



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
05.02.2020 Bulletin 2020/06

(51) Int Cl.:
B27L 7/00 (2006.01)

(21) Application number: **19175147.8**

(22) Date of filing: **17.05.2019**

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR**
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

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

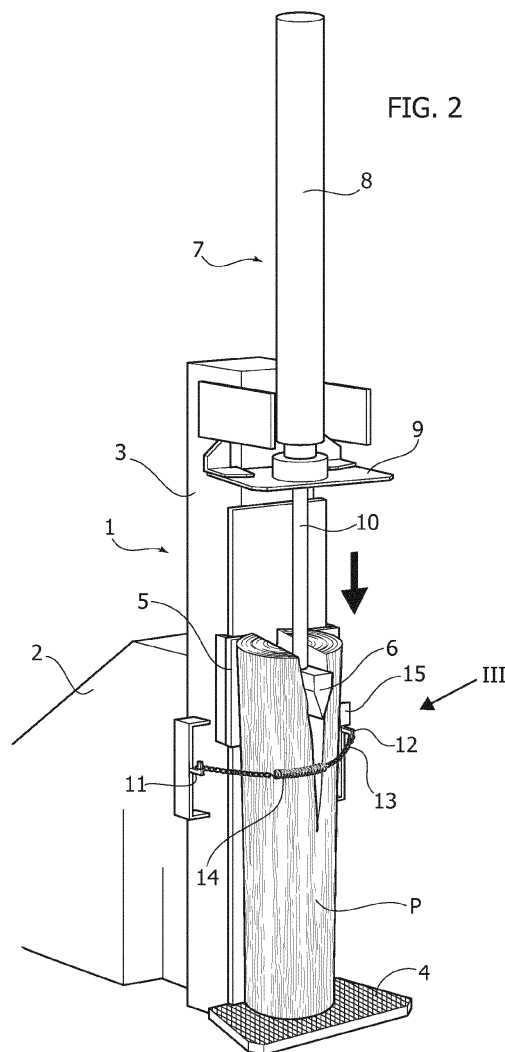
(72) Inventor: **RICCA, Ms. Roberta**
I-12022 Busca (Cuneo) (IT)

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

(30) Priority: **30.07.2018 IT 201800007628**

(54) **WOOD LOG SPLITTING APPARATUS**

(57) A temporary retaining device (13) is suitable to maintain the piece of wood (P) to be split on the support base (4) of the wood log splitting machine in an aligned position with the splitting blade (6) during the displacement of the latter from the receded position towards the resting position on the piece of wood. The retaining device (13) is designed to release the piece of wood (P) during the splitting carried out by said splitting blade (6) and it comprises a flexible and at least partially elastically extensible element.



Description

Field of the invention

[0001] The present invention refers to wood log or stub splitting machines of the type comprising a linear actuator, a splitting blade displaceable by means of the linear actuator between an inoperative retracted position and an advanced splitting position relatively to a base for supporting a piece of wood to be split, a unit for actuating the linear actuator, and means for controlling such actuation unit.

[0002] In the description and in the claims that follow, reference will be made to the case of machines thus made wherein the splitting blade is moveable with respect to the support base: however, it should be observed that the invention also equally applies to the case in which the splitting blade is stationary instead and the support base is displaceable, by means of the linear actuator, between a retracted position and an advanced position relatively to the blade.

State of the prior art

[0003] In wood log or stub splitting machines 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. The pieces of wood to be split are actually normally positioned manually on the support base of the machine, hence it may occur that the fingers or other parts of the body of the operator be accidentally interposed between the piece of wood and the moving blade.

[0004] In order to solve this problem, it was proposed to provide the wood log splitting machine with safety means that require the action of both hands of the operator to perform the operation of splitting the piece of wood by the blade. Hence, there arises the need for a continuous action by both hands of the operator, which are thus compulsorily occupied during the splitting cycle carried out by the blade, with the ensuing impossibility of keeping the piece of wood in the optimal position for the splitting thereof on the support base.

[0005] It is clear that during the actual step of splitting the piece of wood the operator does not need to support the piece of wood given that the action of the wood is sufficient to keep the piece of wood in such splitting position. The critical step, from this point of view, is the one in which the blade progressively approaches the piece of wood up to reaching the actual rest position corresponding to the contact between the splitting blade and an end of the piece of wood to split. In this step, it is important for the piece of wood to maintain the correct splitting position during the approaching of the blade, especially for crooked or curved pieces of wood which rarely have support surfaces which allow the stable balance thereof.

[0006] The German utility model DE 9419074U1 describes a wood log splitting machine with a device for locking the wood log to be split consisting in a blade orthogonal to the wood log to be split. During the positioning of the wood log the blade must be penetrated therein so as to lock it in the splitting position. The blade is provided with an appendage which, during the splitting step, rotates the blade downwards freeing the log. Such solution is complex, expensive and it entails considerable implementation challenges.

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 log splitting machine of the type defined above that does not require the operator to manually hold the piece of wood to be split when approaching the blade to the piece, thus freeing both hands of the operator hence making any other assistance superfluous up to the splitting step.

[0008] According to the invention, this object is obtained thanks to a wood log splitting machine of the type defined in claim 1. In an embodiment, the device for retaining the piece of wood comprises a flexible and at least partially extensible element, for example a chain, any type of rope, an elastic band, removably connected to hooking members arranged on a framework portion of the wood splitting machine.

