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(54) **IMPROVED COMPOUND CHOP SAWING MACHINE**

**VERBESSERTE VERBUNDKAPPSÄGEMASCHINE**

**SCIE À DÉCOUPER COMPLEXE PERFECTIONNÉE**

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## Description

**[0001]** The present invention relates to a compound chop sawing machine for cutting a workpiece into section members, bars and the like.

**[0002]** Known on the market are chop sawing machines and in particular compound chop sawing machines, i.e. machines having two different work tables, an upper and a lower work table respectively, for carrying out cutting of section members, bars, wood laths for skirting boards and other artefacts.

**[0003]** One such compound chop sawing machine having the precharacterising features of claim 1 is disclosed by patent publication no. EP 1,930,139.

**[0004]** These types of machines are generally used *in situ*, e.g. in building yards for cutting off the above mentioned artefacts.

**[0005]** These machines comprise a work head that is movable relative to the lower work table and manually operable by handle members; the work head is provided with a cutting member, generally a powered rotary blade, for carrying out chopping and/or squaring operations on the pieces resting on the lower work table.

**[0006]** In particular, the work head is pivotally associated with the lower work table relative to at least one rotation axis substantially parallel to the plane defined by the lower work table.

**[0007]** The upper region of the work head is substantially planar to define the upper work table which is provided with a slot from which the upper portion of the cutting member emerges for cutting the pieces positioned on said upper work table and rigidly fastened thereto by means of abutment elements and screw threaded fastener means.

**[0008]** In these types of machines classified as dangerous based on safety regulations in force, guard members for the exposed portion of the cutting member must be present, which cutting member is to be inaccessible during both the use steps and the inactive steps of the machine, and manual removal of which must be inhibited.

**[0009]** Known guard members, generally used in accordance with the provisions of the law in these types of machines, consist of a barrier element rigidly associated with the lower region of the work head, at the lower portion of the cutting member.

**[0010]** In addition, guard devices for protecting the exposed portion of the cutting member are known which consist of one or more casings fitted on a blade portion and hinged on the work head so as to follow the forward movement of the cut by insertion into a seat of the work head in a concealable manner and to determine the maximum practicable cut depth.

**[0011]** In addition, these guard devices contemplate the presence of temporary locking means to lock the casing position in a configuration for protection of the exposed blade portion, which locking means can be manually activated by the operator.

**[0012]** At all events, these machines of known type are

not devoid of drawbacks, among which it is to be mentioned that fact that this fixed barrier element constitutes a great hindrance to the normal cutting operations, when pieces of an irregular conformation are to be cut, for example.

**[0013]** In addition, the barrier element constitutes a limit to the work head's stroke relative to the lower work table and, therefore, to the amplitude of the active portion of the cutting member itself, above all in those configurations in which the cutting member is inclined to the lower work table.

**[0014]** Thus these operating limits make it so difficult to carry out the cutting operations that the operator is sometimes obliged to tamper with the machine itself and remove the barrier elements, which will make the guard fully inefficient and, as a result, will impair the machine safety.

**[0015]** Another drawback that can be encountered in the known guard elements of the type involving a casing fitted on the cutting blade is to be ascribed to the fact that they can be easily tampered with, above all in the inactive configuration of the work head, by carrying out a simple rotation of the casing against the action of return spring means, so that the protective effect becomes unsuccessful. Moreover, in order to prevent said tampering actions, suitable expedients of manual activation of the locking means are required.

**[0016]** It is a main task of the present invention to eliminate the above mentioned drawbacks of the known art by envisaging a chop sawing machine that first of all enables execution of the cutting, chopping and squaring operations in a fully safe manner for the operator.

**[0017]** Within the scope of this technical task it is an important aim of the invention to ensure a good cut efficiency, by enabling wide sectors of the active portion of the cutting member to contact the workpieces, irrespective of the angle of inclination of the cutting member to the lower work table and of the shape of the workpiece.

**[0018]** It is a further aim of the invention to obtain a compound chop sawing machine simultaneously offering quickness and good efficiency in cutting and a high degree of protection for the operator.

**[0019]** Another aim of the invention is to make available a simple structure, to be put into practice in a relatively easy manner, of safe use and efficient operation, as well as of relatively reduced cost.

**[0020]** The main task mentioned and the aims specified are substantially achieved by the present compound chop sawing machine in accordance with claim 1.

**[0021]** Further features and advantages of the present invention will become more apparent from the detailed description of a preferred but not exclusive embodiment of a compound chop sawing machine illustrated by way of non-limiting example in the accompanying drawings, in which:

- Fig. 1 is an elevation side view of the chop sawing machine in accordance with the invention, with the

- work head in an upper end-of-stroke configuration;
- Fig. 2 is an elevation side view of the chop sawing machine of the invention, with the work head in a lower end-of-stroke configuration;
- Fig. 3 is an elevation side view of the chop sawing machine seen in Fig. 1 in a step of machining a workpiece;
- Fig. 4 is a partial sectional side view of Fig. 1;
- Fig. 5 is a partial sectional side view of an alternative embodiment of a chop sawing machine in accordance with the invention, with the work head in a lower end-of-stroke configuration;
- Fig. 6 is a view as in Fig. 4 with the covering element in a blade-exposure configuration;
- Fig. 7 is a view as in Fig. 5 with the covering element in a blade-covering configuration.

**[0022]** Referring particularly to the drawings, generally denoted at 1 is a compound chop sawing machine comprising a base 2 defining at least one work table 3 for support of at least one workpiece P.

**[0023]** The work table 3 for example can be of the type rotating about a substantially vertical axis and can have means for temporarily clamping the workpiece, of the vice type or the like for example, not shown in detail as it is of known type.

**[0024]** In addition, the sawing machine 1 comprises at least one work head 4 associated with base 2, which head is movable relative to the work table 3; for instance, the work head is pivotally associated with base 2 for rotation relative to at least one axis substantially parallel to the work table 3 following a rotation R1 shown in the figure.

**[0025]** In particular, the work head 4 is provided with a circular blade 5 having a region at least partly exposed relative to the work head and rotationally driven, by motor means 6 of a type known to a person skilled in the art, for cutting of the workpiece P.

**[0026]** The work head 4, in the preferred embodiment shown in the figures, has an auxiliary work table 3' adjustably associated with the upper portion of the work head; the auxiliary work table is provided with a through slot, from which the upper portion of blade 5 emerges for cutting of a further piece P.

**[0027]** In particular, as known to a person skilled in the art, adjustment concerns the distance between the auxiliary work table 3' and the hinging axis of the blade 5 on the work head 4, so that the cut depth imparted to the further piece P by the upper portion of blade 5 emerging from the auxiliary work table can be adjusted.

**[0028]** The work head 4 is for instance pivotally associated with base 2 relative to two distinct rotation axes, i.e. a first axis orthogonal to the lying plane of blade 5 for moving the work head close to/away from the work table 3 following rotation R1, and a second axis parallel to said lying plane for inclination of the work head 4, and therefore the blade itself, to the work table 3, which rotation is identified by reference R2.

**[0029]** However, it is not to be excluded that the work head 4 may simultaneously have translation movements relative to the work table 3 for carrying out particular cuts on the workpiece P.

**[0030]** The sawing machine 1 comprises at least one guard device 7 for at least one exposed portion of blade 5 at its active portion 5a.

**[0031]** In particular, by exposed portion it is intended the lower arc of blade 5 emerging from the work head 4 comprising the active portion 5a for cutting the workpiece P.

**[0032]** The guard device 7 is alternately movable between a retracted configuration inside the work head 4, so as to release the active portion 5a of blade 5 for engagement on the workpiece P and an extended configuration covering at least said exposed portion.

**[0033]** The machine 1 comprises removable locking means to lock the guard device 7 in at least one of the retracted and extended configurations.

**[0034]** Particularly, to the aims of the present invention, the locking means is of the type involving automatic activation/deactivation.

**[0035]** Specifically, the locking means can be automatically activated upon positioning of the guard device 7 in a retracted and in an extended configuration.

**[0036]** On the contrary, the locking means can be automatically deactivated upon displacement of the work head 4 from at least one upper end-of-stroke configuration to a lower end-of-stroke configuration, at which the work head is respectively fully moved away from the work table 3 and/or fully moved close thereto.

**[0037]** In particular, the locking means comprises removable interconnection means 8 interposed between at least two of the work head 4, guard device 7 and base 2.

