(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 642 895 B1

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
04.06.1997 Bulletin 1997/23

(51) Int. Cl.[6]: **B27B 5/16**, B27B 5/20

(21) Application number: **94305874.3**

(22) Date of filing: **08.08.1994**

(54) Combination mitre and table saw

Kombinierte Tisch- und Gehrungssäge

Scie à table et à onglet combinée

(84) Designated Contracting States:
DE ES FR GB IT SE

(30) Priority: **12.08.1993 GB 9316730**

(43) Date of publication of application:
15.03.1995 Bulletin 1995/11

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(56) References cited:
GB-A- 2 028 226
US-A- 4 531 441

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Description

This invention relates to chop saws and particularly to a combination mitre and table saw, otherwise known as a flip-over saw. In particular, the invention relates to such a saw which is capable of making bevel cuts in both its table saw mode and mitre saw mode.

Mitre saws usually, and table saws always, require a slot to be provided in the workpiece support or table, through which the saw blade will pass. In a mitre saw, the saw blade passes through the slot in the workpiece support once it has cut through the workpiece; in a table saw, the saw blade is mounted below the workpiece support and passes through the slot so as to present a cutting edge above the workpiece support, to which the workpiece may be presented. In order to keep to a minimum any damage which is done to the side of the workpiece which is adjacent the workpiece support as the saw blade emerges from the workpiece, the slot in the workpiece support is generally to be kept as narrow as possible.

When a saw, whether it be a mitre saw or a table saw, is capable of making bevel cuts at a variety of different bevel angles, the slot in the workpiece support must be capable of accommodating the saw blade at any one of that variety of angles. Since the critical width of the slot in the workpiece support is its width at the surface of the workpiece support which is actually supporting the workpiece, namely the upper surface, the requirement for minimal damage to the workpiece has led to the axis about which the saw blade pivots, in order to alter the bevel angle at which it is cutting, being arranged to coincide with the upper surface of the workpiece support. An example of a mitre saw which includes such an arrangement is described and illustrated in US-A-4537105. In that saw, the workpiece support includes a bearing block having a part circular guide slot. The saw blade mounting includes a similar bearing block and the two bearing blocks co-operate to allow relative arcuate movement about the centre of curvature of the guide slot. The centre of curvature of the guide slot coincides with the top of the slot in the workpiece support.

US-A-4531441 illustrates and describes a combination table and mitre saw, i.e. a flip-over saw, which utilizes a similar bevel pivot arrangement. In this saw, the bevel axis of the saw blade is arranged to coincide with the upper surface of the workpiece support when the saw is operating as a table saw. Consequently, when the saw is operating as a mitre saw, the bevel pivot axis coincides with the lower surface of the workpiece support. Accordingly, when operating as a mitre saw, this saw gives relatively poor protection to the workpiece against damage caused by emergence of the saw blade. If the bevel angle is adjustable between ± 45° from the vertical, this will require that the slot in the workpiece support, when the saw is operating as a mitre saw, being at least twice as wide as the workpiece support is thick.

A further problem with the type of bevel pivot exemplified by the above two documents is that there is a tendency, owing to the inevitable tolerances in the mating surfaces of the part circular or part cylindrical bearing parts, for there to be a certain amount of play in the pivot. This results in the bevel pivot axis not being well-defined, which in turn means that the slot in the workpiece support must be widened somewhat to take this into account, not to mention the inaccuracies that this results in the cutting of the workpiece.

The above problem has been recognized, and a solution proposed in the context of mitre saws, in US-A-4934233. In the saw illustrated and described in this document, the bevel pivot arrangement described above has been replaced with a pair of cylindrical parts of identical diameter, the end surfaces of which are abutted together and which are permitted to rotate relative to one another about a central spindle. The use of a central spindle enables the bevel pivot axis to be well-defined, the axis being positioned to coincide with the upper surface of the workpiece support, and the radial extent of the cylinders reduces substantially the amount of play in the pivot. However, since the use of the cylindrical parts inevitably means that there will be projections both above and below the workpiece support, such an arrangement is unsuitable for use with a bench saw and consequently unsuitable for use with a flip-over saw.

It is an object of the present invention to provide a saw having a bevel pivot of improved stability.

Accordingly, the present invention provides a saw comprising a frame, a table mounted in the frame having first and second substantially planar parallel opposed table surfaces, the table being pivotable in the frame between two positions, a pivot block mounted on said first surface, a pivot member pivotally mounted on said pivot block for pivoting about a first axis substantially parallel and within the confines of said first and second surfaces, a saw assembly mounted on said pivot member and comprising a saw blade lying in a plane containing said first axis, a slot in the table adapted to receive said blade to enable cutting of workpieces supported on either surface of the table, and clamp means to clamp said pivot member and block together, wherein said first axis is defined by first and second opposed arcuate pivot surfaces between said pivot member and one or both of said table and pivot block, at least the first pivot surface being defined between said first and second table surfaces.

Said pivot surfaces may comprise a bore in a projection of said pivot member and a pin spanning a slot in the table, said projection being received in said slot.

Alternatively and preferably said first pivot surface is defined by a part substantially cylindrical surface of a projection of said pivot member and a part substantially cylindrical surface of a recess formed in said table, said projection being received in said slot.

