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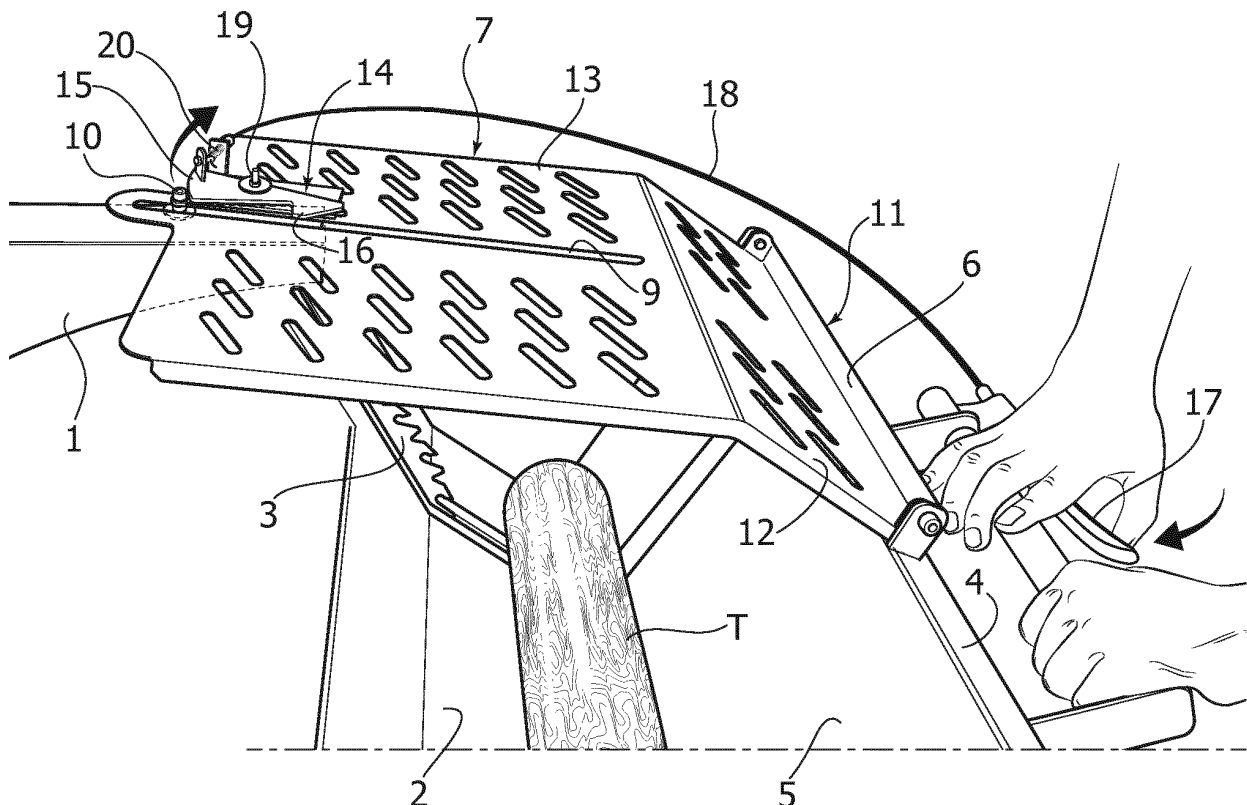
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(54) **TRUNK SAWING MACHINE**

(57) The sawing machine with rotary saw disc (3) comprising a covering element (7) arranged above the rotary saw disc (3) and having a proximal side (6) hinged to a portion (5) of the swinging structure (2) of the trunk

sawing machine and a distal portion (13) slidably constrained to a support (1) thereof by means of a system in which a pin (10, 24) is slidable with respect to a groove (9) or guide (23).

FIG. 2



Description

Field of the invention

[0001] The present invention regards trunk sawing machines with rotary saw disc and swinging cradle structure for supporting a trunk to be cut.

State of the prior art

[0002] Over the years, the applicant has been manufacturing and selling trunk sawing machines thus made comprising a guard for the saw disc moveable between an advanced condition in which it encloses the saw disc and a retracted condition wherein the saw disc is not protected by the guard. The swinging cradle structure is displaceable orthogonally to the saw disc from an inoperative retracted position, corresponding to the operative arrangement of the guard, towards a cutting advanced position corresponding to the condition in which the guard is arranged in the retracted condition and the saw disc is exposed to progressively cut the trunk.

[0003] In the use of these trunk sawing machines the operator is often exposed to the risk of injuries, most of which occur when cutting the piece of wood when, due to distraction or due to the need to accelerate the execution times, the operator may come into contact with the saw disc which, no longer being protected by the guard, could hurt the hand of the operator.