**[0038]** The interconnection means 8 can be according to the invention advantageously automatically activated upon positioning of the guard device 7 to the retracted and/or extended configuration or, alternatively, upon positioning of the work head 4 to the upper and/or lower end-of-stroke configuration.

**[0039]** The guard device 7 in the particular embodiment shown in the figures comprises at least one first and one second circular sector, 9 and 10 respectively, which are pivotally associated with the work head 4 around respective rotation axes substantially parallel to the rotation axis of blade 5.

**[0040]** The first and second circular sectors, 9 and 10, comprise at least one first and one second plate 11 and 12 respectively, which have a lune-shaped conformation and are substantially disposed in coplanar relationship with blade 5 in the vicinity of the blade itself.

**[0041]** In turn, each plate 11, 12 has a peripheral edge, 11a and 12a respectively, which is turned up in a U-shaped conformation for holding the corresponding portion of blade 5.

**[0042]** The first and second circular sectors, 9 and 10 respectively, are interconnected with each other by mutual-drive means and at least partly overlapped.

**[0043]** The drive means comprises at least one stud 13 protruding in a transverse direction from at least one of the first and second plates, 11 and 12 respectively, which through progressive opening of said plate, is progressively slidably guided within a guide 14 associated with the other of the first and second plates.

**[0044]** In particular, the first plate 11 is pivotally associated with the work head 4 in coaxial relationship with blade 5 and comprises feeler means 15 following the profile of the workpiece P.

**[0045]** The feeler means 15 is associated with one end of the first plate 11 facing the workpiece P for urging the first plate from the extended to the retracted configuration, against the action of spring means 16 and upon advancing of the cut on the workpiece P.

**[0046]** The feeler means 15 for instance comprises a roller rotatably associated with the end of the first plate 11 facing the workpiece P and resting on said piece during the working step thereof.

**[0047]** The second plate 12, in turn, is rotatably associated with the work head 4, with its rotation axis substantially parallel to and distinct from the rotation axis of blade 5, as in the particular embodiment shown in Fig. 5, for example.

**[0048]** According to the invention the second plate 12 is pivotally associated with the work head 4 coaxially with the blade itself, as shown in Fig. 4 for example.

**[0049]** The interconnection means 8 comprises at least one catch 17 to retain the first plate 11, which catch is associated with said plate and removably insertable into at least one housing seat 18 associated with at least one of the base 2 and the work head 4 in order to retain the guard device 7 in the retracted configuration.

**[0050]** In particular, the interconnection means 8 comprises at least one tailpiece 19 associated with base 2 in a rocking manner relative to an axis substantially orthogonal to the rotation axis of blade 5.

**[0051]** The housing seat 18 is advantageously made at the tailpiece 19.

**[0052]** In particular, the tailpiece 19 is adapted to follow the inclination rotation R2 of the work head 4, but not the rotation R1 of same.

**[0053]** The work head 4 is in fact pivotally associated with the tailpiece 19, which tailpiece co-operates with the guard device 7 for protection of at least one exposed portion of blade 5 when the guard device is in its extended configuration or, in an equivalent manner, the work head 4 is in its upper end-of-stroke configuration.

**[0054]** In fact, the tailpiece 19 is suitable for protection of the remaining portion of blade 5 that is not covered by the guard device 7 when the work head 4 is in its upper end-of-stroke configuration, fully moved away from the work table.

**[0055]** The interconnection means 8 further comprises at least one pin 20 associated with at least one of the work head 4 and the guard device 7.

**[0056]** Pin 20 can be housed in at least one recess 21 associated with the other of the work head 4 and the

guard device 7 for retaining the guard device in said extended configuration. The interconnection means 8 comprises at least one interconnecting lever interposed between at least the first plate 11 and the work head 4.

**[0057]** In particular, the interconnection means 8 comprises a plurality of interconnecting levers and advantageously, a first interconnecting lever 22a hinged on the work head 4, a second interconnecting lever 22b hinged on the end of the first plate 11 distal from the peripheral edge 11a, and at least one intermediate interconnecting lever 22c linked to the above levers and hinged on the work head 4 in the vicinity of its centre line.

**[0058]** Advantageously, the end of the first plate 11 distal from the peripheral edge 11a is positioned on the side opposite to the peripheral edge relative to the rotation axis of the first plate.

**[0059]** Pin 20 in the preferred embodiment is associated with the intermediate interconnecting lever 22c and is guided along at least one substantially L-shaped slot 23 and associated with the second interconnecting lever 22b.

**[0060]** Recess 21 is made at an end of slot 23 for locking pin 20 when the guard device 7 is in the extended configuration. The spring means 16, consisting of a helical spring for example, are directly interposed between the first interconnecting lever 22a and the intermediate interconnecting lever 22c for return of the guard device from the retracted configuration to the extended configuration, insertion of pin 20 into recess 21 and, therefore, locking of the guard device 7.

**[0061]** In addition, catch 17 for retaining the first plate 11, in the particular embodiment shown in the figures is rigidly associated with the second interconnecting lever 22b; due to rotation of the work head 4 from the upper end-of-stroke to the lower end-of-stroke configurations the retaining catch is fitted into the housing seat 18 associated with the tailpiece 19 in a rigid and adjustable manner for locking the guard device 7 to the extended configuration. Moreover, the work head can comprise guard means 24 for the upper portion of the blade, of the type for example involving a casing pivotally associated with the auxiliary work table 3' and adapted to fit the upper portion of blade 5 under non-use conditions of the latter.

**[0062]** Finally, in a preferred embodiment the guard device 7 comprises at least one covering element 25 to cover the exposed portion of blade 5 proximal to the hinging point of the work head 4 on base 2.

**[0063]** The covering element 25 is in particular suitable for protection of the remaining portion of blade 5 that is not covered by the first and second circular sectors 9 and 10 when the work head 4 is in its lower end-of-stroke configuration, fully approaching the work table itself.

**[0064]** In this way blade 5, particularly under non use conditions of the machine 1 or during cutting operations carried out on the auxiliary table 3', appears to be fully protected both when the work head 4 is in the upper end-of-stroke configuration and when it is in the lower end-of-stroke configuration.

**[0065]** Advantageously, the covering element 25 is alternately movable between a configuration for protection of blade 5 when the work head 4 is positioned in the lower end-of-stroke configuration and a configuration at which the blade is exposed.

**[0066]** In particular, as shown in Figs. 6 and 7, the covering element 25 is rotatably and/or slidably associated with the tailpiece 19 being provided with means for converting the rotary motion for moving the work head 4 close to/away from the work table 3 into a rotation/translation motion of the covering element itself for passage of the latter from the covering configuration to the exposing configuration and vice versa.

**[0067]** The converting means may for instance be of the cam-rocker arm type or consist of other technically equivalent means and is not shown in the drawings as it is known to a person skilled in the art.

**[0068]** The machine 1 particularly comprises a pair of tailpieces 19 and a pair of covering elements 25 disposed on the opposite side relative to blade 5.

**[0069]** Operation of the present invention is as follows.

**[0070]** When the work head 4 is in the upper end-of-stroke configuration, the locking means of the guard device 7 is activated; in particular, pin 20 is fitted in recess 21 and the first and second interconnecting levers 22a and 22b, as well as the intermediate interconnecting lever 22c are restrained from rotating by mutual jamming so that, as a result, any rotation of the first and second plates, 11 and 12 respectively, is prevented.

**[0071]** In this configuration in which the guard device is locked in the extended configuration, the operator can carry out the loading and clamping operations of the workpiece P on the work table 3 in a safe manner.

**[0072]** Once the piece P is ready for being worked, through rotation of the work head 4 blade 5 is moved close to the workpiece. During this first step blade 5 is protected by the guard device 7 that remains in the extended configuration by effect of the spring means 16.

**[0073]** As the active portion 5a of blade 5 comes into contact with the workpiece P, the guard device 7 progressively uncovers it, against the action of the spring means 16, during advancing of the cut due to the feeler means 15 resting on the piece itself while the so-called exposed portion of the blade is left in any case covered.

**[0074]** In the lower end-of-stroke configuration of the work head 4 the retaining catch 17 is inserted, due to rotation of the work head relative to the tailpiece 19, in the housing seat 18 retaining the second interconnecting lever 22b and the first plate 11 therewith and preventing rotation of said lever.

**[0075]** Also in this configuration blade 5 is inaccessible and protected, enabling the operator to carry out working operations in a fully safe manner.