In this event said second pivot surface may comprise another part substantially cylindrical surface on

said projection and a part substantially cylindrical surface on said pivot block above said first surface.

In this way two conflicting requirements are met. Firstly there is no projection beyond said second surface, which in use forms the working surface of the saw in bench saw mode of operation of the saw and which requires a flat unencumbered surface for efficient operation. Secondly, the pivot axis of the pivot member is securely positioned and has little or no opportunity to float which would otherwise give rise to positional error of the blade.

Preferably said pivot axis is intermediate said first and second surfaces and most preferably centrally between them so that the slot entrance at either surface can be minimised.

Preferably said part substantially cylindrical surface of the recess subtends an angle of 180° less the angle of pivot required of the pivot member about said first axis.

Preferably said projection is supported axially against movement thereof. Said axial support may comprise a radial surface with respect to said first axis being formed in said recess. Adjustment means may be provided to adjust axially said radial surface.

Said adjustment means may comprise a wedge section received in said table at the end of said recess and forming said first radial surface, and screw means received in said wedge section and adapted to draw said section axially with respect to said first axis.

As with US-A-4531441 and US-A-4537105, the pivot block preferably also co-operates with the pivot member to allow sliding arcuate relative motion of the pivot block and the pivot support about the first axis. For convenience, it is preferred that said clamp means comprises the pivot block having an arcuate slot and the pivot member having a locating pin, such as a releasable bolt which is operable to secure the pivot member to the pivot block.

Preferably, said pivot member further comprises a pivot guide mounted on the pivot block on the side thereof remote from the pivot member and between which the pivot block is clamped when said releasable bolt is tightened. Said pivot guide serves, inter alia, to close the arcuate slot in the pivot block and prevent the ingress of dust.

For reasons which will be apparent, it is also preferred that the pivot member includes stop surfaces adapted to abut the table to limit the relative rotation of one with respect to the other in both directions.

The present invention will now be described by way of example with reference to the accompanying drawings, wherein:-

Figure 1 is a side view of the saw;

Figure 2a is a side view in greater detail of a first bevel pivot arrangement;

Figure 2b is a side view of a second and preferred bevel pivot arrangement;

Figure 3a is a front view of the bevel pivot arrangement of Figure 2a; and

Figure 3b is a similar view of the preferred arrangement.

In Figure 1, a saw 10 comprises a saw assembly 20 mounted on a workpiece support or table 16. The mounting is such as to allow pivotal motion of the saw assembly 20 relative to the table 16 about two spaced, orthogonal axes 28,92. A pivot support 26 is pivotally mounted on the workpiece support or table 16 about an axis 92 which is parallel to the upper and lower surfaces of the workpiece support 16 and coincident with the plane of the saw blade, in a manner which will be more particularly described with reference to Figures 2 and 3. The saw assembly 20 is itself pivotally mounted on the pivot support 26 about a second axis 28 which is perpendicular both to the first axis 92 and to the plane of the saw blade. Pivoting about the second axis 28 enables the saw assembly 20 to be raised and lowered and to allow a saw blade under a lower guard 36 to engage and cut a workpiece supported on the table 16 against a fence 17.

To enable the saw 10 to perform mitre cuts when operating as a mitre saw, a circular portion of the table 16 is rotatable about a vertical axis with respect to the remainder of the table. The saw assembly 20 rotates with the circular portion of the table 16. The fence 17 is fixed in position on the remainder of the table 16.

The saw can be rendered a table saw by plunging the blade into a slot (not shown) in the table and locking the saw assembly in this position. The table 16 is then pivoted by means (not shown) through 180° so that the undersurface of the table is then uppermost and the saw blade protrudes from beneath. Such a saw was first described in DE-A-1628992, although a preferred pivot arrangement for the table 16 is described in our copending British application number 9218363.1.

Pivoting of the saw assembly 20 about the first axis 92 enables the saw 10 to make bevel cuts when acting as a mitre saw or when acting as a table saw. As can more clearly be seen from Figures 2 and 3, pivoting of the pivot support 26, and hence of the saw assembly 20, about the first axis 92, is controlled by two concentric opposing pivot surfaces (described further below) centred on the pivot axis 92. The use of dual concentric pivot surfaces reduces substantially the likelihood of any unwanted floating of the bevel axis.

A pivot block 27, which is rigidly affixed to the circular, rotatable portion of the table 16, co-operates with the pivot support 26 so as to allow sliding arcuate relative motion of the two. The pivot member 26 has a bolt 17 passing through it and this bolt 170 is received within an arcuate slot 173 in the pivot block 27. The bolt 170 is adapted to secure the pivot support 26 to the pivot block 27, and is releasable. To this end, the bolt 170 is provided with a handle 172 and co-operates with a captive nut or other captive thread in known manner. In particular, the bolt 170 may be such as is described in our British Patent Application No. 9218366.4.

In a first alternative arrangement, said concentric opposing pivot surfaces are formed by a pin or spindle 92' which is recessed into the rotatable portion of the workpiece support or table 16 and which laterally spans a semicircular recess 90 therein. The pivot support 28 has a corresponding lug or projection 88 which is received in the semicircular recess 90, and through which the spindle 92' passes. Thus relative rotation of the pivot support 26 with respect to the workpiece support or table 16 occurs about the spindle 92'. This arrangement provides for stable pivoting, and also locates the first axis 92 between the surfaces of the workpiece support 16, in this case centrally between the surfaces, so as to enable the width of the slot (not shown) in the workpiece support 16, which is necessary for passage of the saw blade, to be kept to a minimum.