[0004] A further possible cause of injuries for the operator arises from shrapnel and fragments of the trunk which can be ejected by the swinging structure during the cutting step.

[0005] Patent EP2266767 on behalf of the Applicant discloses a trunk sawing machine thus made comprising a safety device for preventing the ejection - from the swinging structure - of the residual trunk resulting from the cutting until the swinging structure is returned to the retracted condition.

[0006] However, such solution is not entirely effective at protecting the operator during the entire step of cutting the trunk.

[0007] Patent applications n° GB207821A and n° US1566191A, which substantially describe the same solution, regard a trunk sawing machine provided with means for protecting the saw comprising a first U-shaped fixed protection element, a second protection element moveable with respect to the first element and a third protection element hinged to the second protection element.

[0008] Such solution is poorly practical due to the difficulty of inserting the pieces of wood to be cut into the trunk sawing machine and complex to implement.

Summary of the invention

[0009] The object of the present invention is to overcome the aforementioned drawback, and provide an im-

provement for trunk sawing machines thus made which allows to drastically reduce, and even eliminate, the risks of injury for the operator in the situations described previously.

[0010] According to the main characteristic of the invention, such object is attained thanks to a trunk sawing machine according to claim 1.

[0011] This allows to close - at the top part - the swinging structure by means of the guard during the entire step of cutting the trunk protecting the operator against direct contact with the blade and against possible ejection of fragments of the trunk during the cutting.

[0012] According to a preferred embodiment of the invention, the distal portion of the covering element can include a slidable groove with respect to a pin protruding from the support.

[0013] According to a further embodiment of the invention, the distal portion of the covering element includes a pin moveable along a support guide.

[0014] In an embodiment of the invention, such covering element comprises a safety device suitable to prevent the unintentional movement of the swinging structure from the inoperative retracted position towards the cutting advanced position. Such characteristic makes the machine safer in particular should a user inadvertently impact against the swinging structure while the rotary saw is running.

[0015] According to an aspect of the invention, such safety device includes a manually actuated control for enabling the movement of the swinging structure from the inoperative retracted position towards the cutting advanced position.

[0016] In an embodiment, the safety device comprises a swinging abutment carried by the covering element and angularly moveable between a stop position in which it intercepts the pin in the inoperative retracted position of the swinging structure preventing the movement thereof, and an inoperative position, in which it does not prevent such movement.

[0017] According to a further advantageous aspect of the invention, such abutment can be configured in a manner such that in a first position thereof it intercepts the pin in the retracted position of the swinging structure preventing the movement thereof, while in a second position it allows a partial advancement of the swinging structure in a pre-cutting position. The full advancement of the swinging structure to the cutting position from the pre-cutting position is allowed only when said abutment is rotated to the first position once again. In such configuration, the trunk sawing machine according to the invention has a further safety for the user who imparts a constraint and release action of the actuation control of the safety device by at least one hand of the operator when carrying out the action of cutting the piece of wood progressively positioned on the swinging structure.

[0018] According to a further aspect of the invention, the abutment displacement is activated by the action of a cable or hydraulic device provided with a manual ac-

tuation lever carried by the portion of the swinging structure opposite to the saw disc. The abutment can be a pawl hinged on a substantially median portion thereof to the covering element, and it comprises an end suitable to intercept the pin in the retracted position of the swinging structure and a protruding portion suitable to intercept the pin in the pre-cutting position of the swinging structure. Furthermore, conveniently provided for are resilient means for automatically returning the abutment from the second position thereof or inoperative retracted position to the first position thereof or stop position following the release of said manual actuation lever.

[0019] In the embodiment of the invention in which the guide is provided for on the support, the safety device comprises a stop arranged at the proximal end of the guide and suitable to intercept the pin in the inoperative retracted position of the swinging structure preventing the movement thereof towards the cutting advanced position. The pin can be released by applying a lifting force by the operator on the covering element.

Brief description of the drawings

[0020] The invention will now be described in detail with reference to the attached drawings, provided purely by way of non-limiting example, wherein:

- figure 1 is a lateral elevational schematic perspective view of an embodiment of the trunk sawing machine according to the invention,
- figure 2 is a lateral elevational perspective view - in larger scale - of a part of the trunk sawing machine according to another embodiment of the invention in which the swinging structure is in the retracted position,
- figure 3 is a view similar to the figure 2 in which the swinging structure is in the pre-cutting position,
- figure 4 is a view similar to figure 2 in which the swinging structure is in the cutting position.
- figure 5 is a variant of figure 2; and
- figure 6 is a view similar to figure 5 in which the swinging structure is in the cutting position.

Detailed description of the invention

[0021] Figure 1 schematically illustrates a trunk sawing machine according to the invention while figures 2 to 4 illustrate three different operative conditions of such machine to be addressed hereinafter. The trunk sawing machine is of the generally conventional type and thus only the essential components and the components expressly making reference to the invention will be described.

