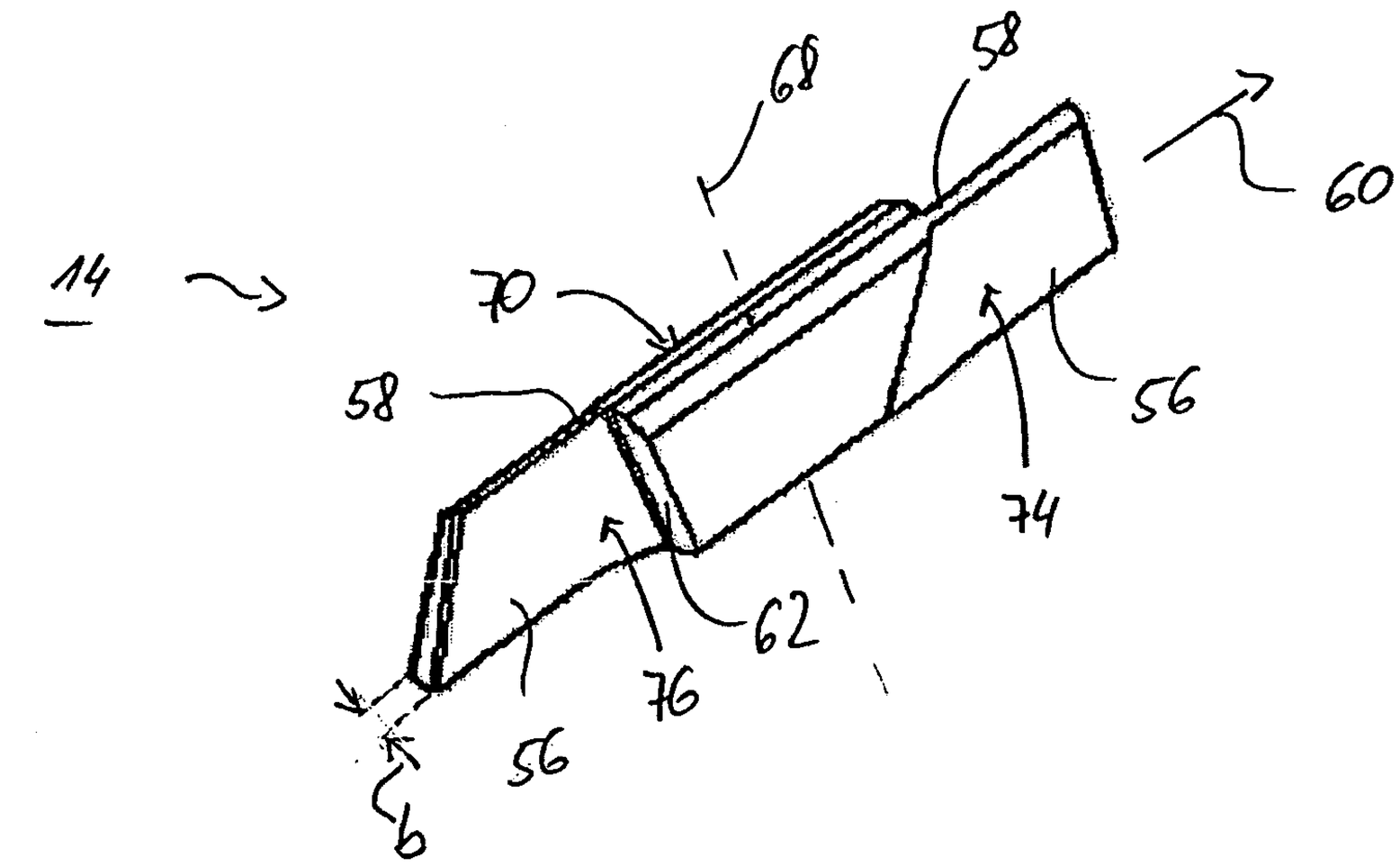

14
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56
b

Fig 8A