A further degree of stability for the bevel pivot is afforded by the fact that the lug 88 of the pivot support 26 is tightly received within the semicircular recess 90, thereby preventing unwanted axial movement.

However, a perceived potential problem with this arrangement is seen in that, if the clamp formed by the bolt 170 is loosened more than necessary, extreme bending forces about an axis parallel the axis 28 may be imposed on the pin 92' by the weight of the saw assembly (at least in table saw mode) so that there is a danger of the pin and/or table in that region bending and causing significant damage to the saw.

Consequently, Figures. 2b and 3b illustrate a second and preferred bevel pivot arrangement. In this case, there is no pin or spindle; the pivot lug 88 is simply received in a correspondingly shaped, semicircular recess 90 in the rotatable portion of the table 16. In addition, the pivot block 27 and the pivot lug 88 each support a part-cylindrical surface 130,132, the surface 130 carried by the pivot block being press-formed on a plate 134 attached thereto. The surface 130 carried by the pivot block 27 faces towards the first axis 92; the other surface 132 faces away. With the saw operating as a chop saw, load is borne by the lug 88 and recess 90. However, when the saw is in its table mode, it is the part-cylindrical surfaces 130,132 which do this job. Both the lug 88 and recess 90 arrangement and the pair of part-cylindrical surfaces 130,132 provide for pivoting about the first axis 92 and co-operate to provide a stable pivot axis.

The lug 88 is axially supported against movement by the ends of the recess 90. Towards the pivot block 27 there is a small clearance between the lug 88 and end 91 of the recess which is not taken up when the clamp bolt 170 is tightened. However, the lug may abut that end when the saw is in its bench saw mode and the bolt 170 is overly loosened. However the flexibility in the plate 134 in the region of its surface 130 can accommodate torsion loads without permanent damage to the table or lug being caused. At the other end, a nylon or like material wedge 180 is secured by a screw 182. Tightening the screw draws the plug 180 downwardly and axially against the lug 88 and thereby supports the lug when the bolt 170 is loosened when the saw is in its chop saw mode. If the bolt 170 is overly loosened in this position only small forces act on the plug through the pivot support 26 attempting to pivot about an axis more or less passing through the bolt 170 but lying parallel the pivot axis 28. If the forces are sufficient to damage the wedge 180 then this component is easily replaced.

The pivot support 26 is also provided with a pair of stop surfaces 174,176 which respectively limit movement of the pivot support by abutting the table 16 when the pivot support 26 is vertical and inclined at an angle of 45° with respect to the table or workpiece support 16.

Thus the advantage gained by both embodiments of the invention is that a precise location of the bevel axis is achieved, much like that achieved in US-A-4934233, but, on the other hand, the lower pivot surface (when in mitre saw mode) does not extend below the level of the bottom surface 16b of the table. Hence it will not encumber this surface with protuberances which would hinder efficient use of the saw when it is switched to bench saw mode.

It will of course be understood that the above description has been given purely by way of example and that modifications of detail may be made without departing from the scope of the invention as defined by the appendant claims.

Claims

1. A saw comprising a frame, a table mounted in the frame having first and second substantially planar parallel opposed table surfaces, the table being pivotable in the frame between two positions, a pivot block mounted on said first surface, a pivot member pivotally mounted on said pivot block for pivoting about a first axis substantially parallel and within the confines of said first and second surfaces, a saw assembly mounted on said pivot member and comprising a saw blade lying in a plane containing said first axis, a slot in the table adapted to receive said blade to enable cutting of workpieces supported on either surface of the table, and clamp means to clamp said pivot member and block together, wherein said first axis is defined by first and second opposed arcuate pivot surfaces between said pivot member and one or both of said table and pivot block, at least the first pivot surface being defined between said first and second table surfaces.

2. A saw according to claim 1, in which said pivot surfaces comprise a bore in a projection of said pivot member and a pin spanning a slot in the table, said projection being received in said slot.

3. A saw according to claim 1, in which said first pivot surface is defined by a part substantially cylindrical surface of a projection of said pivot member and a part substantially cylindrical surface of a recess

formed in said table, said projection being received in said slot.

4. A saw according to claim 3, in which said second pivot surface comprises another part substantially cylindrical surface on said projection and a part substantially cylindrical surface on said pivot block above said first table surface.

5. A saw as claimed in claim 3 or 4, in which said part substantially cylindrical surface of the recess subtends an angle of 180° less the angle of pivot required of the pivot member about said first axis.

6. A saw as claimed in claim 3, 4 or 5, in which said projection is supported against axial movement thereof.

7. A saw as claimed in claim 6, in which said support comprises a radial surface with respect to said first axis being formed in said recess.

8. A saw as claimed in claim 7, further comprising adjustment means to adjust axially said radial surface.

9. A saw as claimed in claimed 8, in which said adjustment means comprises a wedge section received in said table at the end of said recess and forming said first radial surface, screw means received in said wedge section adapted to draw said section axially with respect to said first axis.