[0022] The trunk sawing machine comprises a framework 22 with wheels 8, a support 1, on which it rotates, around a horizontal axis, a saw disc 3 driven in rotation by a motor-driven unit not shown due to the fact that it is well known to a man skilled in the art.

[0023] A swinging cradle structure for supporting the

trunk T to be cut arranged transversely to the saw disc 3 is indicated with 2. Such cradle structure 2 is displaceable with respect to the saw disc 3 between the inoperative retracted position illustrated in figure 2, and the advanced position illustrated in figure 4, to progressively move the trunk T against the saw disc 3, so as to obtain the transversal cutting thereof into two pieces.

[0024] According to the main characteristic of the invention, a side 6 of a covering element 7 is connected to the upper edge 4 of the portion 5 of the swinging structure 2 opposite to the saw disc 3 by means of a hinge 11.

[0025] In the embodiments represented in the figures, the covering element 7 is substantially planar-shaped and a portion 12 thereof in proximity of the hinge 11 has an angle with respect to a distal portion 13 thereof. In the preferred embodiment represented in figures 2 to 4 such distal portion 13 has a groove 9 slidably constrained to a pin 10 protruding from the support 1 while in the embodiment represented in figures 5 and 6 a pin 24, carried by the covering element 7, is moveable along a guide 23 provided for on the support 1. In this manner, at least one portion of the covering element 7 covers - at the top part - the swinging structure 2 during the entire cutting step, as described hereinafter, protecting the operator against possible contact with the saw disc 3 or against wood fragments ejected from the swinging structure 2 when cutting the trunk T.

[0026] According to an advantageous characteristic of the invention the trunk sawing machine comprises a safety device designed to releasably lock the swinging structure 2 in the inoperative retracted position so as not to allow the movement thereof until it is actuated intentionally.

[0027] Such safety device, in the embodiment represented in figures 2 to 4, comprises a swinging pawl-shaped abutment 14, hinged on the distal portion 13 of the covering element 7 beside the groove 9.

[0028] The pawl 14 can be displaced by means of a manual mechanism, described hereinafter, from a first position visible in figure 2, in which it prevents the inadvertent movement of the swinging structure 2, to a second position visible in figure 3, in which it allows a partial advancement of the swinging structure 2 in a pre-cutting position but it blocks a further advancement thereof towards the cutting position of figure 4. Such further advancement, as explained hereinafter, is allowed when the pawl 14 is rotated in the first position once again.

[0029] The pawl 14 has a first protruding end 15 which, when the pawl 14 is in the first position described above, intercepts the pin 10 in the inoperative retracted position of the swinging structure 2, preventing the movement thereof. The pawl 14 has a second hook-like end 16 which, when the pawl 14 is in the second position, intercepts the pin 10 preventing the further movement of the swinging structure 2, blocking it in the pre-cutting position described previously.

[0030] The safety device comprises a manual actuation lever 17 pivoted to the upper edge 4 of the swinging

structure 2 and operatively connected by means of a cable slidable in a sheath 18 at the first end 15 of the pawl 14 so as to cause the rotation thereof around a pivot 19 from the first to the second position when an operator actuates such lever 17. A spring 20 is designed to automatically return the pawl 14 from the second position to the first position following the release of the lever 17.

[0031] In the further embodiment of the invention represented in figures 5 and 6, the pin 24 protrudes from the distal portion 13 and it is moveable along the guide 23 of the support 1 which has proximal and distal portions straight and inclined with respect to each other. At the end of the proximal portion of the guide there is provided for a cavity 25 suitable to intercept and stop the pin 24 in the inoperative receded position of the swinging structure. The disengagement between the pin 24 and the cavity 25 can be obtained by initially applying a lifting force on the covering element using the handle 26, and subsequently pushing the swinging structure towards the cutting advanced position.

[0032] The operation of the machine is generally conventional: the trunks T to be cut are positioned one by one on the swinging structure 2 by arranging the end of the trunk against an adjustable abutment indicated with 21 in figure 1.

[0033] Should the trunk sawing machine not be provided with the safety device, the operator simply moves the swinging structure 2 manually towards the cutting position represented in figure 4. During such displacement, the covering element 7 advances and rotates partially due to the hinge 11 while the groove or guide slides with respect to the pin or vice versa allowing the variable surface portion of the covering element 7 to cover - at the top part - the swinging structure 2 during the entire cutting cycle.