**[0076]** During return from the lower end-of-stroke configuration to the upper end-of-stroke configuration, blade 5 is progressively covered by the first and second plates 11 and 12, urged by the spring means 16, enabling the operator to carry out removal of the worked piece P in a

safe manner.

**[0077]** Practically, it has been ascertained that the invention achieves the intended purposes and in particular it is herein pointed out that the chop sawing machine of the invention allows the cutting, chopping and squaring operations to be carried out in a fully safe manner for the operator.

**[0078]** In addition, it has been found that the above described chop sawing machine ensures a good cutting efficiency, enabling wide sectors of the active portion of the cutting member to come into contact with the workpieces, irrespective of the angle of inclination of the cutting member to the lower work table and of the shape of the workpiece. Moreover, the invention as conceived allows a compound chop sawing machine to be obtained which at the same time offers quickness in cutting, good cut efficiency and high protection degree for the operator, together with a simple structure of relatively easy practical achievement, safe use and efficient operation, and in addition a relatively reduced cost.

## Claims

1. A compound chop sawing machine (1) comprising:

- a base (2) defining at least one work table (3) for support of at least one workpiece (P);
- at least one work head (4) associated with said base, which is movable relative to said work table between at least one upper end-of-stroke configuration in which said work head is fully moved away from said work table and lower end-of-stroke configuration in which said head is fully moved close to said work table wherein the at least one work head is provided with a rotary circular blade (5) at least partly emerging from said head and exposed for cutting of said piece, said work head comprising at least one auxiliary work table (3'), for support of a further workpiece, associated on the upper part with said head and provided with at least one slot from which at least the upper portion of said blade emerges;
- at least one guard device (7) for at least one exposed portion of said blade, at the lower active portion (5a) thereof, which is alternately movable between a configuration at which it is retracted in said work head to release said active portion for engagement with said workpiece and an extended configuration at which it covers said at least one exposed portion;
- wherein the machine further comprises a removable locking means (8) of said guard device (7) in at least one of said retracted and extended configurations, wherein said locking means is of automatic activation/deactivation type and wherein said locking means comprises remov-

- able interconnection means (8) interposed between at least two of said work head (4), guard device (7) and base (2), which means can be automatically activated upon positioning of said guard device to said retracted and/or extended configuration or upon positioning of said work head to the at least one upper and/or lower end-of-stroke configuration;
- wherein said interconnection means comprises at least one catch (17) for retention of said first plate (11) associated therewith and adapted to be removably inserted in at least one housing seat (18) associated with at least one of said base (2) and work head (4) for retaining said guard device (7) in said retracted configuration;
  - **characterized in that** said interconnection means (8) comprises at least one tailpiece (19) associated in a rocking manner with said base (2), said housing seat (18) being made at said tailpiece (19) and said covering element (25) being associated with said tailpiece;
  - wherein said work head (4) is pivotally associated relative to said tailpiece (19), said tailpiece cooperating with said guard device (7) for protection of at least one exposed portion of said blade (5) when said guard device is in said extended configuration and/or said work head is in said upper end-of-stroke configuration.
2. A machine as claimed in claim 1, **characterized in that** said work head (4) is pivotally associated with said base (2), being alternately movable between an upper end-of-stroke configuration and a lower end-of-stroke configuration, wherein said head is fully moved away from and close to said work table respectively, and said guard device (7) comprises at least one covering element (25) for the exposed portion of said blade (5) proximal to the hinging point of said work head on said base, said covering element being alternately movable between a blade protection configuration upon positioning of said work head in the lower end-of-stroke configuration, and a blade exposure configuration.
  3. A machine as claimed in claim 1, **characterized in that** said guard device (7) comprises at least one first (11) and one second (12) circular sector associated with said work head (4) in a rotatable manner about respective axes substantially parallel to the rotation axis of said blade (5), said first and second (12) circular sectors comprising at least one first (11) and one second plate respectively, which are lune-shaped and disposed substantially in coplanar relationship with said blade in the vicinity of the blade itself and each having a peripheral edge (11a, 12a) turned-up in a U-shaped configuration for holding the corresponding portion of said blade, said circular sectors being interconnected with each other by mutual drive means and at least partly overlapped.
  4. A machine as claimed in claim 3, **characterized in that** said first plate (11) is pivotally associated with said work head (4) in coaxial relationship with said blade and comprises feeler means (15) following the profile of said piece (P), associated with an end of said first plate facing said piece, for urging said first plate (11) from said extended configuration to said retracted configuration against the action of spring means (16).
  5. A machine as claimed in claim 3, **characterized in that** said second plate (12) is pivotally associated with said work head (4) having a rotation axis parallel to the rotation axis of said blade.
  6. A machine as claimed in claim 3, **characterized in that** said second plate (12) is pivotally associated with said work head (4) in coaxial relationship with said blade (5).
  7. A machine as claimed in one or more of the preceding claims 3 to 6, **characterized in that** said interconnection means (8) comprises at least one pin (20) associated with at least one of said work head and guard device and adapted to be housed in at least one recess (21) associated with the other of said work head and guard device for retaining said guard device in said extended configuration.
  8. A machine as claimed in one or more of the preceding claims, **characterized in that** said interconnection means (8) comprises at least one interconnecting lever (22a, 22b, 22c) interposed between at least said first plate and work head (4).
  9. A machine as claimed in one or more of the preceding claims, **characterized in that** said interconnection means (8) comprises a plurality of interconnecting levers (22a, 22b, 22c), a first interconnecting lever (22a) hinged on said work head, a second interconnecting lever (22b) hinged on the end of said first plate (11) distal from said peripheral edge (11a), and at least one intermediate interconnecting lever (22c) linked to the first and second levers (22a, 22b) and hinged on said work head (4) in the vicinity of its centre line, said pin (20) being associated with said intermediate interconnecting lever (22c) and guided along at least one slot (23) having an L-shaped configuration and associated with said second interconnecting lever (22b), said recess (21) being made at an end of said slot (23) for locking said pin when the guard device is in the extended configuration.
  10. A machine as claimed in claim 13 when appended to claim 5, **characterized in that** said spring means (16) is directly interposed between at least one of

said first (22a) and second (22b) interconnecting levers and said at least one intermediate interconnecting lever (22c) for return of the guard device (7) from the retracted configuration to the extended configuration, insertion of said pin (20) in said recess (21) and locking of said guard device (7).

11. A machine as claimed in one or more of the preceding claims, **characterized in that** the locking means (8) can be automatically deactivated upon displacement of the at least one work head (4) from the upper end-of-stroke configuration to the lower end-of-stroke configuration at which the work head is moved closer to the work table (3) and/or displacement of the at least one work head (4) from the lower end-of-stroke configuration to the upper end-of-stroke configuration at which the work head is moved away from the work table (3).

## Patentansprüche

1. Verbundkappsägemaschine (1), umfassend:

- eine Basis (2), die zumindest einen Arbeitstisch (3) zum Stützen von zumindest einem Werkstück (P) definiert;
- zumindest einen Arbeitskopf (4), der der Basis zugeordnet ist und bezüglich des Arbeitstischs zwischen zumindest einer oberen Endlagenkonfiguration, in der der Arbeitskopf vollständig vom Arbeitstisch weg bewegt ist, und einer unteren Endlagenposition, in der der Kopf vollständig nahe zum Arbeitstisch bewegt ist, beweglich ist, wobei der zumindest eine Arbeitskopf mit einem drehbaren kreisförmigen Blatt (5) versehen ist, das zumindest teilweise aus dem Kopf austritt und zum Schneiden des Stücks freiliegt, wobei der Arbeitskopf zumindest einen Zusatzarbeitstisch (3') zum Stützen eines weiteren Werkstücks umfasst, der am oberen Teil dem Kopf zugeordnet ist und mit zumindest einem Schlitz versehen ist, aus dem zumindest der obere Abschnitt des Blatts austritt;
- zumindest eine Schutzeinrichtung (7) für zumindest einen freiliegenden Abschnitt des Blatts am unteren aktiven Abschnitt (5a) davon, die abwechselnd zwischen einer Konfiguration, in der sie in den Arbeitskopf zum Freigeben des aktiven Abschnitts zum Eingreifen in das Werkstück eingezogen ist, und einer ausgefahrenen Position, in der sie den zumindest einen freiliegenden Abschnitt abdeckt, beweglich ist;
- wobei die Maschine ferner ein abnehmbares Sperrmittel (8) der Schutzeinrichtung (7) in zumindest einer der eingezogenen und ausgefahrenen Konfiguration umfasst, wobei das Sperrmittel von automatischer Aktivierungs-/Deakti-

vierungsart ist, und wobei das Sperrmittel abnehmbare Verbindungsmittel (8) umfasst, die zwischen zumindest zwei des Arbeitskopfs (4), der Schutzeinrichtung (7) und der Basis (2) eingeschoben sind, wobei die Mittel nach dem Positionieren der Schutzeinrichtung in die eingezogene und/oder ausgefahrte Konfiguration oder nach dem Positionieren des Arbeitskopfs in die zumindest eine obere und/oder untere Endlagenkonfiguration automatisch aktiviert werden kann;