10. A saw according to any preceding claim, in which said pivot axis is intermediate said first and second surfaces.

11. A saw as claimed in claim 10, in which said pivot axis is central between said first and second surfaces so that the slot entrance at either surface is minimised.

12. A saw according to any preceding claim, in which the pivot block co-operates with the pivot member to allow sliding arcuate relative motion of the pivot block and the pivot support about the first axis.

13. A saw according to claim 12, in which said clamp means comprises the pivot block having an arcuate slot and the pivot member having a locating pin which engages the pivot block's arcuate slot.

14. A saw according to claim 13, in which the locating pin is a releasable bolt which is operable to secure the pivot member to the pivot block.

15. A saw according to claim 14, in which said pivot member further comprises a pivot guide mounted on the pivot block on the side thereof remote from the pivot member and between which the pivot block is clamped when said releasable bolt is tightened.

16. A saw according to any preceding claim in which the pivot member includes stop surfaces adapted to abut the table to limit the relative rotation of one with respect to the other in both directions.

Patentansprüche

1. Säge mit einem Rahmen, einem am Rahmen befestigten Tisch, der erste und zweite im wesentlichen ebene, parallele, einander gegenüberliegende Tischflächen hat und im Rahmen zwischen zwei Stellungen schwenkbar ist, einem an der ersten Fläche befestigten Schwenkblock, einem um eine im wesentlichen parallel und innerhalb der Begrenzungen von erster und zweiter Fläche liegende erste Achse schwenkbar am Schwenkblock befestigten Schwenkelement, einer am Schwenkelement befestigten und ein in einer die erste Achse enthaltenden Ebene liegendes Sägeblatt aufweisenden Sägeanordnung, einem im Tisch vorgesehenen Schlitz zur Aufnahme des Blattes, um das Schneiden von Werkstücken zu ermöglichen, die auf jeder der Flächen abstützend gehalten sind, und Klemmitteln, um Schwenkelement und Schwenkblock zusammenzuklemmen, wobei die erste Achse durch erste und zweite einander gegenüberliegende, gekrümmte Schwenkflächen zwischen Schwenkelement und Tisch und/oder Schwenkblock gebildet ist und zumindest die erste Schwenkfläche zwischen der ersten und der zweiten Tischfläche gebildet ist.

2. Säge nach Anspruch 1, bei der die Schwenkflächen eine Bohrung in einem Vorsprung des Schwenkelementes und einen Stift aufweisen, der einen Schlitz im Tisch überspannt, wobei der Vorsprung vom Schlitz aufgenommen wird.

3. Säge nach Anspruch 1, bei der die erste Schwenkfläche durch eine teilweise im wesentlichen zylindrische Fläche eines Vorsprungs des Schwenkelementes und eine teilweise im wesentlichen zylindrische Fläche einer Aussparung im Tisch gebildet ist, wobei der Vorsprung im Schlitz aufgenommen ist.

4. Säge nach Anspruch 3, bei der die zweite Schwenkfläche eine andere teilweise im wesentlichen zylindrische Fläche an dem Vorsprung und eine teilweise im wesentlichen zylindrische Fläche am Schwenkblock oberhalb der ersten Tischfläche aufweist.

5. Säge nach Anspruch 3 oder 4, bei der die teilweise im wesentlichen zylindrische Fläche der Ausspa-

rung einen Winkel von 180° abzüglich dem Schwenkwinkel einschließt, der für das Schwenken des Schwenkelementes um die erste Achse erforderlich ist.

6. Säge nach Anspruch 3, 4 oder 5, bei der der Vorsprung gegen axiale Bewegung abgestützt ist.

7. Säge nach Anspruch 6, bei der diese Abstützung eine in der Aussparung ausgebildete, bezüglich der ersten Achse radiale Fläche aufweist.

8. Säge nach Anspruch 7, ferner enthaltend Einstellmittel zur axialen Einstellung der radialen Fläche.

9. Säge nach Anspruch 8, bei der die Einstellmittel einen Keilabschnitt, der im Tisch am Ende der Aussparung aufgenommen ist und die erste radiale Fläche bildet, und Schraubmittel aufweist, die vom Keilabschnitt aufgenommen und zum axialen Ziehen des Abschnittes bezüglich der ersten Achse geeignet sind.

10. Säge nach einem der vorhergehenden Ansprüche, bei der die Schwenkachse zwischen erster und zweiter Fläche liegt.

11. Säge nach Anspruch 10, bei der die Schwenkachse mittig zwischen erster und zweiter Fläche liegt, so daß der Schlitzeinlaß an jeder Fläche ein Minimum ist.

12. Säge nach einem der vorhergehenden Ansprüche, bei der der Schwenkblock mit dem Schwenkelement zusammenwirkt, um eine gleitende, gekrümmte Relativbewegung des Schwenkblockes und der Schwenkhalterung um die erste Achse zu ermöglichen.

13. Säge nach Anspruch 12, bei der die Klemmittel den Schwenkblock mit einem gekrümmten Schlitz und das Schwenkelement mit einem Positionierstift aufweisen, der in Eingriff mit dem gekrümmten Schlitz des Schwenkblockes steht.

