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(54) WOOD LOG OR STUB SPLITTING APPARATUS

HOLZBLOCK- ODER -STUMPFSPALTVORRICHTUNG

APPAREIL DE FENDAGE DE BÛCHES OU DE CHICOTS DE BOIS

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(73) Proprietor: **Ricca Andrea & C. S.n.c.
12022 Busca (Cuneo) (IT)**

(72) Inventor: **RICCA, Roberta
I-12022 Busca (Cuneo) (IT)**

(74) Representative: **Buzzi, Franco
Buzzi, Notaro & Antonielli d'Oulx S.p.A.
Corso Vittorio Emanuele II, 6
10123 Torino (IT)**

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Description

Field of the invention

[0001] The present invention regards wood log or stub splitting apparatuses as per the preamble of claim 1. Such a wood log or stub splitting apparatus is known from the document WO2012/167194 A2.

State of the prior art

[0002] In wood log or stub splitting apparatuses of this type there arises the need of safeguarding the safety of the operator, in particular as regards the risk of injuries to the hands when displacing the splitting blade from the retracted position to the advanced position. As a matter of fact, the pieces of wood to be split are normally positioned manually on the support surface of the apparatus, hence it may occur that the fingers or other parts of the body of the operator be accidentally interposed between the wood log and the moving blade. In order to overcome this problem, it was proposed to provide the log splitting apparatus with safety means that require a continuous holding action with both hands of the operator to perform the operation of splitting the wood log positioned whenever required on the support surface of the apparatus. A particular solution of this type, for example described and illustrated in documents EP-B-0438997 and EP-B-0519150, consists in using a pair of tilting arms or handlebars which serve two purposes: locking - between them - the wood log on the support surface in a centred position with respect to the splitting blade, and granting consent to the activation of the actuation unit to carry out the splitting operation only through a manoeuvre simultaneously continuously exerted on both arms, and thus using both hands.

[0003] Besides being capable of guaranteeing the required operational safety, solutions of this type reveal the drawback of compulsorily engaging the hands of the user during the entire blade advancement cycle and the ensuing difficulty of positioning the pieces to be split correctly, particularly if crooked or bent. It is clear that during the actual step of splitting the wood log the user is not exposed to any risk of injury given that it is not possible to inadvertently introduce the hands under the blade, while - from this point of view the critical step is only the one in which the blade progressively approaches the wood log up to the actual contact with the latter. Thus, the safety system proposed in the aforementioned prior art documents basically creates excessive hindrance for the operator who, instead of being forced to passively observe the entire splitting step, could more usefully use this period of time to hold the pieces of wood to prevent them from falling uncontrollably during the splitting step.

[0004] A solution for partially overcoming this drawback is proposed in DE-A-19640687, according to which the two levers for locking the wood log to be split are eliminated, and the safety means comprise two spaced

control buttons operatively connected to the actuation unit of the linear actuator, which is of the pressurised fluid type. By actuating only one of the two buttons, the splitting blade is displaced with a lower pressure until the blade rests against the wood log to be split, held with the other hand by the operator in this step. By continuously and simultaneously actuating both buttons, the blade is thus made to advance with a higher pressure for splitting the wood log.

[0005] It is clear that this solution does not allow to overcome the aforementioned drawback either, given that in any case the splitting step requires the passive assistance by the operator who thus cannot hold the wood log during the splitting operation.

[0006] Another solution was proposed by the Applicant EP 0891 845, according to which the linear actuator bearing the blade of the log splitting apparatus is axially moveable with respect to the support structure of the apparatus so that, during the first step of approaching the blade to the log, the actuation unit can be made temporarily inoperative so as to stop the displacement of the blade should there be applied - thereon - a resistance to the displacement thereof. This solution is applicable to small log splitting apparatuses, typically having a linear actuator with hydraulic jack whose cylinder is substantially incorporated in the framework and the stem bearing the cutting blade is extended and retracted by the upper end of the cylinder. Such solution cannot be applied on large log splitting apparatuses in which the cylinder of the hydraulic jack is typically supported in a cantilevered fashion by an upper end of the support structure and in which the stem extends downwards from the lower end of the cylinder.

Summary of the invention

[0007] The object of the present invention is to overcome the aforementioned drawback, and more in particular to provide a wood splitting apparatus of the type defined above guaranteeing the maximum degree of safety for the operator in particular in the critical step of approaching the blade to the log, as explained previously.