- wobei das Verbindungsmittel zumindest eine Arretierung (17) zum Halten der ersten Platte (11) umfasst, die ihm zugeordnet ist und dazu geeignet ist, abnehmbar in zumindest einen Gehäusesitz (18) eingefügt zu sein, der zumindest einem der Basis (2) und des Arbeitskopfs (4) zum Halten der Schutzeinrichtung (7) in der eingezogenen Konfiguration zugeordnet ist;

- **dadurch gekennzeichnet, dass** das Verbindungsmittel (8) zumindest ein Endstück (19) umfasst, das der Basis (2) schaukelnd zugeordnet ist, wobei der Gehäusesitz (18) am Endstück (19) hergestellt ist und das Abdeckelement (25) dem Endstück zugeordnet ist;

- wobei der Arbeitskopf (4) schwenkbar bezüglich des Endstücks (19) zugeordnet ist, wobei das Endstück mit der Schutzeinrichtung (7) zum Schutz von zumindest einem freiliegenden Abschnitt des Blatts (5) zusammenwirkt, wenn die Schutzeinrichtung in der ausgefahrenen Konfiguration und/oder der Arbeitskopf in der oberen Endlagenkonfiguration ist.

2. Maschine nach Anspruch 1, **dadurch gekennzeichnet, dass** der Arbeitskopf (4) der Basis (2) schwenkbar zugeordnet ist, wobei er abwechselnd zwischen einer oberen Endlagenkonfiguration und einer unteren Endlagenkonfiguration beweglich ist, in der der Kopf vollständig vom Arbeitstisch weg bzw. dazu hin bewegt ist, und die Schutzeinrichtung (7) zumindest ein Abdeckelement (25) für den freiliegenden Abschnitt des Blatts (5) proximal zum Drehpunkt des Arbeitskopfs an der Basis umfasst, wobei das Abdeckelement abwechselnd zwischen einer Blattschutzkonfiguration nach dem Positionieren des Arbeitskopfs in der unteren Endlagenkonfiguration und einer Blattfreilegungskonfiguration beweglich ist.

3. Maschine nach Anspruch 1, **dadurch gekennzeichnet, dass** die Schutzeinrichtung (7) zumindest einen ersten (11) und einen zweiten (12) Kreissektor umfasst, die dem Arbeitskopf (4) drehbar um jeweilige Achsen, die im Wesentlichen parallel zur Drehachse des Blatts (5) verlaufen, zugeordnet sind, wobei die ersten und zweiten (12) Kreissektoren jeweils zumindest eine erste (11) und eine zweite Platte umfassen, die kugelzweieckförmig sind und in im We-

sentlichen komplanarer Beziehung zum Blatt in der Nähe des Blatts selbst angeordnet sind und jede eine Umfangskante (11a, 12a), die in einer U-förmigen Konfiguration nach oben gebogen ist, zum Halten des entsprechenden Abschnitts des Blatts aufweisen, wobei die Kreissektoren durch gegenseitige Antriebsmittel miteinander verbunden sind und sich zumindest teilweise überdecken.

4. Maschine nach Anspruch 3, **dadurch gekennzeichnet, dass** die erste Platte (11) dem Arbeitskopf (4) in coaxialer Beziehung zum Blatt schwenkbar zugeordnet ist und Fühlermittel (15) umfasst, die dem Profil des Stücks (P) folgen und einem Ende der ersten Platte dem Stück zugekehrt zugeordnet sind, um die erste Platte (11) gegen die Wirkung von Federmitteln (16) aus der ausgefahrenen Konfiguration in die eingezogene Konfiguration zu drücken. 10
5. Maschine nach Anspruch 3, **dadurch gekennzeichnet, dass** die zweite Platte (12) dem Arbeitskopf (4) mit einer Drehachse parallel zur Drehachse des Blatts schwenkbar zugeordnet ist. 15
6. Maschine nach Anspruch 3, **dadurch gekennzeichnet, dass** die zweite Platte (12) dem Arbeitskopf (4) in coaxialer Beziehung zum Blatt (5) schwenkbar zugeordnet ist. 20
7. Maschine nach einem oder mehr der vorhergehenden Ansprüche 3 bis 6, **dadurch gekennzeichnet, dass** das Verbindungsmittel (8) zumindest einen Stift (20) umfasst, der zumindest einem des Arbeitskopfs und der Schutzeinrichtung zugeordnet und dazu geeignet ist, in zumindest einer Aussparung (21), die dem anderen des Arbeitskopfs und der Schutzeinrichtung zugeordnet ist, zum Halten der Schutzeinrichtung in der eingezogenen Konfiguration untergebracht zu sein. 25
8. Maschine nach einem oder mehr der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** das Verbindungsmittel (8) zumindest einen Verbindungshebel (22a, 22b, 22c) umfasst, der zwischen zumindest der ersten Platte und dem Arbeitskopf (4) eingeschoben ist. 30
9. Maschine nach einem oder mehr der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** das Verbindungsmittel (8) mehrere Verbindungshebel (22a, 22b, 22c) umfasst, wobei ein erster Verbindungshebel (22a) an den Arbeitskopf angelenkt ist, ein zweiter Verbindungshebel (22b) an das Ende der ersten Platte (11) distal von der Umfangskante (11a) angelenkt ist und zumindest ein zwischenliegender Verbindungshebel (22c) mit dem ersten und zweiten Hebel (22a, 22b) verbunden ist und an den Arbeitskopf (4) in der Nähe seiner Mittellinie ange- 35

lenkt ist, wobei der Stift (20) dem zwischenliegenden Verbindungshebel (22c) zugeordnet ist und zumindest einen Schlitz (23) mit einer L-förmigen Konfiguration entlang geführt ist und dem zweiten Verbindungshebel (22b) zugeordnet ist, wobei die Aussparung an einem Ende des Schlitzes (23) zum Sperren des Stifts, wenn sich die Schutzeinrichtung in der ausgefahrenen Konfiguration befindet, hergestellt ist.

10. Maschine nach Anspruch 13, wenn abhängig von Anspruch 5, **dadurch gekennzeichnet, dass** das Federmittel (16) direkt zwischen zumindest einen der ersten (22a) und zweiten (22b) Verbindungshebel und den zumindest einen zwischenliegenden Verbindungshebel (22c) zum Zurückholen der Schutzeinrichtung (7) aus der ausgefahrenen Konfiguration in die eingezogene Konfiguration, Einführen des Stifts (20) in die Aussparung (21) und Sperren der Schutzeinrichtung (7) eingeschoben ist. 40
11. Maschine nach einem oder mehr der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** das Sperrmittel (8) nach der Verschiebung des zumindest einen Arbeitskopfs (4) aus der oberen Endlagenkonfiguration in die untere Endlagenkonfiguration, in der der Arbeitskopf näher zum Arbeitstisch (3) bewegt ist, und/oder der Verschiebung des zumindest einen Arbeitskopfs (4) aus der unteren Endlagenkonfiguration in die obere Endlagenkonfiguration, in der der Arbeitskopf vom Arbeitstisch (3) weg bewegt ist, automatisch deaktiviert werden kann. 45

## Revendications

1. Scie à onglet composite (1), comprenant :

- une base (2) définissant au moins une table de travail (3) pour supporter au moins une pièce (P) ;
- au moins une tête de travail (4) associée à ladite base, qui est mobile par rapport à ladite table de travail entre au moins une configuration de fin de course supérieure, dans laquelle ladite tête de travail est complètement écartée de ladite table de travail, et une configuration de fin de course inférieure, dans laquelle ladite tête est complètement déplacée près de ladite table de travail, dans laquelle la au moins une tête de travail est pourvue d'une lame circulaire rotative (5) émergeant au moins en partie de ladite tête et exposée pour découper ladite pièce, ladite tête de travail comprenant au moins une table de travail auxiliaire (3'), pour supporter une autre pièce, associée sur la partie supérieure à ladite tête et pourvue d'au moins une fente d'où au moins la partie supérieure de ladite lame