14. Säge nach Anspruch 13, bei der der Positionierstift ein lösbarer Bolzen ist, der zum Festsetzen des Schwenkelementes am Schwenkblock betätigbar ist.

15. Säge nach Anspruch 14, bei das Schwenkelement eine Schwenkführung aufweist, die am Schwenkblock an der vom Schwenkelement entfernten Seite befestigt ist und zwischen der und dem Schwenkelement der Schwenkblock geklemmt wird, wenn der lösbare Bolzen angezogen wird.

16. Säge nach einem der vorhergehenden Ansprüche, bei der das Schwenkelement eine Anschlagfläche zur Anlage des Tisches aufweist, um die relative Drehung des einen bezüglich dem anderen in beiden Richtungen zu begrenzen.

Revendications

1. Scie comportant un bâti, une table montée dans le bâti et présentant une première et une seconde surfaces de table substantiellement planes, parallèles et opposées, la table pouvant pivoter dans le bâti entre deux positions, un bloc de pivotement monté sur ladite première surface, un élément pivotant monté, avec liberté de pivotement, sur ledit bloc de pivotement pour pivoter autour d'un premier axe substantiellement parallèle et à l'intérieur de ladite première et de ladite seconde surfaces, un ensemble formant scie monté sur ledit élément pivotant et comprenant une lame de scie située dans un plan contenant ledit premier axe, une fente, dans la table, conçue pour recevoir ladite lame pour permettre la coupe de pièces à scier supportées sur l'une ou l'autre surface de la table, et des moyens de bridage pour brider ensemble ledit élément pivotant 26 et ledit bloc de pivotement 27, ledit premier axe étant défini par une première et une seconde surfaces de pivotement en arc, opposées, entre ledit élément pivotant et l'un, ou les deux, de ladite table et dudit bloc de pivotement, au moins la première surface de pivotement étant définie entre ladite première et ladite seconde surfaces de la table.

2. Scie selon la revendication 1, dans laquelle lesdites surfaces de pivotement comportent un perçage dans une saillie dudit élément pivotant et un axe franchissant un évidement prévu dans la table, ladite saillie étant reçue dans ledit évidement.

3. Scie selon la revendication 1, dans laquelle ladite première surface de pivotement est définie par une surface partiellement substantiellement cylindrique d'une saillie dudit élément pivotant et une surface partiellement substantiellement cylindrique d'un évidement formé dans ladite table, ladite saillie étant reçue dans ledit évidement.

4. Scie selon la revendication 3, dans laquelle ladite seconde surface de pivotement comporte une autre surface partiellement substantiellement cylindrique sur ladite saillie et une surface partiellement substantiellement cylindrique sur ledit bloc de pivotement au-dessus de ladite première surface de la table.

5. Scie comme revendiquée dans la revendication 3 ou 4, dans laquelle ladite surface partiellement substantiellement cylindrique de l'évidement soustend un angle de 180° inférieur à l'angle de pivotement nécessaire pour l'élément pivotant autour

dudit premier axe.

6. Scie comme revendiquée dans les revendications 3, 4 ou 5, dans laquelle ladite saillie est supportée à l'égard de son mouvement axial.

7. Scie comme revendiqué dans la revendication 6, dans laquelle ledit support comporte une surface radiale, par rapport audit premier axe, formée dans ledit évidement.

8. Scie comme revendiquée dans la revendication 7, comportant en outre des moyens d'ajustement pour ajuster axialement ladite surface radiale.

9. Scie comme revendiquée dans la revendication 8, dans laquelle lesdits moyens d'ajustement comportent une section en coin reçue dans ladite table à l'extrémité dudit évidement et formant ladite première surface radiale, des moyens formant vis reçus dans ladite section en coin et conçus pour tirer axialement ladite section par rapport audit premier axe.

10. Sec selon l'une quelconque des revendications précédentes, dans laquelle ledit axe de pivotement se trouve entre ladite première et ladite seconde surfaces.

11. Scie comme revendiquée dans la revendication 10, dans laquelle ledit axe de pivotement est au centre entre ladite première et ladite seconde surfaces de façon que l'entrée de la fente sur l'une ou l'autre des surfaces soit réduite au minimum.

12. Scie selon l'une quelconque des revendications précédentes, dans laquelle le bloc de pivotement coopère avec l'élément pivotant pour permettre un mouvement de coulissement relatif en arc du bloc de pivotement et du support pivotant autour du premier axe.

13. Scie selon la revendication 12, dans laquelle lesdits moyens formant bride comportent le bloc de pivotement, qui présente une fente en arc, et l'élément pivotant comporte une broche de positionnement qui vient en prise avec l'évidement en arc du bloc de pivotement.

14. Scie selon la revendication 13, dans laquelle la broche de positionnement est un boulon amovible qui peut avoir pour rôle de fixer l'élément pivotant au bloc de pivotement.

15. Scie selon la revendication 14, dans laquelle ledit élément pivotant comporte en outre un guide de pivotement monté sur le bloc de pivotement, de son côté éloigné à l'élément pivotant, et entre lequel le bloc de pivotement est bridé lorsque ledit boulon amovible est serré.

16. Scie selon l'une quelconque des revendications précédentes, dans laquelle l'élément pivotant comporte des surfaces de butée conçues pour buter la table pour limiter la rotation relative de l'une par rapport à l'autre dans les deux sens.