[0008] According to the invention, this object is attained thanks to the log splitting apparatus defined in claim 1. The cylinder of the hydraulic jack is articulated inferiorly to a rotatable bracket provided on top of the support structure. Thus, the hydraulic jack is moveable - by means of the rotatable bracket - between a first position, in which the actuation unit is susceptible to be made operative through the control means, and a second position, corresponding to the application - on the blade - of a resistance to the displacement thereof towards the advanced position, for example due to a hand of a distracted operator, in which the actuation unit is made temporarily inoperative, so as to stop the displacement of the blade towards the advanced position.

[0009] Thanks to this solution idea, during the initial step of displacing the blade from the retracted position towards the advanced position, the operator can position

and align the piece to be split on the support surface of the apparatus under safe conditions given that should the blade encounter even a slight resistance to the displacement thereof towards the advanced position, the movement thereof automatically stops immediately. In any case, the stopping of the blade occurs when the latter intercepts the surface of the wood log to be split. Thus, in this step there is no risk whatsoever of exposing the operator to the risk of injury, given that the simple contact between a hand or another part of the body thereof would cause the immediate stopping thereof. Thus, the operator has to use both hands in order to control the start of the splitting step, as specified by the regulations.

[0010] In a preferred embodiment of the invention, the displacement of the rotatable bracket from the first to the second angular position is countered by at least one spring whose restoring force can be advantageously adjusted as a function of the desired degree of the minimum counteracting force of the blade to stop the apparatus.

[0011] According to a further aspect of the invention the cylinder comprises a pin whose ends protrude from the lateral surface thereof. The pin is carried by the bracket by means of a releasable retaining arm.

Brief description of the drawings

[0012] The invention will now be described in detail, purely by way of non-limiting example, with reference to the attached drawings, wherein:

figure 1 is a lateral elevational schematic perspective view of an embodiment of the wood log splitting apparatus according to the invention wherein the splitting blade is in a partly advanced splitting position, figure 2 is a lateral elevational perspective view - in larger scale - of a part of the log splitting apparatus. figures 3-5 are views similar to figure 2.

Detailed description of the invention

[0013] Given that the log splitting apparatus is of the generally conventional type, only the essential components and the components expressly referred to in the invention will be described.

[0014] Initially referring to figure 1, the invention comprises a support structure generally indicated with 1, consisting of a framework 2, a vertical upright 3 and a horizontal base 4 for supporting the wood log P which is to be split when required.

[0015] Vertically slidable in a guided fashion along the upright 3 is a slide-like support 5 and bearing - cantilevered - a splitting blade 6 displaceable between a raised position, and a final lowered position for splitting the wood log P.

[0016] For such displacements, the blade 6 with the slide 5 is carried by the stem 9 of a hydraulic jack 7 comprising a cylinder 8 arranged substantially vertically facing the upright 3 and articulated beneath said upright 3,

as clarified hereinafter.

[0017] The upright 3 further bears an electrical-hydraulic actuation unit, not shown in that known to a man skilled in the art, of the hydraulic jack 7 with the related control means 10, 11, 25 to displace the blade 6 from a raised or receded position to an advanced or lowered position and vice versa. The control means 10, 11, 25 include, so as to comply with the regulatory safety specifications set forth for such wood log splitting apparatuses, safety means for example consisting of a pair of levers 10 or buttons 11 that require the action of both hands of the operator to carry out the operation for splitting the wood log P.

[0018] Now, with reference to figure 2, according to the crucial aspect of the invention, the hydraulic jack 7 is not fixed. As a matter of fact, it can oscillate between a first angular position and a second angular position with respect to the upright 3 for a stroke of pre-established degree. According to the invention, the cylinder 8 of the hydraulic jack 7 comprises - at the lower part - a horizontal transversal pin 12 whose ends traverse respective lateral slots 13 of a pair of rotatable brackets 14 each having an end opposite to the corresponding slot 13 hinged to the top part of the upright 3 by means of the pin 15.

[0019] As better observable in figure 3, the brackets 14 are joined, substantially in the respective central portions, by a shaft 16 bearing a pair of plates 17 fixed to each one of which is a vertical stem 18 bearing - at the top part - a washer 19. Compression helical springs 20 are interposed between the washers 19 and the pair of plates 17.