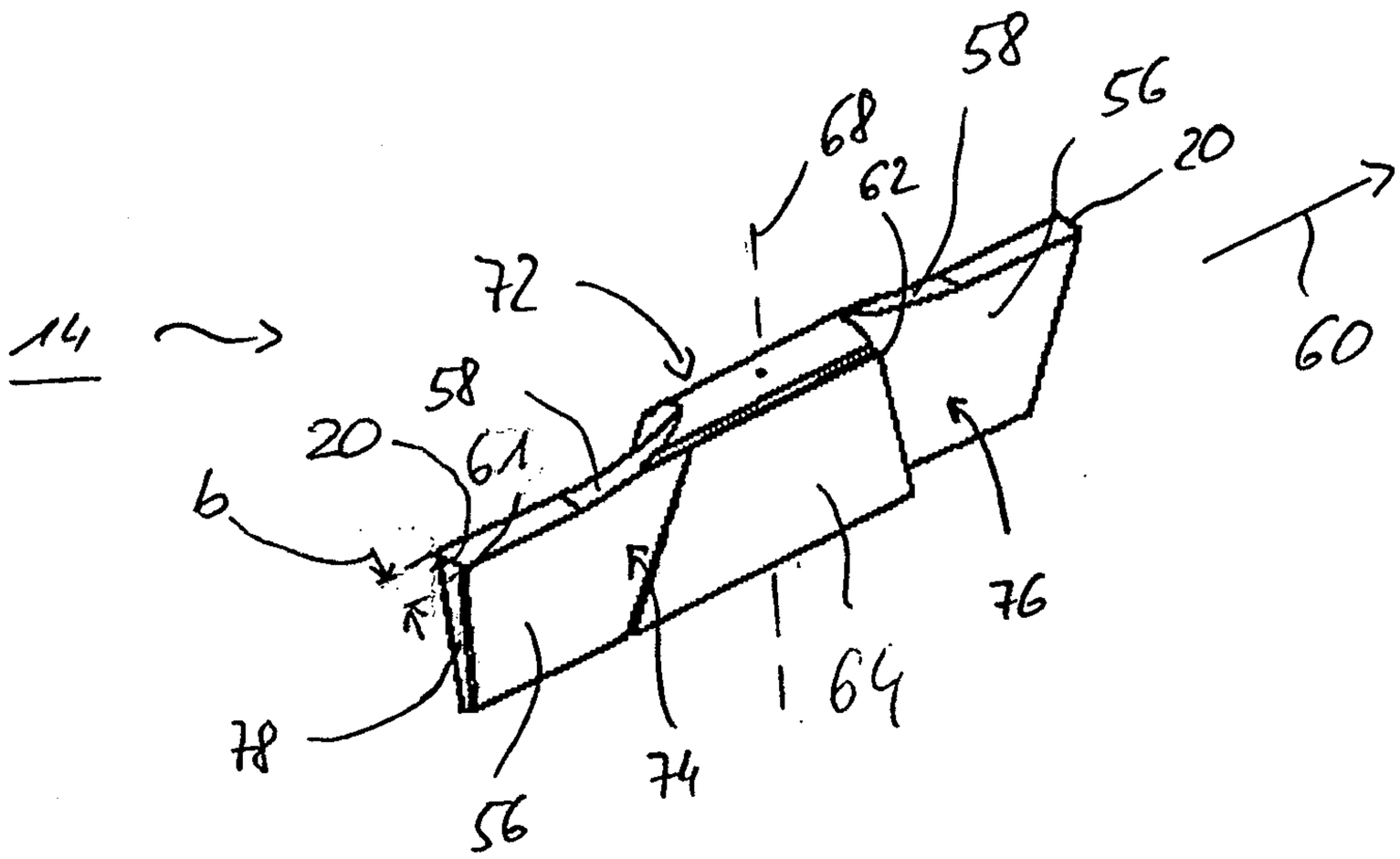
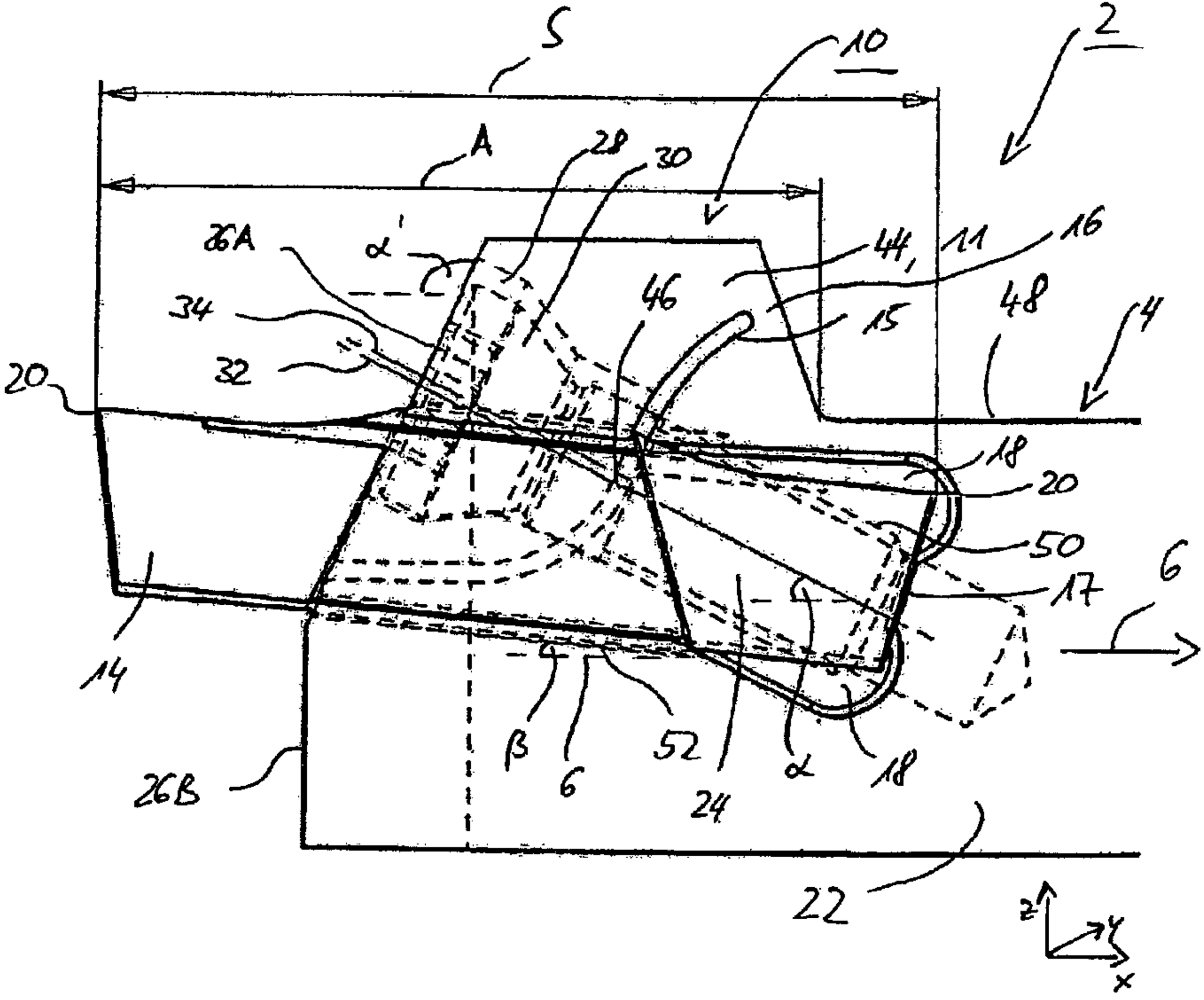

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Fig 8B


S
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26B
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