FIG.1

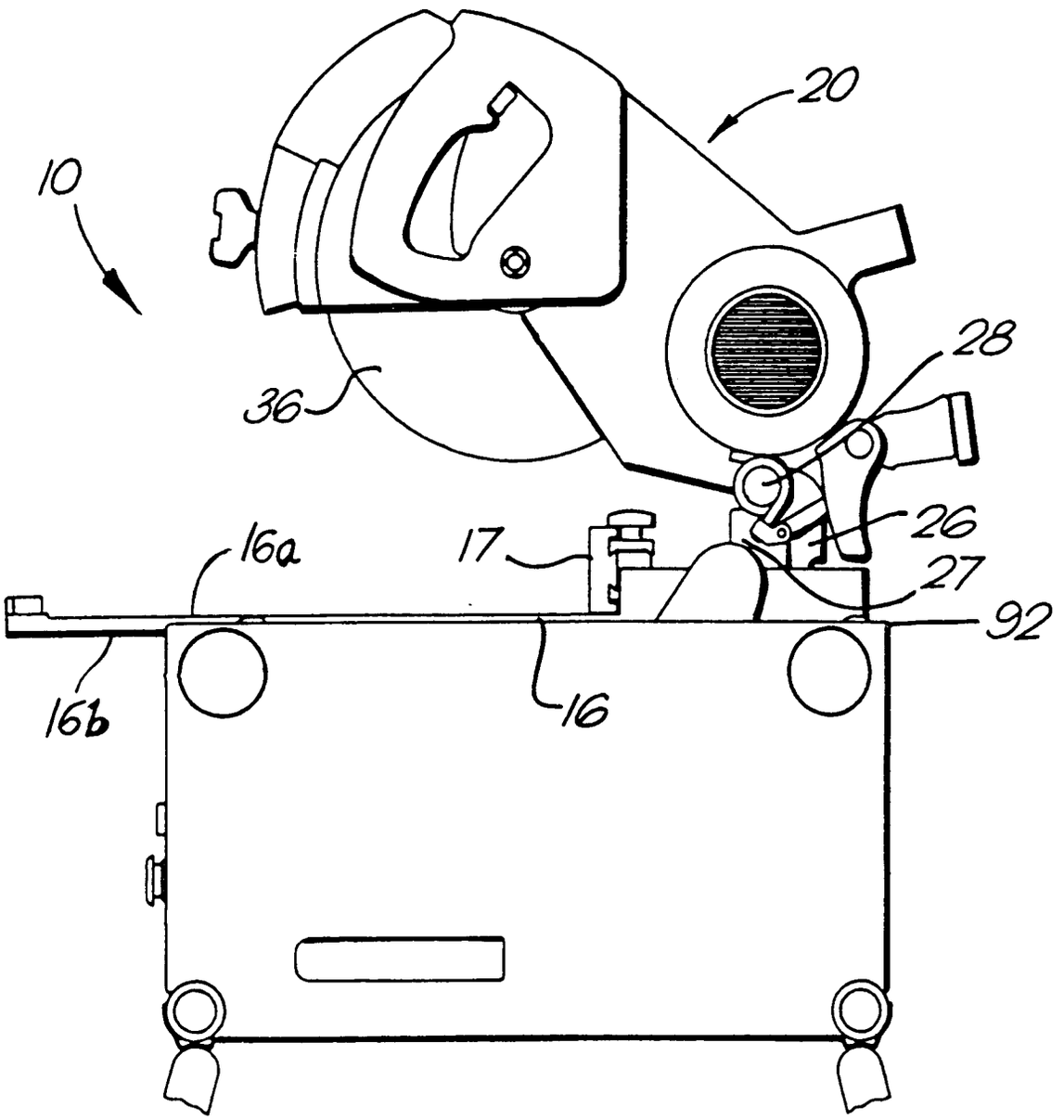


FIG.2a