émerge ;

- au moins un dispositif de protection (7) pour au moins une portion exposée de ladite lame, dans sa portion inférieure active (5a), qui est mobile en alternance entre une configuration, dans laquelle il est rétracté dans ladite tête de travail pour libérer ladite portion active afin d'assurer un engagement avec ladite pièce, et une configuration déployée, dans laquelle il recouvre ladite au moins une portion exposée ;

- dans laquelle la machine comprend en outre un moyen de verrouillage amovible (8) dudit dispositif de protection (7) dans au moins l'une des dites configurations rétractée et déployée, dans laquelle ledit moyen de verrouillage est du type à activation/désactivation automatique et dans laquelle ledit moyen de verrouillage comprend un moyen d'interconnexion amovible (8) intercalé entre au moins deux de ladite tête de travail (4), dudit dispositif de protection (7) et de ladite base (2), lequel moyen peut être automatiquement activé lors du positionnement dudit dispositif de protection dans ladite configuration rétractée et/ou déployée ou lors du positionnement de ladite tête de travail dans la au moins une configuration de fin de course supérieure et/ou inférieure ;

- dans laquelle ledit moyen d'interconnexion comprend au moins un arrêt (17) pour y retenir ladite première plaque (11) associée et qui est à même d'être inséré de manière amovible dans au moins un siège de logement (18) associé à au moins l'une de ladite base (2) et de ladite tête de travail (4) pour retenir ledit dispositif de protection (7) dans ladite configuration rétractée ;

- **caractérisée en ce que** ledit moyen d'interconnexion (8) comprend au moins une pièce de queue (19) associée en mode basculant à ladite base (2), ledit siège de logement (18) étant formé sur ladite pièce de queue (19) et ledit élément de recouvrement (25) étant associé à ladite pièce de queue ;

- dans laquelle ladite tête de travail (4) est associée à pivotement à ladite pièce de queue (19), ladite pièce de queue coopérant avec ledit dispositif de protection (7) pour la protection d'au moins une portion exposée de ladite lame (5) lorsque ledit dispositif de protection se trouve dans ladite configuration déployée et/ou que ladite tête de travail se trouve dans ladite configuration de fin de course supérieure.

2. Scie selon la revendication 1, **caractérisée en ce que** ladite tête de travail (4) est associée à pivotement à ladite base (2), en état susceptible de se déplacer en alternance entre une configuration de fin de course supérieure et une configuration de fin de course inférieure, dans laquelle ladite tête est com-

plètement écartée de ladite table de travail et rapprochée de celle-ci, respectivement, et ledit dispositif de protection (7) comprend au moins un élément de recouvrement (25) pour la portion exposée de ladite lame (5) proximale du point d'articulation de ladite tête de travail sur ladite base, ledit élément de recouvrement étant mobile en alternance entre une configuration de protection de la lame lors du positionnement de ladite tête de travail dans la configuration de fin de course inférieure, et une configuration d'exposition de la lame.

3. Scie selon la revendication 1, **caractérisée en ce que** ledit dispositif de protection (7) comprend au moins un premier (11) et un second (12) secteur circulaire associés à ladite tête de travail (4) en mode rotatif autour d'axes respectifs sensiblement parallèles à l'axe de rotation de ladite lame (5), lesdits premier et second (12) secteurs circulaires comprenant au moins une première (11) et une seconde plaque, respectivement, qui sont conformées en fuséau et disposées sensiblement en relation coplanaire avec ladite lame au voisinage de la lame elle-même et ayant chacun un bord périphérique (11a, 12a) incurvé vers le haut en configuration en forme de U pour maintenir la portion correspondante de ladite lame, lesdits secteurs circulaires étant interconnectés l'un avec l'autre par des moyens d'entraînement mutuels et se chevauchant au moins en partie.
4. Scie selon la revendication 3, **caractérisée en ce que** ladite première plaque (11) est associée à pivotement à ladite tête de travail (4) en relation coaxiale avec ladite lame et comprend des moyens palpeurs (15) qui suivent le profil de ladite pièce (P), associés à une extrémité de ladite première plaque en regard de ladite pièce, pour presser ladite première plaque (11) de ladite configuration déployée dans ladite configuration rétractée à l'encontre de l'action de moyens à ressort (16).
5. Scie selon la revendication 3, **caractérisée en ce que** ladite seconde plaque (12) est associée à pivotement à ladite tête de travail (4) ayant un axe de rotation parallèle à l'axe de rotation de ladite lame.
6. Scie selon la revendication 3, **caractérisée en ce que** ladite seconde plaque (12) est associée à pivotement à ladite tête de travail (4) en relation coaxiale avec ladite lame (5).
7. Scie selon une ou plusieurs des revendications 3 à 6, **caractérisée en ce que** ledit moyen d'interconnexion (8) comprend une goupille (20) associée à au moins l'un ou l'autre de ladite tête de travail et dudit dispositif de protection et qui est à même d'être logée dans au moins un évidement (21) associé à

l'autre de ladite tête de travail et dudit dispositif de protection pour retenir ledit dispositif de protection dans ladite configuration déployée.