[0020] Figure 4 shows a pair of releasable retaining arms 21 each comprising a hook-like portion provided for engaging a respective end of the pin 12 of the cylinder 8, and being joined in the opposite portions by a handle for disengaging such arms from the pin 12 countering the force of a spring 26.

[0021] As better clarified hereinafter, during the operation should the splitting blade 6 encounter a resistance during the lowering thereof towards the support platform 4 starting from the raised position, the cylinder 8 is displaced upwards with the action of the springs 20. According to the invention and as better observable in figure 4, indicated with 22 is a contact switch, whose body 22 is fixed to one of the brackets 14 and designed to make the actuation unit of the log splitting apparatus inoperative, stopping the displacement of the blade 6 towards the advanced position, when such contact switch 22 is moved away from an abutment 23 integrally joined to the upright 3.

[0022] Figure 5 shows a covering strip 24 bearing a button 25 designed to return the blade to the initial raised position after the splitting step.

[0023] The wood log splitting apparatus according to the invention operates as follows.

[0024] Let us assume starting from an initial condition in which the hydraulic jack 7 is retracted, and the splitting blade 6 is in the receded position, i.e. raised above the

support platform 4. The operator can load a wood log P to be split on the support platform 4, by positioning it and aligning it with respect to the blade 6.

[0025] Then the operator commands the start of the splitting cycle, normally by actuating one of the buttons 11 so as to arrange both hands for positioning and centring the piece to be split more comfortably. According to the invention, the blade 6 descends until it rests on the wood log P to be split, or until it encounters a resistance against the lowering thereof, for example due to an inadvertent contact of a finger or another part of the body of the operator with such blade 6. In both cases a resistance, whose degree can be adjusted by means of springs 20, applied to the blade 6 causes the oscillation of the cylinder 8, or of the hydraulic jack 7, thanks to the rotation of the brackets 14 which will also move the contact switch 22 away from the relative counteracting means 23 thus stopping the actuation unit of the apparatus.

[0026] Starting from this position, both buttons 11 have to be actuated in order to resume the displacement of the blade 6 downwards so as to split the piece P resting on the platform 4. This requires the action of both hands of the operator who cannot hold the piece P to be split in this step. However, the stability of the piece P on the support platform 4 is guaranteed in this step by the counteraction of the blade 6 from above.

[0027] At the end of the splitting stroke of the blade 6, pressing the button 25 will allow to return the blade 6 to the initial raised position.

Claims

1. Wood log or stub splitting apparatus comprising a support structure (1) that includes a framework (2) and a vertical upright (3), a hydraulic jack (7) comprising a cylinder (8) and a stem (9) bearing a splitting blade (6) displaceable between an inoperative retracted position and an advanced splitting position with respect to a support surface (4) of a wood log (P) to be split, an actuation unit of the linear actuator, control means (10, 11, 25) of said actuation unit to displace said splitting blade (6) from said retracted position to said advanced position and vice versa, said control means (10, 11, 25) including safety means requiring the action of both of the operator's hands to perform splitting operation, in which said actuation unit is configured to be rendered operational via said control means (10, 11, 25) in order to initially move said splitting blade (6) from the retracted position to an abutment position corresponding to the contact between the splitting blade (6) and an end of the wood log (P) to be split, **characterised in that** the cylinder (8) of the hydraulic jack (7) is articulated inferiorly to a rotatable bracket (14) provided on top of said vertical upright (3) of the support structure (1), said rotatable bracket (14) including a contact switch (22) and said upright (3)

including an abutment (23), **in that** a resistance applied to said blade (6) causes the oscillation of the cylinder (8), or of the hydraulic jack (7), thanks to the rotation of the brackets (14) which will also move the contact switch (22) away from the relative counteracting means (23) thus stopping the actuation unit of the apparatus, the hydraulic jack (7) being rotatable between a first angular position, in which said actuation unit can be made operative through said control means (10, 11, 25), and a second angular position, corresponding to the application - onto the blade (6) - of said resistance against the displacement thereof towards the advanced position, in which said actuation unit is made temporarily inoperative, so as to stop the displacement of the blade (6) towards said advanced position.

2. Log splitting apparatus according to claim 1, **characterised in that** said displacement of the rotatable bracket (14) from the first to the second angular position is helped by at least one spring (20).
3. Log splitting apparatus according to claim 1 or 2, **characterised in that** said cylinder (8) comprises a pin (12) whose ends protrude from the lateral surface thereof, said pin (12) being carried by said rotatable bracket (14) by means of a releasable retaining arm (21).