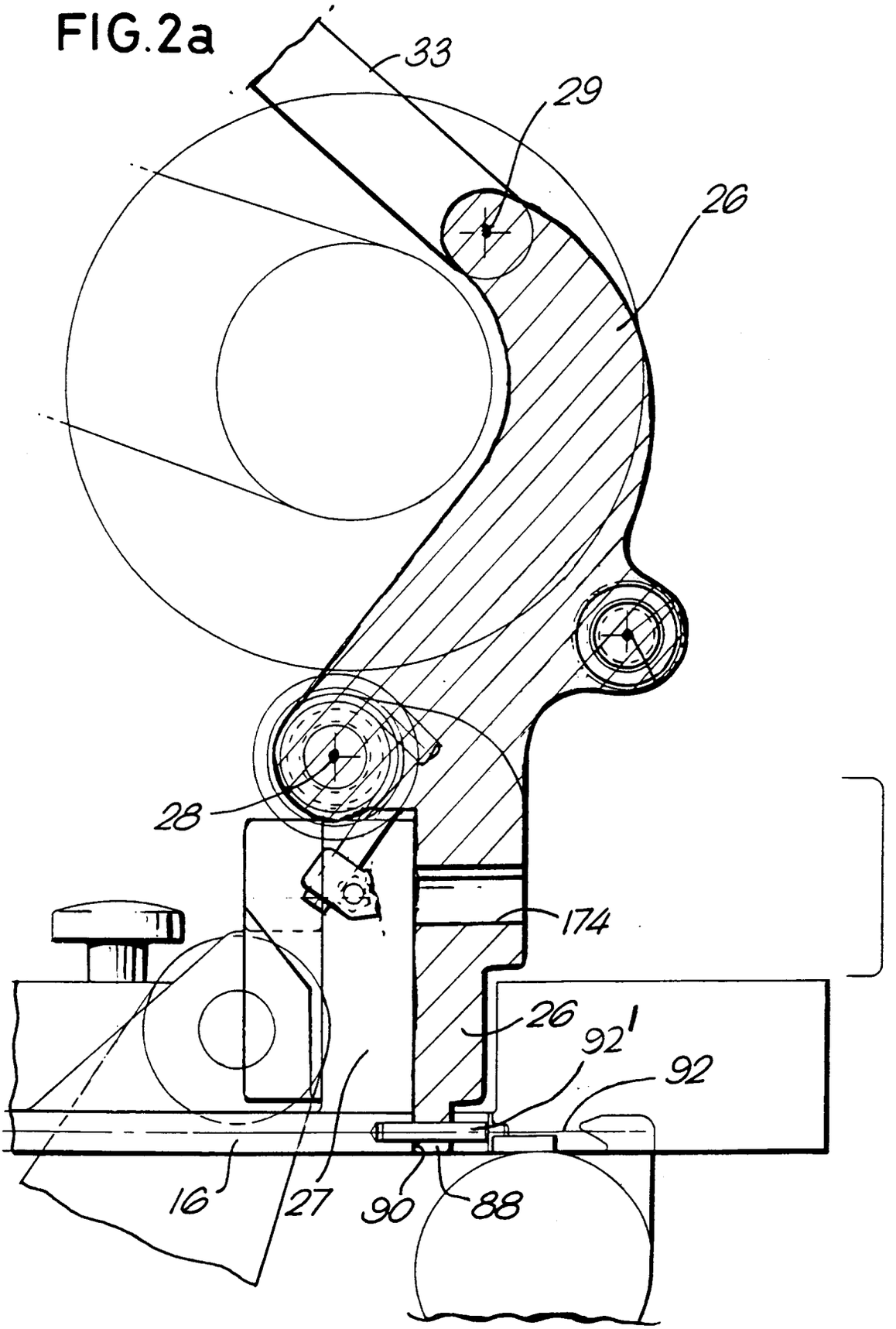
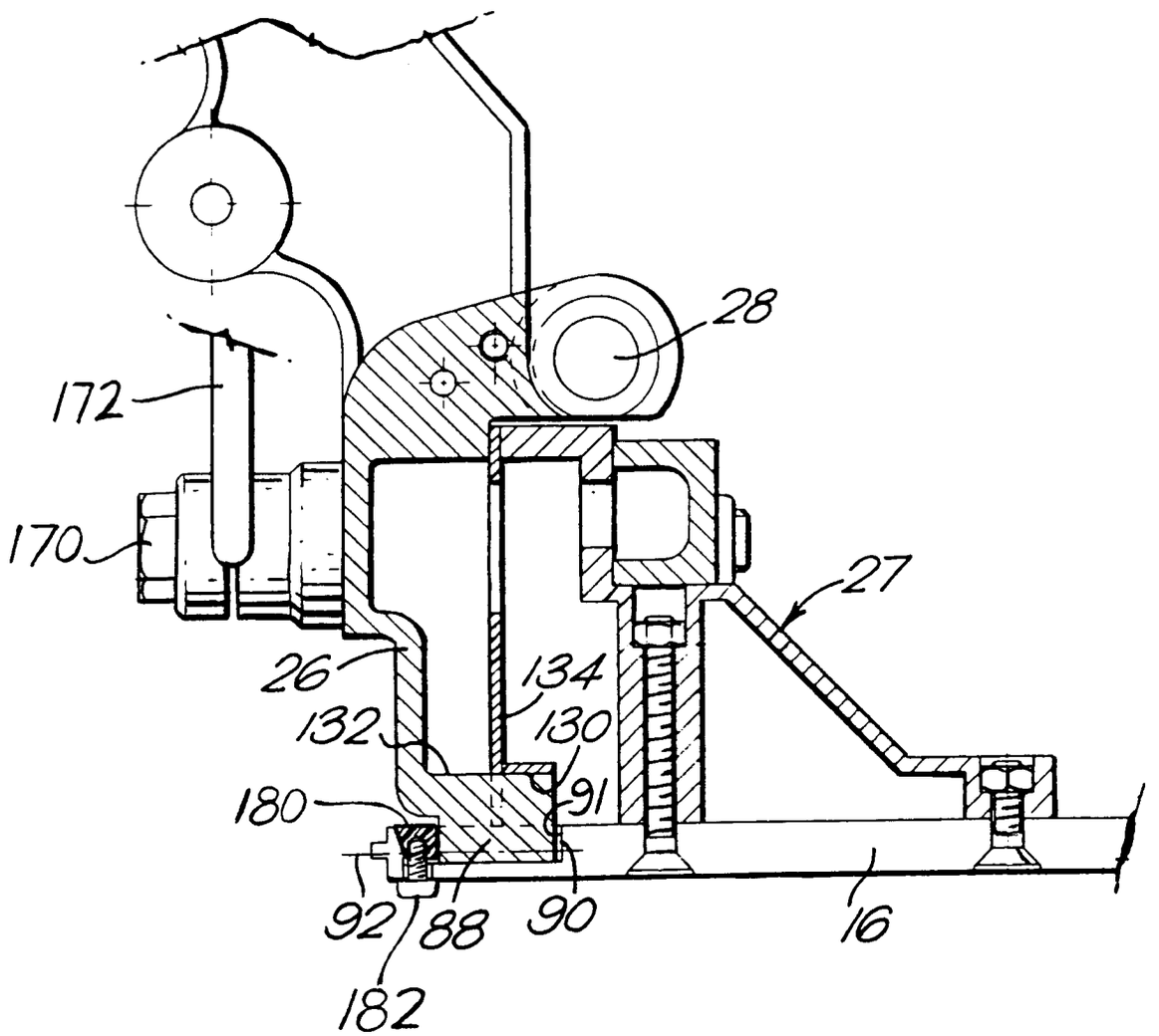