[0034] Should the trunk sawing machine be provided with the safety device described previously in the first embodiment shown in the figures 2 to 4, the operator may start the cutting cycle by manually displacing the swinging structure 2 from the receded position to the pre-cutting position represented in figure 3 by simultaneously actuating the lever 17 so as to rotate the pawl 14 to the second position. In order to allow the further advancement of the swinging structure 2 to the cutting advanced position visible in figure 4, the operator must release the lever 17 so that the pawl 14 is returned to the first position by the spring 20 allowing such further advancement. Upon cutting the trunk T the operator may return the swinging structure 2 to the receded position of figure 2, pick up the two pieces of the trunk and start a new cutting cycle.

[0035] In the embodiment shown in figures 5 and 6 in order to carry the swinging structure towards the cutting position, the operator, as specified previously, must first apply an upward force on the covering element 7.

[0036] Obviously, the construction details and the embodiments may widely vary with respect to what has been described and illustrated, without departing from the

scope of protection of the present invention as defined in the claims that follow. Thus, for example, the safety device actuation mechanism can be hydraulic and the displacement of the swinging structure 2 can be obtained by means of a motor-driven actuation device.

Claims

1. A trunk sawing machine comprising a support (1), a rotary saw disc (3), a swinging cradle structure (2) for supporting a trunk (T) to be cut on which said trunk (T) is displaceable orthogonally to the saw disc (3) from an inoperative receded position towards a cutting advanced position in which the trunk (T) is progressively moved against said saw disc (3) to be cut, a covering element (7) arranged above said rotary saw disc (3) **characterised in that** said covering element (7) comprises a proximal side (6) hinged to a portion (5) of said swinging structure (2) opposite to the saw disc (3), and a distal portion (13) slidably constrained to said support (1) by means of a system in which a pin (10, 24) is slidable with respect to a groove (9) or guide (23).
2. The trunk sawing machine according to claim 1, **characterised in that** said distal portion (13) of the covering element (7) includes said groove (9) which is slidable with respect to a pin (10) protruding from the support (1).
3. The trunk sawing machine according to claim 1, **characterised in that** said distal portion (13) of the covering element (7) includes a pin (24) which is movable along said guide (23) of the support (1).
4. The trunk sawing machine according to claim 3, **characterised in that** said guide (23) has at least two portions inclined with respect to each other.
5. The trunk sawing machine according to any one of the preceding claims, **characterised in that** it further comprises a safety device (14, 17, 18, 25) suitable to prevent unintentional movement of said swinging structure (2) from said inoperative receded position towards said cutting advanced position.
6. The trunk sawing machine according to claim 5, **characterised in that** said safety device comprises an abutment (14) carried by said covering element (7) and movable between a stop position in which it intercepts said pin (10) in said inoperative receded position of the swinging structure (2) so as to prevent movement thereof, and an inoperative position, in which it does not prevent said movement.

7. The trunk sawing machine according to claim 5,
characterised in that said safety device comprises
a stop (25) arranged at the proximal end of the guide
(23) and designed to intercept said pin (24) in said
inoperative retracted position of said swinging struc- 5
ture (2), the pin (24) being releasable from said stop
(25) by applying a lifting force of said covering ele-
ment (7) .

8. The trunk sawing machine according to claim 6, 10
characterised in that said safety device includes a
manually actuated control (17) to allow movement
of said swinging structure (2) from said inoperative
retracted position towards said cutting advanced po-
sition. 15

9. The trunk sawing machine according to any one of
the preceding claims, **characterised in that** said
covering element (7) is substantially planar-shaped
and includes an inclined portion (12). 20

10. The trunk sawing machine according to one of claims
6, 8 or 9, **characterised in that** said abutment (14)
is movable between a first position, in which it inter-
cepts said pin (10) in said inoperative retracted posi- 25
tion of said swinging structure (2) preventing the
movement thereof, a second position, in which it al-
lows a partial advancement of the swinging structure
(2) to a pre-cutting position, the full advancement of
the swinging structure (2) to the cutting position from 30
said pre-cutting position being allowed when said
abutment(14) is again moved in said first position.

11. The trunk sawing machine according to one of claims
6 or 8-10, **characterised in that** the movement of 35
said abutment (14) is carried out by a cable or hy-
draulic device provided with a manually actuated le-
ver (17) carried by said portion (5) of the swinging
structure (2) opposite to the saw disc (3).
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12. The trunk sawing machine according to one of claims
6 or 8-11, **characterised in that** said abutment is a
swinging pawl (14) hinged in a substantially median
portion to said covering element (7), comprising an
end (15) suitable to intercept said pin (10) in said 45
retracted position of the swinging structure (2), and
a protruding portion (16) suitable to intercept said
pin (10) in the pre-cutting position of the swinging
structure (2).
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13. The trunk sawing machine according to one of claims
6 or 8-12, **characterised in that** said abutment (14)
is provided with return resilient means (20) from said
second position or inoperative retracted position to
said first position or stop position following the re- 55
lease of said lever (17).