Patentansprüche

1. Rundholz- oder Stumpfspaltvorrichtung, aufweisend eine Trägerstruktur (1), aufweisend einen Rahmen (2) und einen vertikalen Ständer (3), einen hydraulischen Heber (7), der einen Zylinder (8) und einen Schaft (9) aufweist, der eine Spaltklinge (6) trägt, die zwischen einer unwirksamen zurückgezogenen Position und einer vorgeschobenen Spaltposition in Bezug zu einer Auflagefläche (4) eines zu spaltenden Rundholzes (P) beweglich ist, eine Betätigungseinheit des linearen Betätigers, Steuermittel (10, 11, 25) der Betätigungseinheit, um die Spaltklinge (6) von der zurückgezogenen Position in die vorgeschobene Position und umgekehrt zu bewegen, wobei die Steuermittel (10, 11, 25) Sicherheitsmittel aufweisen, die die Beteiligung beider Hände des Bedieners verlangen, um den Spaltvorgang auszuführen, wobei die Betätigungseinheit so konfiguriert ist, dass sie über die Steuermittel (10, 11, 25) betriebsbereit wird, um die Spaltklinge (6) anfänglich aus der zurückgezogenen Position in eine Anschlagposition zu bewegen, die dem Kontakt zwischen der Spaltklinge (6) und einem Ende des zu spaltenden Rundholzes (P) entspricht, **dadurch gekennzeichnet, dass** der Zylinder (8) des hydraulischen Hebbers (7) unten an einer dreh-

baren Halterung (14) artikuliert befestigt ist, die oben auf dem vertikalen Ständer (3) der Trägerstruktur (1) bereitgestellt ist, wobei die drehbare Halterung (14) einen Kontaktschalter (22) und der Ständer (3) ein Widerlager (23) aufweist, sodass ein Widerstand, der auf die Klinge (6) ausgeübt wird, die Oszillation des Zylinders (8) oder des hydraulischen Hebers (7) durch die Drehung der Halterung (14) bewirkt, die auch den Kontaktschalter (22) von den entsprechenden Gegenmitteln (23) wegbewegt, wodurch die Betätigungseinheit der Vorrichtung angehalten wird, der Hydraulikzylinder (7) zwischen einer ersten Winkelposition, in der die Betätigungseinheit durch die Steuermittel (10, 11, 25) in Betrieb gesetzt werden kann, und einer zweiten Winkelposition, die dem Aufbringen des Widerstands gegen die Verschiebung der Klinge (6) in Richtung der vorgeschobenen Position entspricht, in der die Betätigungseinheit vorübergehend außer Betrieb gesetzt wird, um die Verschiebung der Klinge (6) in Richtung der vorgeschobenen Position zu stoppen, drehbar ist.

2. Rundholzpaltvorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Verschiebung der drehbaren Halterung (14) von der ersten in die zweite Winkelposition durch mindestens eine Feder (20) unterstützt wird.
3. Rundholzpaltvorrichtung nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** der Zylinder (8) einen Stift (12) aufweist, dessen Enden aus seiner seitlichen Fläche herausragen, wobei der Stift (12) mittels eines lösbaren Haltearms (21) von der drehbaren Halterung (14) getragen wird.

Revendications

1. Appareil de fendage de bûches de bois ou de tronçons de bois comprenant une structure de support (1) qui inclut une ossature (2) et un montant vertical (3), un vérin hydraulique (7) comprenant un cylindre (8) et une tige (9) portant une lame de fendage (6) déplaçable entre une position reculée inactive et une position de fendage avancée par rapport à une surface de support (4) d'une bûche de bois (P) à fendre, une unité d'actionnement de l'organe d'actionnement linéaire, des moyens de commande (10, 11, 25) de ladite unité d'actionnement pour déplacer ladite lame de fendage (6) de ladite position reculée à ladite position avancée et vice versa, lesdits moyens de commande (10, 11, 25) incluant des moyens de sécurité nécessitant l'action des deux mains de l'opérateur pour effectuer l'opération de fendage, où ladite unité d'actionnement est configurée pour être rendue opérationnelle via lesdits moyens de commande (10, 11, 25) afin de déplacer initialement ladite lame de fendage (6) de la position