8. Scie selon une ou plusieurs des revendications précédentes, **caractérisée en ce que** ledit moyen d'interconnexion (8) comprend au moins un levier d'interconnexion (22a, 22b, 22c) intercalé entre au moins ladite première plaque et la tête de travail (4).  
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9. Scie selon une ou plusieurs des revendications précédentes, **caractérisée en ce que** ledit moyen d'interconnexion (8) comprend une pluralité de leviers d'interconnexion (22a, 22b, 22c), un premier levier d'interconnexion (22a) articulé sur ladite tête de travail, un second levier d'interconnexion (22b) articulé sur l'extrémité de ladite première plaque (11) distale par rapport audit bord périphérique (11a) et au moins un levier d'interconnexion intermédiaire (22c) relié au premier et au second levier (22a, 22b) et articulé sur ladite tête de travail (4) au voisinage de sa ligne centrale, ladite goupille (20) étant associée audit levier d'interconnexion intermédiaire (22c) et guidée le long d'au moins une fente (23) ayant une configuration en forme de L et associée audit second levier d'interconnexion (22b), ledit évidement (21) étant formé à une extrémité de ladite fente (23) pour verrouiller ladite goupille lorsque le dispositif de protection est dans la configuration déployée.  
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10. Scie selon la revendication 13, dans la mesure où elle est annexée à la revendication 5, **caractérisée en ce que** ledit moyen à ressort (16) est directement intercalé entre au moins l'un desdits premier (22a) et second (22b) leviers d'interconnexion et ledit au moins un levier d'interconnexion intermédiaire (22c) pour ramener le dispositif de protection (7) de la configuration rétractée à la configuration déployée, insérer ladite goupille (20) dans ledit évidement (21) et verrouiller ledit dispositif de protection (7).  
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11. Scie selon une ou plusieurs des revendications précédentes, **caractérisée en ce que** le moyen de verrouillage (8) peut être automatiquement désactivé lors du déplacement de la au moins une tête de travail (4) de la configuration de fin de course supérieure à la configuration de fin de course inférieure, où la tête de travail est déplacée plus près de la table de travail (3), et/ou du déplacement de la au moins une tête de travail (4) de la configuration de fin de course inférieure à la configuration de fin de course supérieure, où la tête de travail est écartée de la table de travail (3).  
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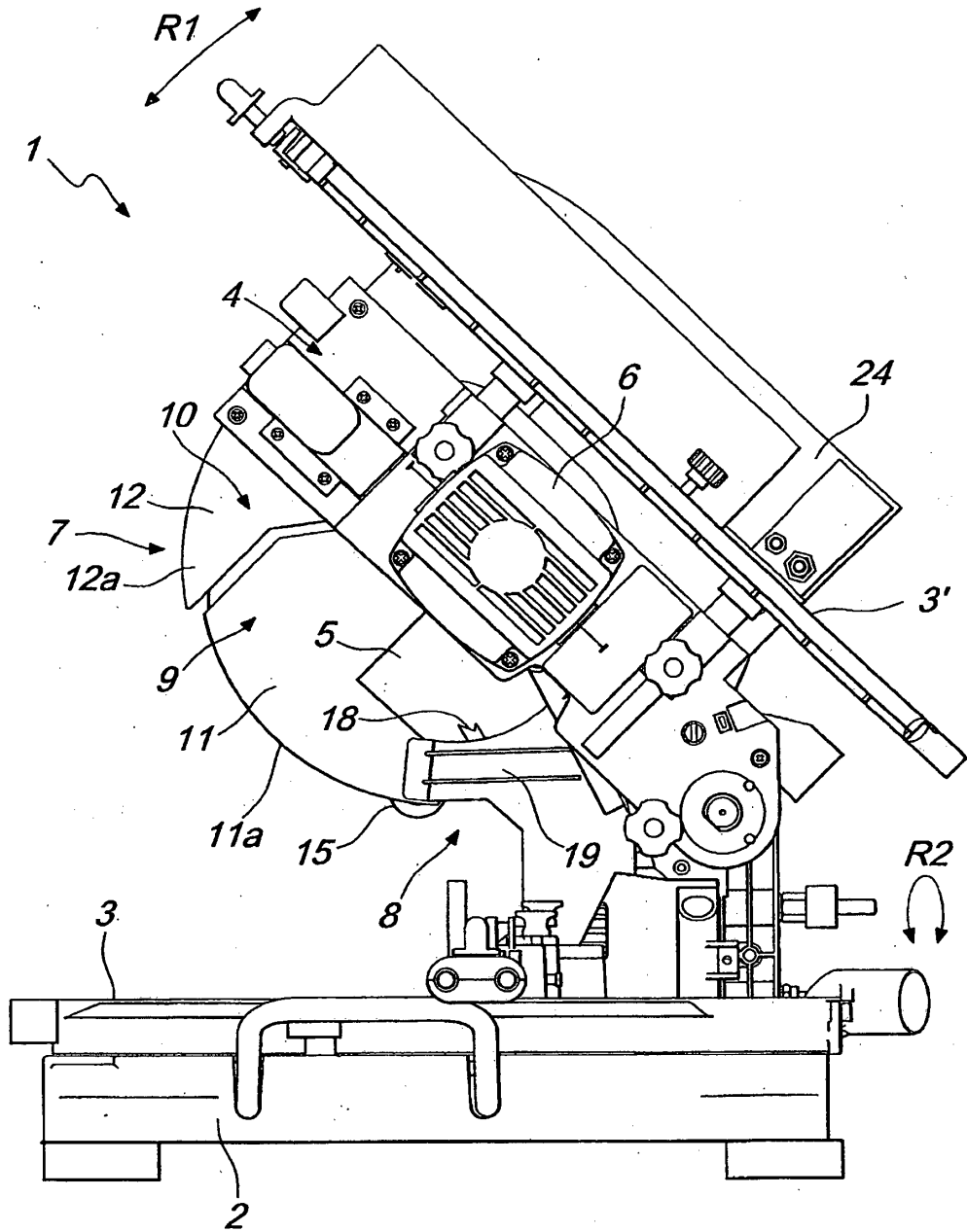
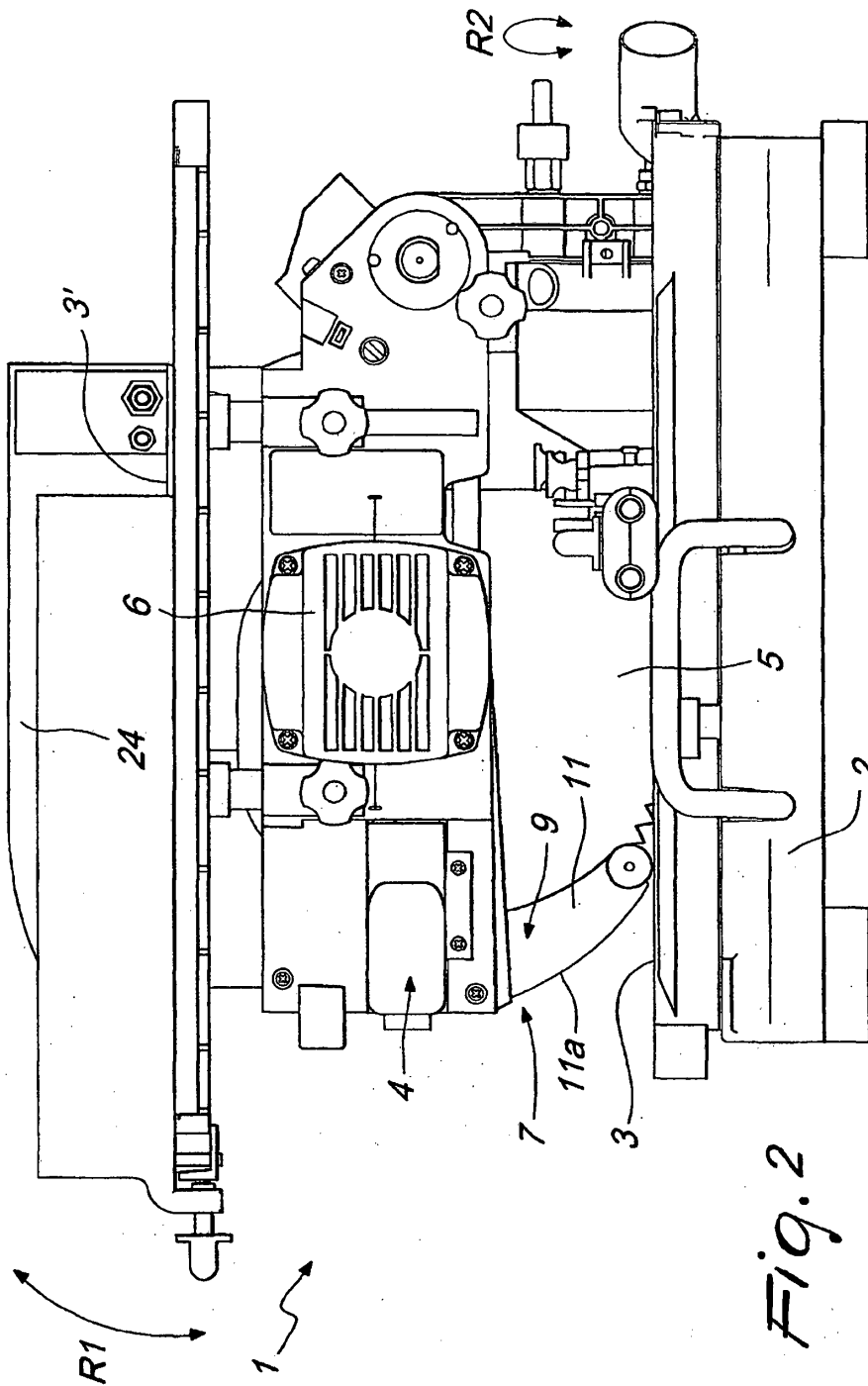
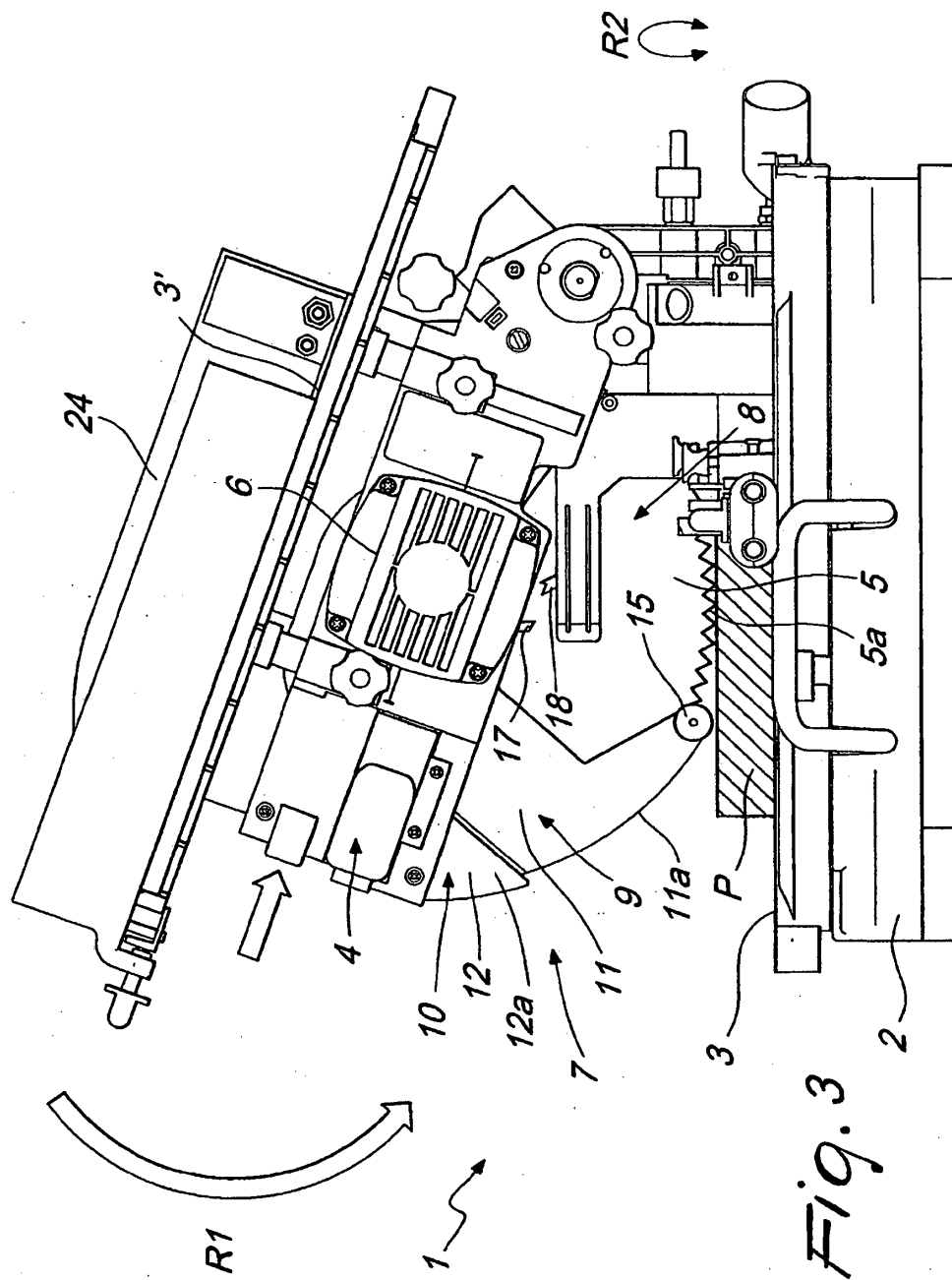
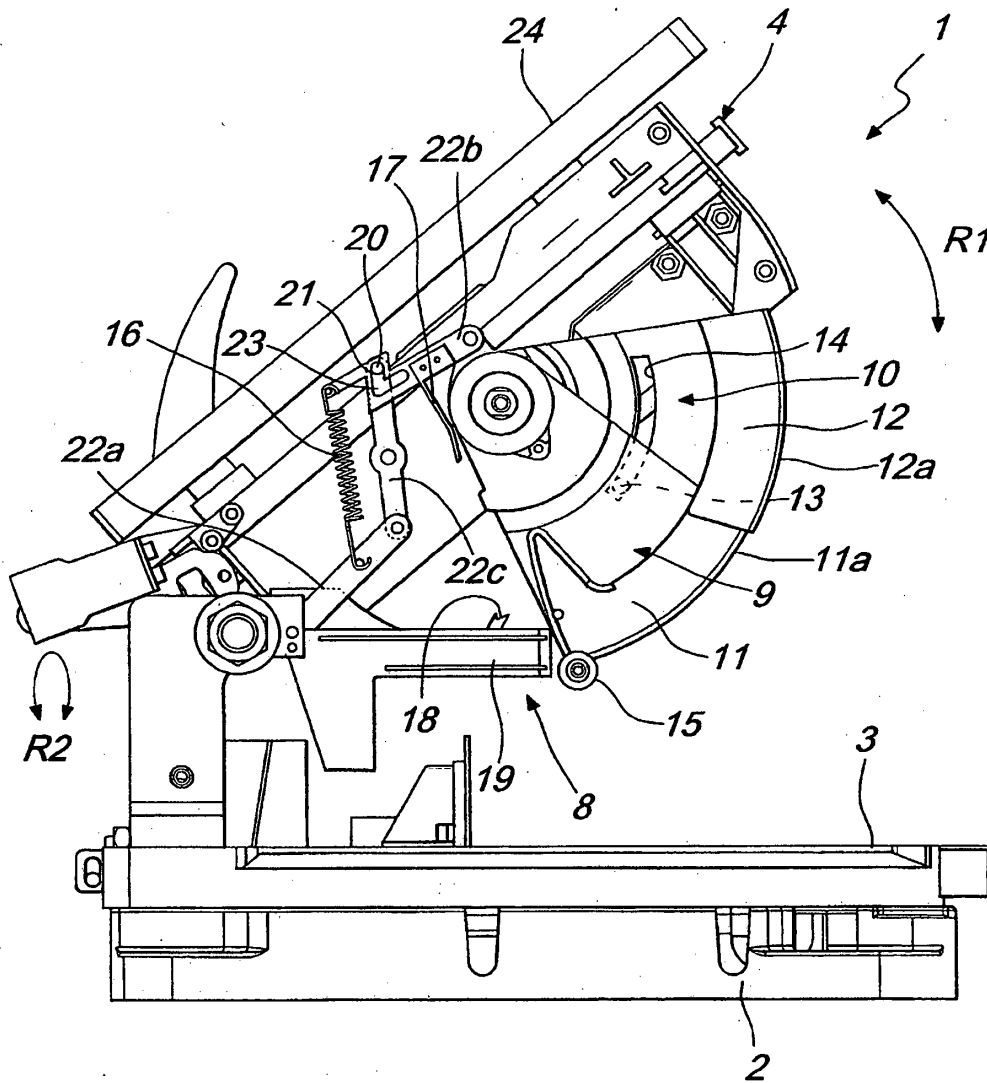