FIG. 1

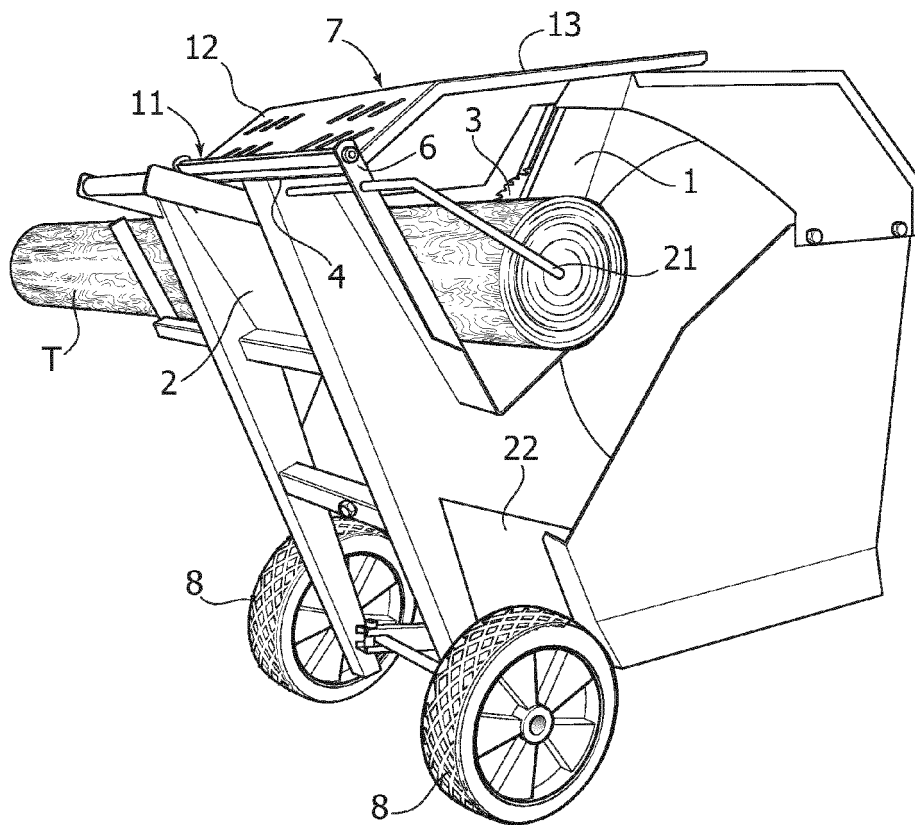


FIG. 2

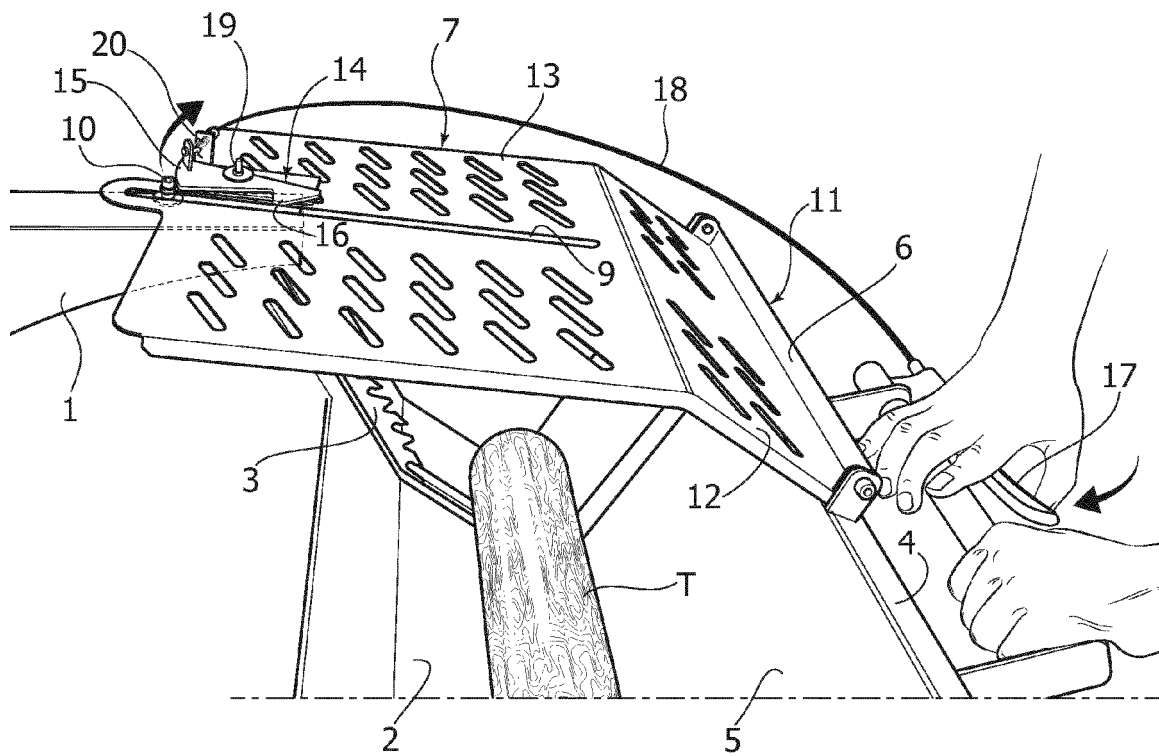


FIG. 3

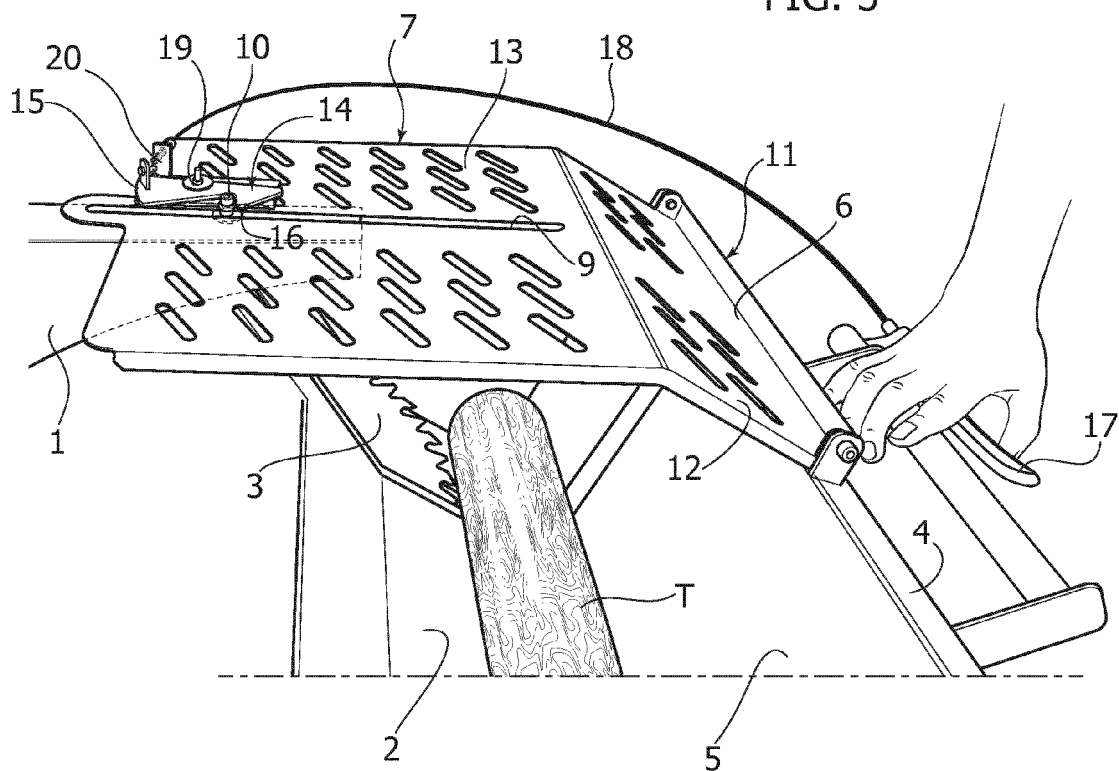