reculée à une position de butée correspondant au contact entre la lame de fendage (6) et une extrémité de la bûche de bois (P) à fendre,

caractérisé en ce que le cylindre (8) du vérin hydraulique (7) est articulé à sa partie inférieure à un support rotatif (14) prévu au sommet dudit montant vertical (3) de la structure de support (1), ledit support rotatif (14) incluant un interrupteur de contact (22) et ledit montant (3) incluant une butée (23), **en ce qu'une** résistance appliquée à ladite lame (6) provoque l'oscillation du cylindre (8), ou du vérin hydraulique (7), grâce à la rotation des supports (14) qui va également éloigner l'interrupteur de contact (22) des moyens d'action contraire relative (23) arrêtant ainsi l'unité d'actionnement de l'appareil, le vérin hydraulique (7) pouvant tourner entre une première position angulaire, dans laquelle ladite unité d'actionnement peut être rendue active par le biais desdits moyens de commande (10, 11, 25), et une seconde position angulaire, correspondant à l'application - sur la lame (6) - de ladite résistance contre le déplacement de celle-ci vers la position avancée, dans laquelle ladite unité d'actionnement est rendue temporairement inactive, de manière à arrêter le déplacement de la lame (6) vers ladite position avancée.

2. Appareil de fendage de bûches selon la revendication 1, **caractérisé en ce que** ledit déplacement du support rotatif (14) de la première à la seconde position angulaire est favorisé par au moins un ressort (20).
3. Appareil de fendage de bûches selon la revendication 1 ou 2, **caractérisé en ce que** ledit cylindre (8) comprend un axe (12) dont les extrémités font saillie de sa surface latérale, ledit axe (12) étant porté par ledit support rotatif (14) au moyen d'un bras de retenue amovible (21).