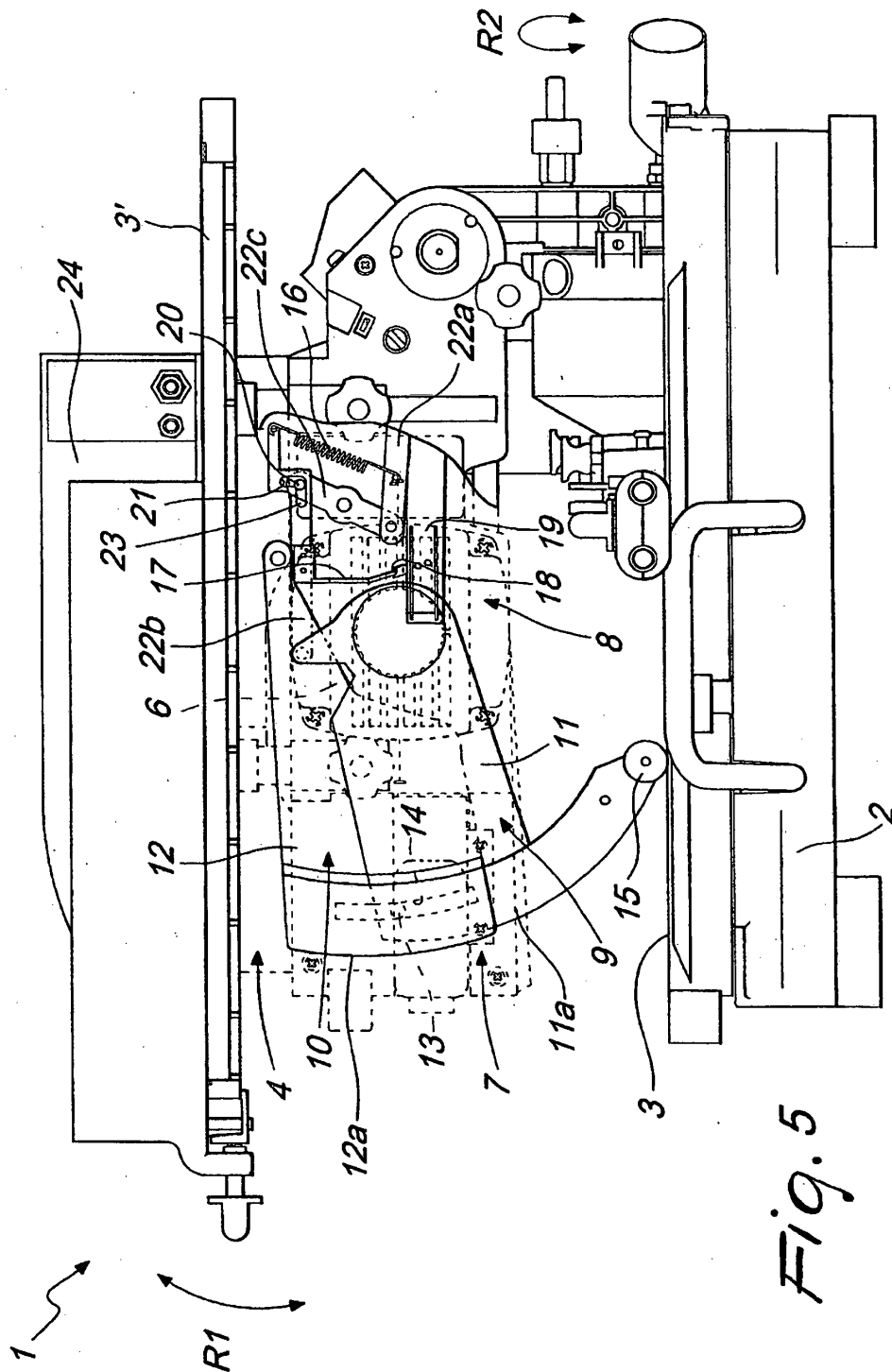
Fig. 1







*Fig. 4*



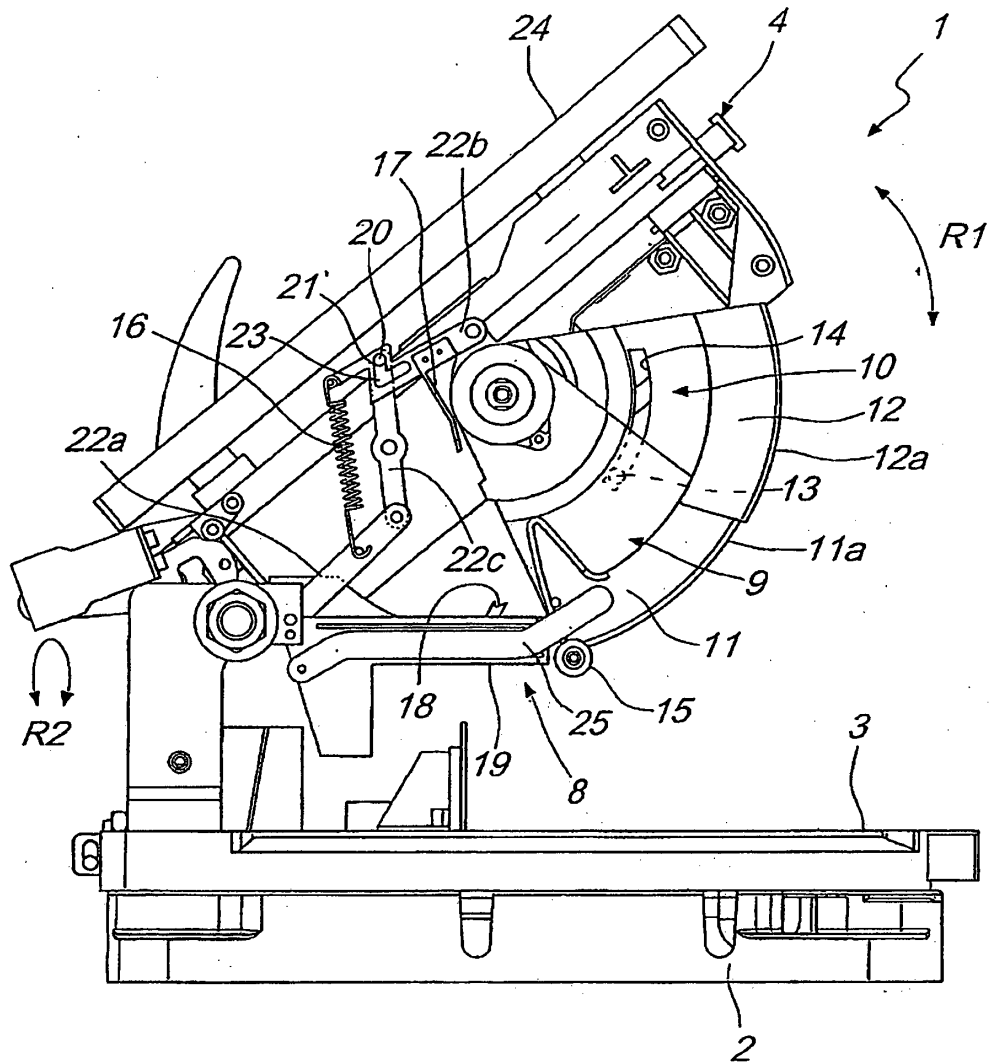
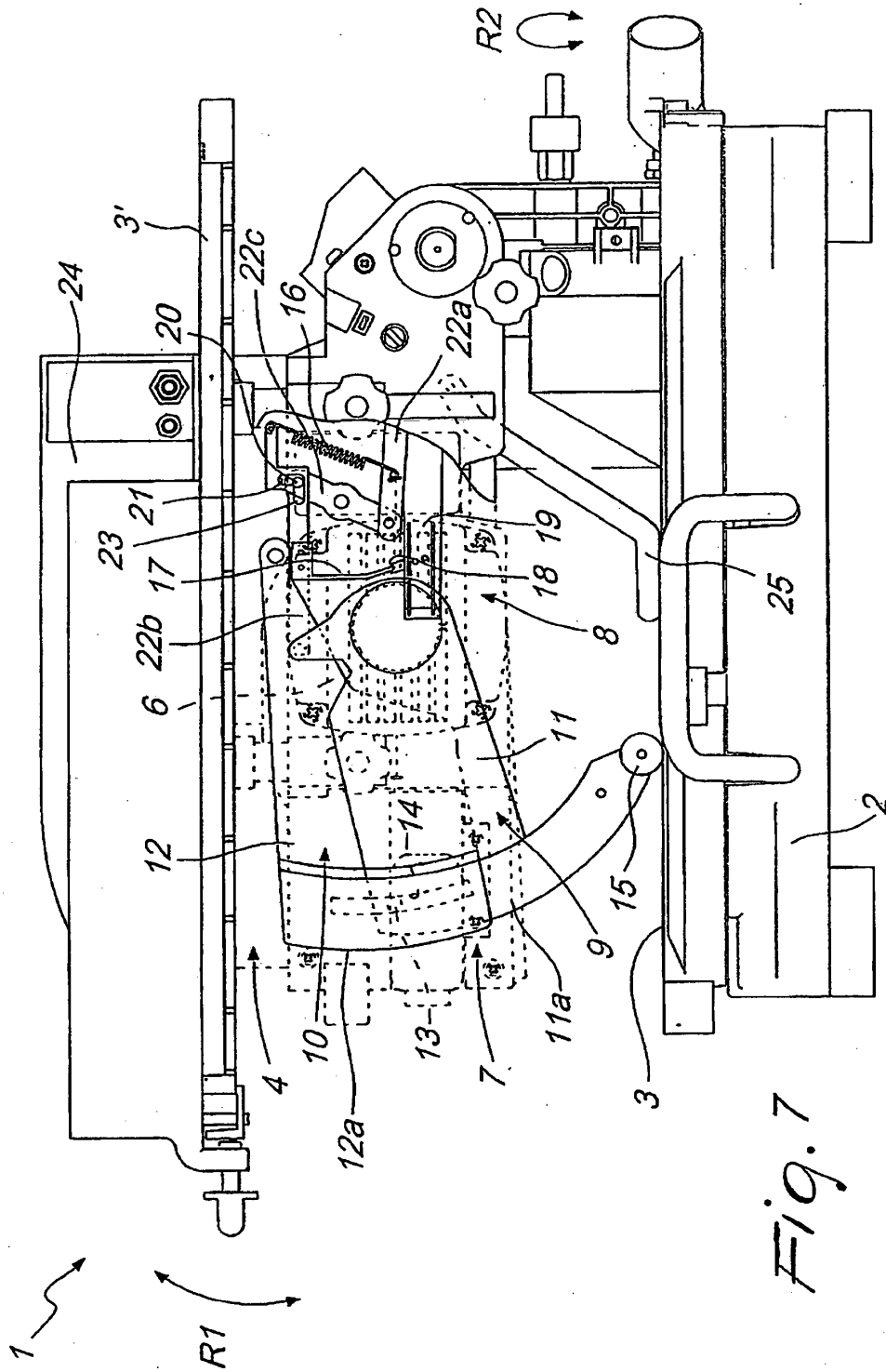


Fig. 6



**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

- EP 1930139 A [0003]