FIG. 4

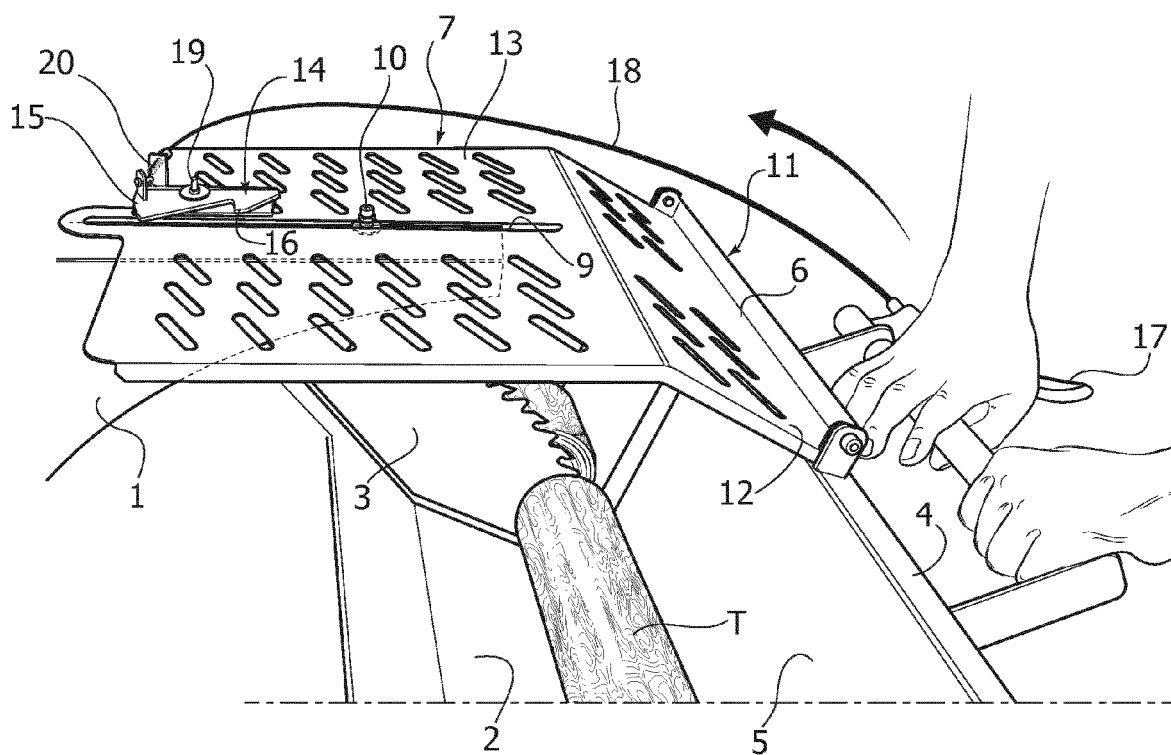


FIG. 5

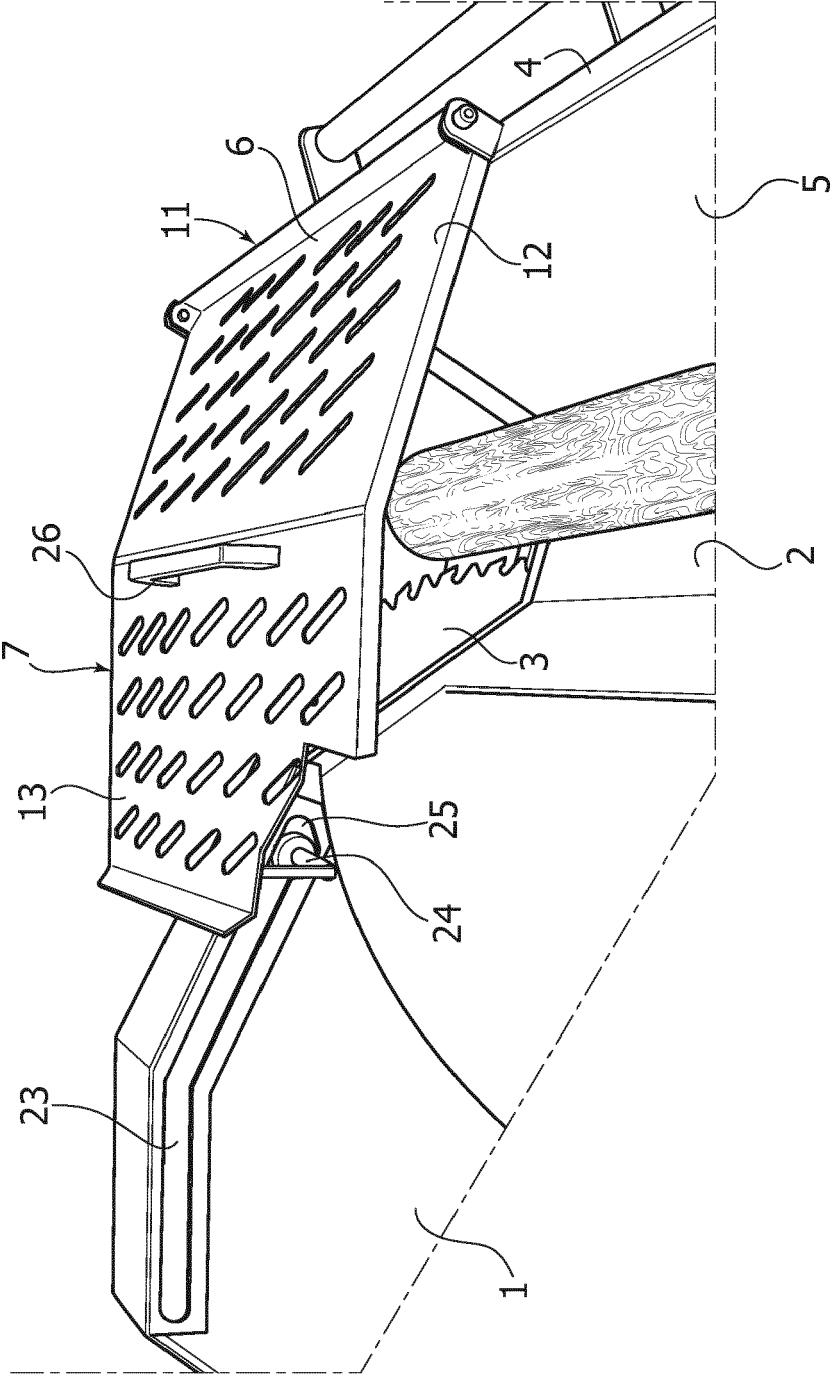
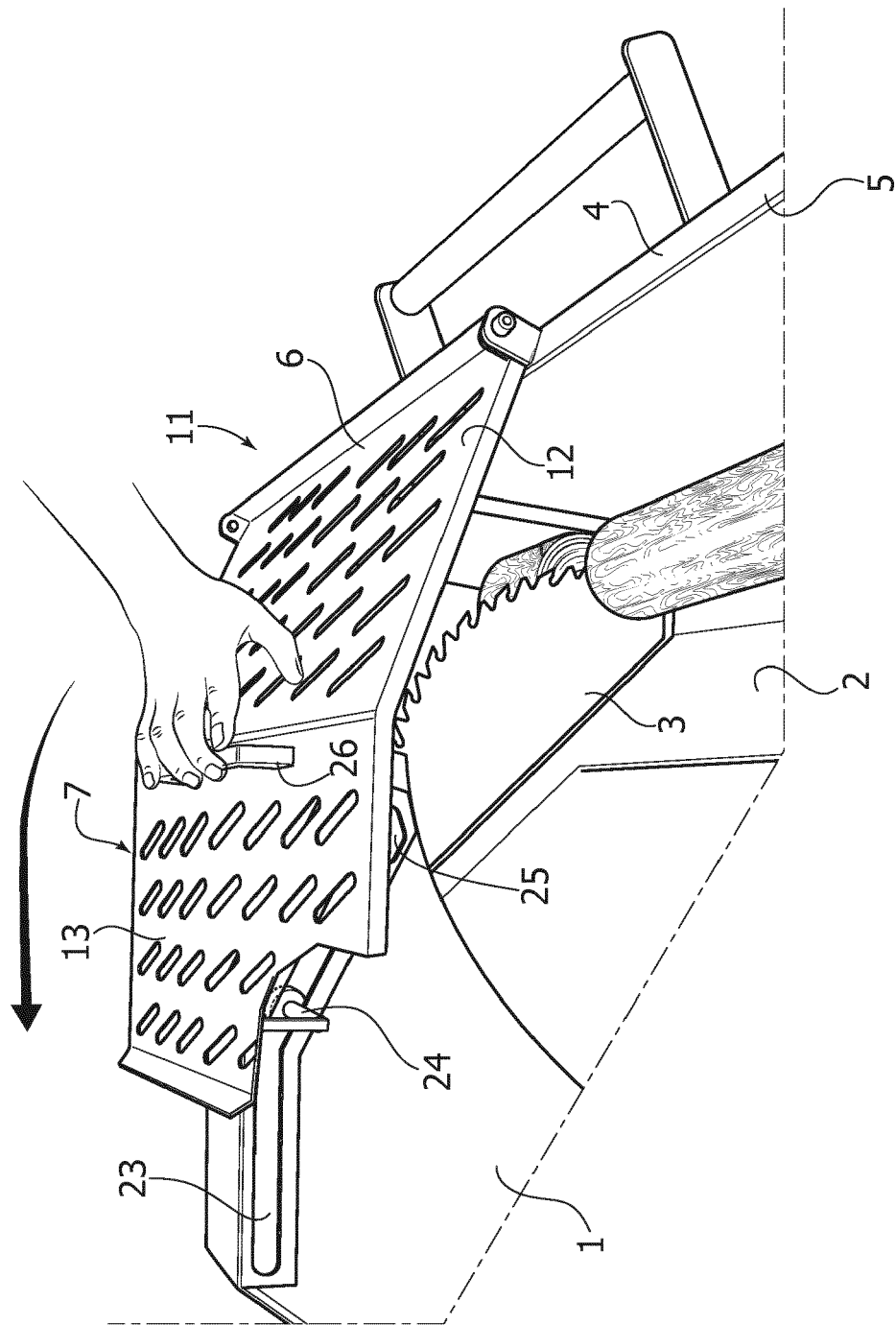


FIG. 6





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Application Number
EP 19 19 7018

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Place of search The Hague		Date of completion of the search 29 January 2020	Examiner Rijks, Mark
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