FIG. 2

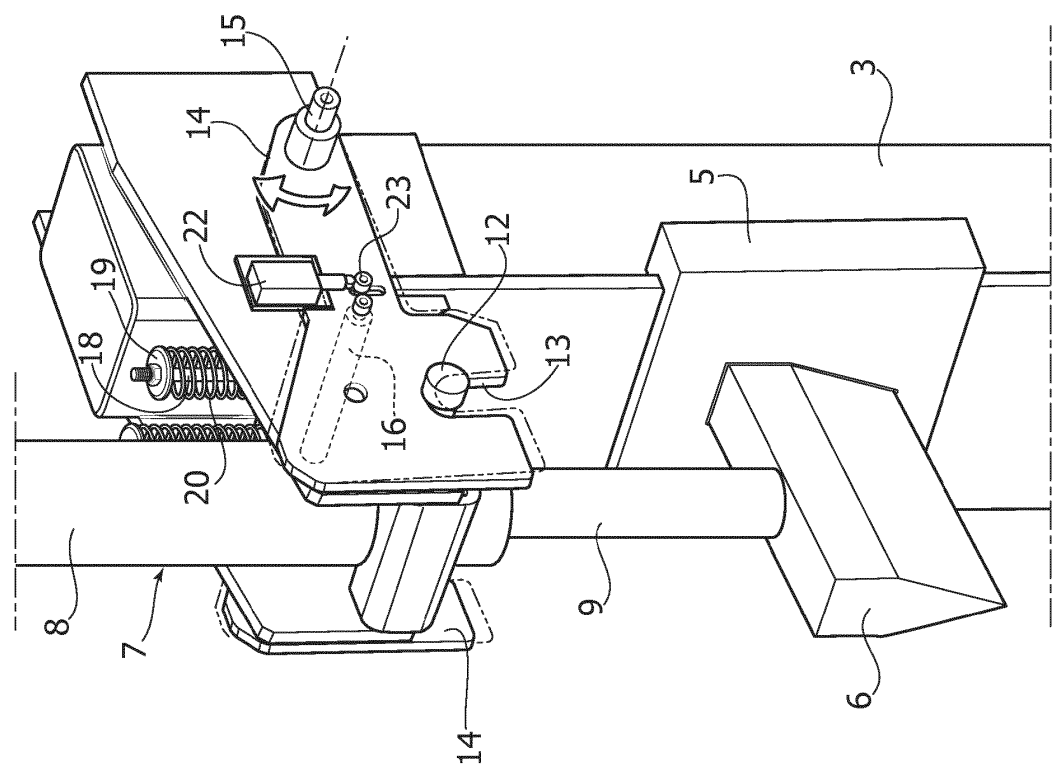


FIG. 1

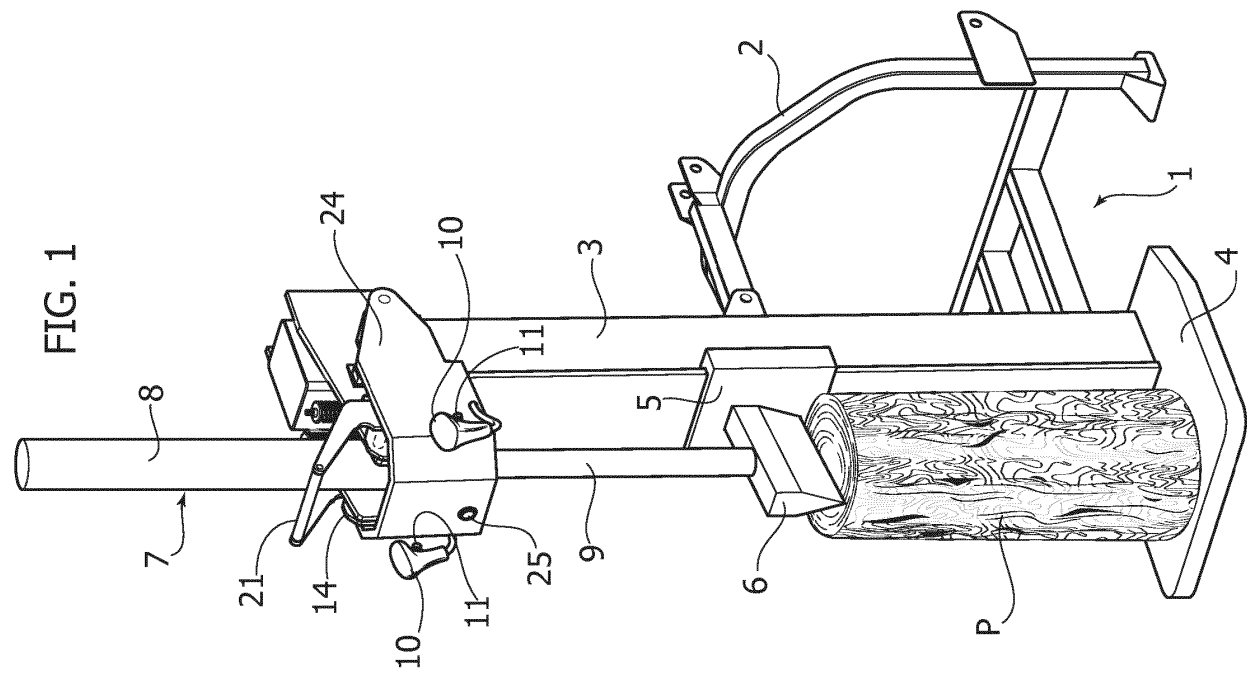


FIG. 4