FIG. 2b



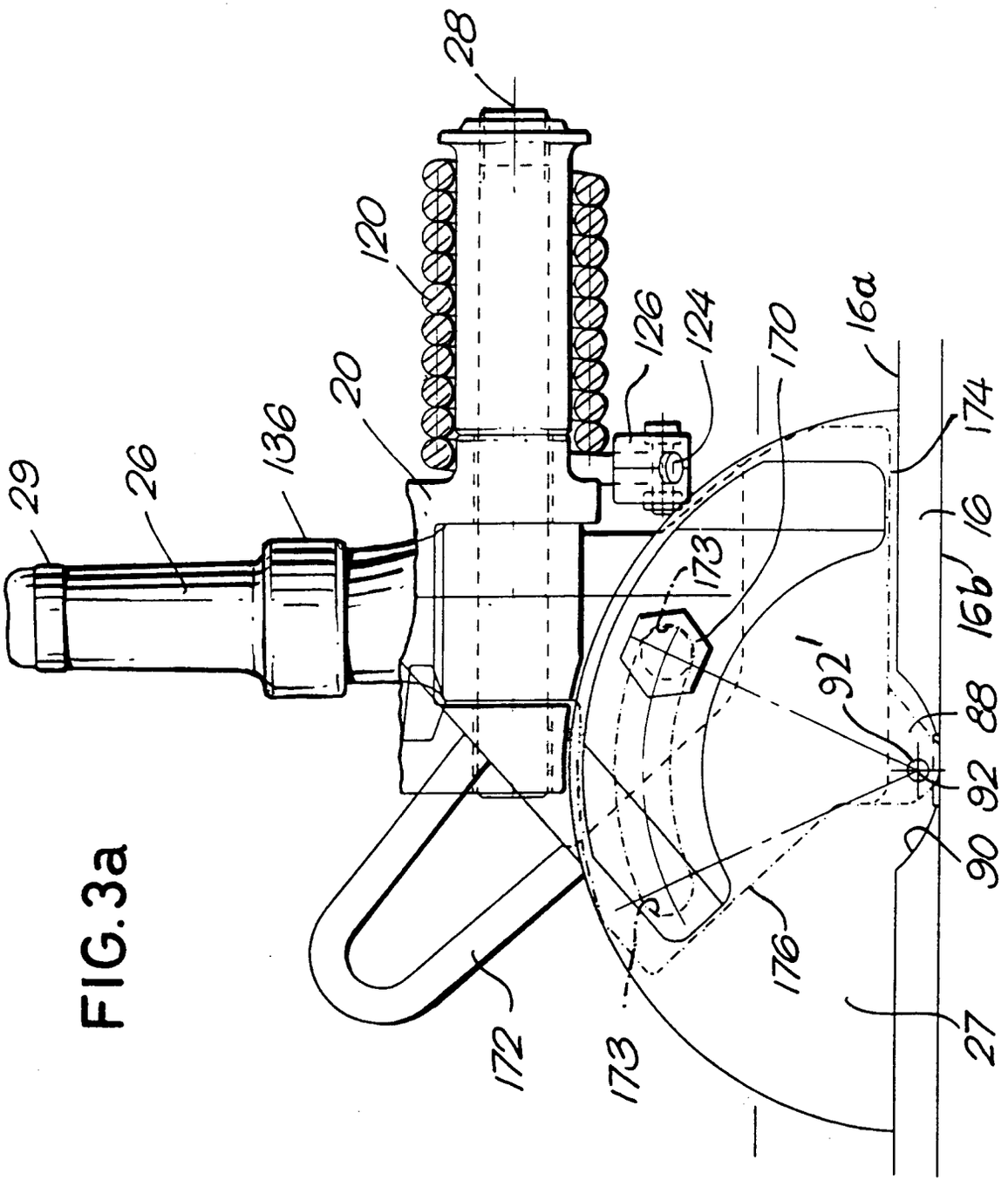

28
120
126
124
170
16a
174
20
136
29
26
16
16b
173
97'
88
92
90
176
27
172
173

FIG.3a

FIG.3b