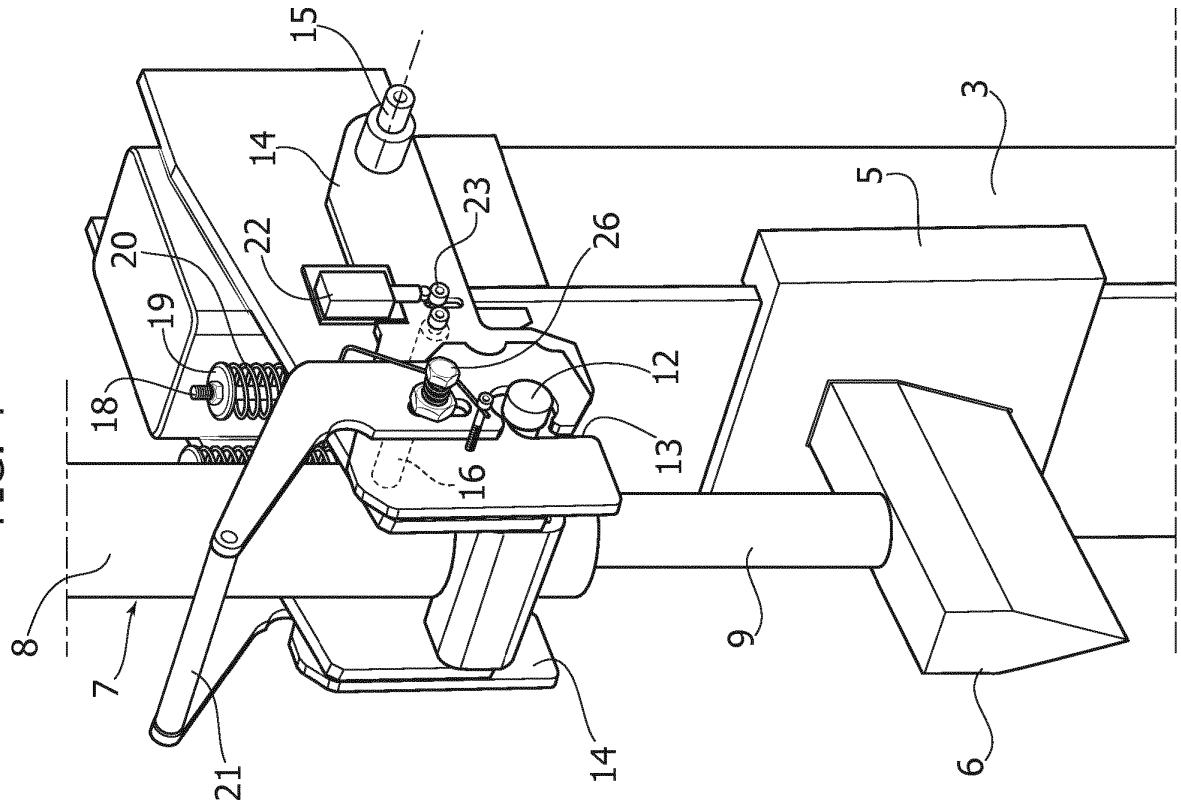


FIG. 3

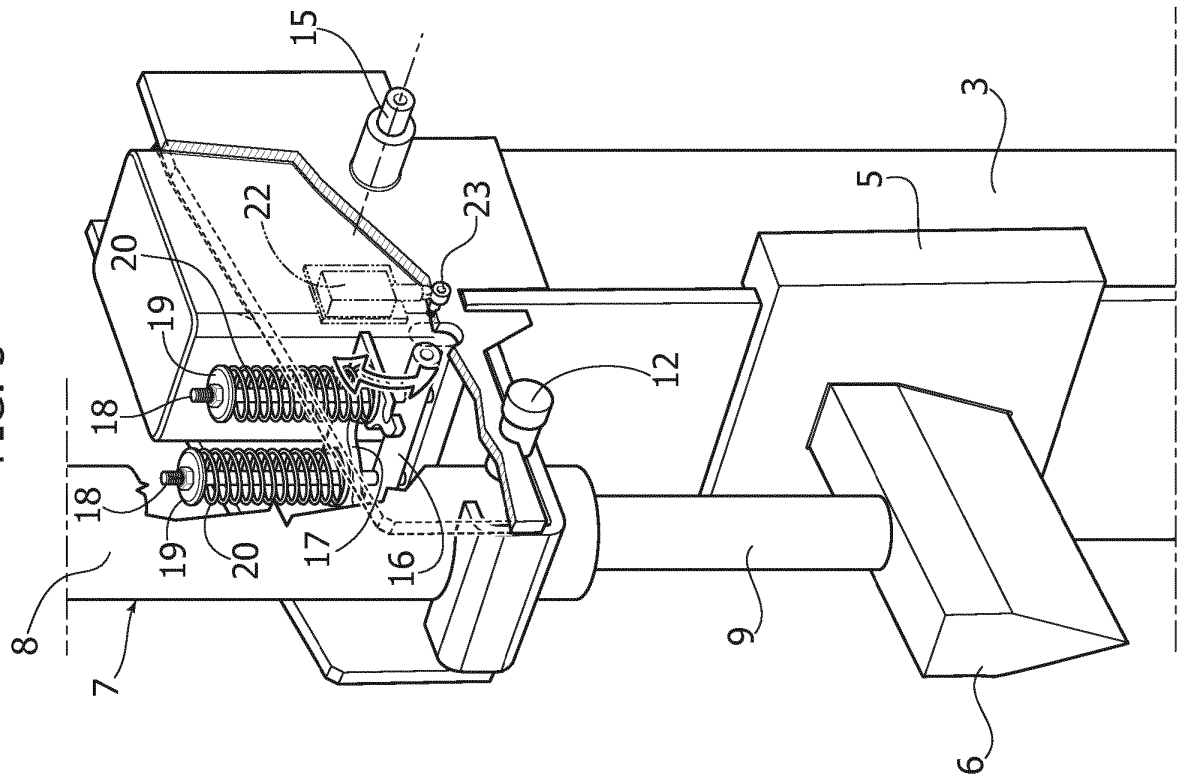
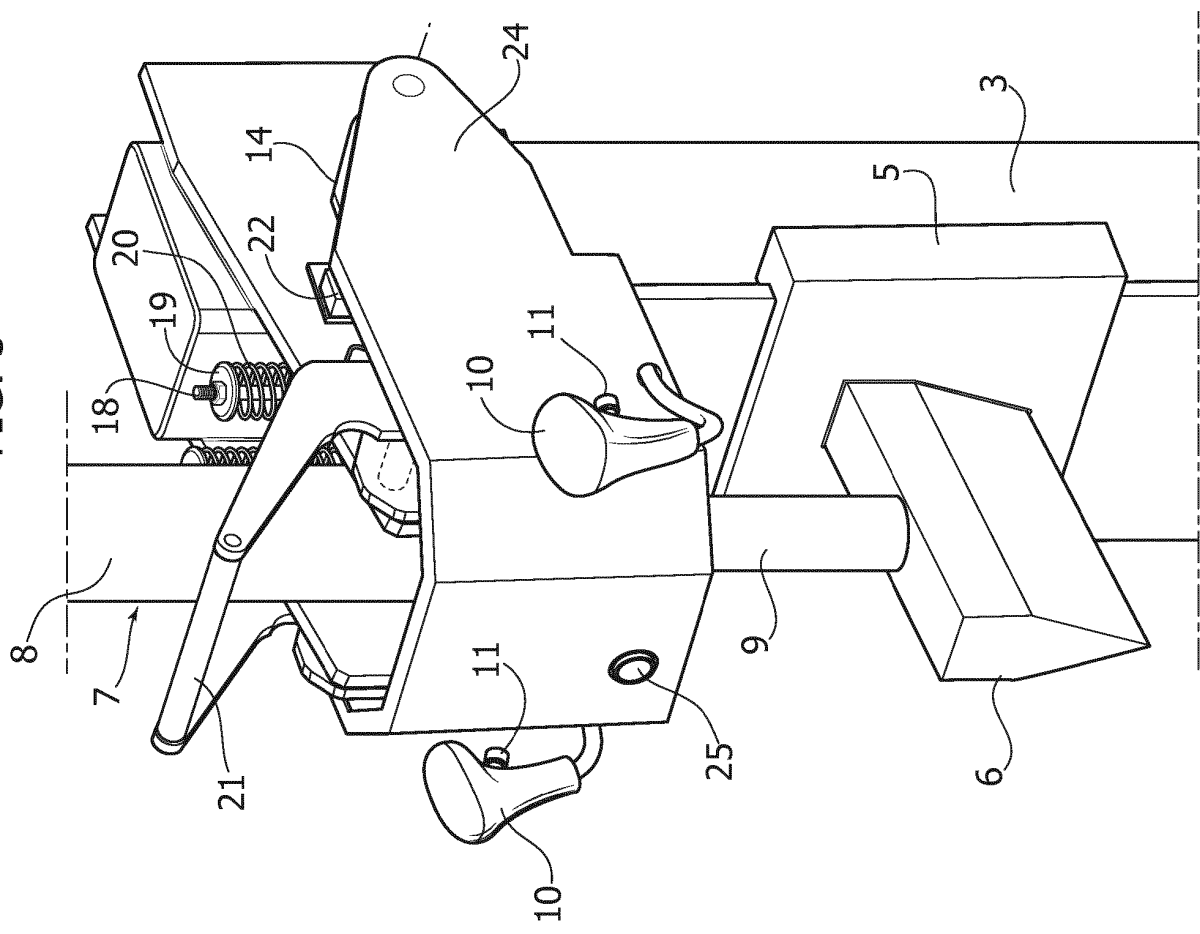


FIG. 5



REFERENCES CITED IN THE DESCRIPTION

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