[0009] In an embodiment, the flexible element is a chain and it is provided with a pair of hooking members mutually arranged in a manner such that the chain can at least partially surround the piece of wood to be split. One of the hooking members is designed to automatically disengage the chain so that it can release the piece of wood when the splitting blade is displaced from the rest position to the advanced splitting position.

[0010] The chain may comprise an elastic portion, for example a helical spring or an elastic band, so as to allow the chain to effectively adhere to pieces of wood of different dimensions, locking them integrally joined in the pre-established position on the support base.

[0011] One of the hooking members may be open towards the support base so as to allow a quick disengagement of the flexible element connected thereto when the appendage, integrally joined to the blade, contacts an end portion of the flexible element during the advancement of the blade from the rest position to the advanced splitting position.

[0012] Generally, the disengagement of the retaining device from the piece of wood to be split occurs in the initial section of the displacement of the splitting blade, between the rest position and the advanced splitting position, for example about 1/3 of the total length of the piece of wood from the support base.

Brief description of the drawings

[0013] Further characteristics of the invention will be apparent from the following detailed description, with reference to the attached drawings, provided by way of non-limiting example, wherein:

- figure 1 is a lateral elevational schematic perspective view of an embodiment of the wood log splitting machine according to the invention wherein the splitting blade is in an inoperative retracted position,
- figure 2 is a view similar to figure 1 wherein the splitting blade is in a partially advanced splitting position,
- figure 3 is an enlarged view of the detail indicated by arrow III of figure 2 during the release of the retaining device from the piece of wood, and
- figure 4 is a view similar to figures 1 and 2 wherein the splitting blade is in a final lowered position,

Detailed description of the invention

[0014] Initially referring to figure 1, the wood log splitting machine according to the invention essentially comprises a support structure generally indicated with 1, consisting of a body 2, a vertical upright 3 and a horizontal base 4 for supporting the piece of wood P which is to be split progressively.

[0015] Vertically slidable along the upright 3 - in a guided fashion - is a slider-like support 5 laterally provided with a projecting appendage 15 and bearing - in a cantilevered fashion - a splitting blade 6 displaceable between a raised position, represented in figure 1, and a final lowered position of the piece of wood P, represented in figure 4, by means of a linear actuator 7 consisting of a hydraulic jack. The cylinder 8 of the hydraulic jack 7 is fixed to a support 9 carried by the upright 3, while the lower end of the stem 10 thereof is connected to the splitting blade 6.

[0016] The upright 3 further bears an electrical-hydraulic unit for actuating the hydraulic jack 7 with the relative control means, not represented in that known to a man skilled in the art, for displacing the blade 6 from a raised or retracted position to an advanced or lowered position and vice versa. The control means include, so as to comply with the regulatory safety specifications set forth for such wood log splitting machines, safety means for example consisting of a pair of levers or buttons that require the action of both hands of the operator to carry out the operation for splitting the piece of wood P.

[0017] As observable in figures 1 and 2, vertically arranged on the support base 4 is a piece of wood P to be split, in a position aligned with the splitting blade 6.

[0018] Arranged on the front lateral edges of the upright 3 are two hooking members consisting - in this preferred embodiment - in a hook 11 for example open at the top and in a hook 12 open at the bottom 12, positioned at about 1/3 of the length of the piece of wood P with respect to the support base 4. Such position can also be adjusted vertically.

[0019] A chain or rope 13 can be engaged in the hooks 11 or 12 so as to partially surround the piece of wood to be split P. A spring 14 provided in a median portion of the chain 13 provides a tension that is necessary and sufficient to firmly and temporarily lock the piece of wood P in the splitting position as illustrated in figure 1. The spring 14 can be replaced by an elastically extensible band or the like.

[0020] The wood log splitting machine according to the invention operates as follows.

[0021] Let us assume starting from an initial condition of figure 1, in which the splitting blade 6 is in a retracted or raised position above the support base 4. The operator can load a piece of wood P to be split on the support base 4, by positioning it and aligning it with respect to the blade 6. At this point the operator inserts an end of the chain 13 in the left hook 11, in the direction of the arrow represented in figure 1. The operator subsequently extends the chain 13 up to inserting the other end thereof into the right hook 12 open at the bottom, in the direction of the relative arrow represented in figure 1, integrally locking the piece of wood P in the correct splitting position.

[0022] Thus, the operator commands the start of the splitting cycle having both hands free to actuate the control means of the hydraulic jack 7 without having to be concerned with holding the piece of wood P in the splitting position.

[0023] Thus, the blade 6 descends up to resting on the piece of wood P to be split.

[0024] Starting from this position, the downward displacement of the blade 6 starts the step of splitting the piece P. When the appendage 15, integrally joined to the blade 6 by means of the support 5, meets the corresponding end of the chain 13, at about 1/3 of the length of the piece of wood P, a further advancement of the blade, represented by the left arrow of figure 3, causes the automatic disengagement of the end of the chain 13 from the hook 12, pushing it in the direction of the right arrow of figure 3.

[0025] Figure 4 shows the splitting blade in the final lowered position thereof with the chain 13 which remained hanged to the hook 11, ready for the subsequent use thereof.

[0026] When the chain 13 releases the piece of wood P, the stability of the piece on the support base 4 is guaranteed by the opposition against the blade 6 from above which terminates the splitting operation reaching the final lowered position of figure 4.

[0027] At this point, after returning the blade 6 to the initial raised position of figure 1, the operator can remove the split pieces of wood log and insert a new one to be split thereinto locking it by means of the chain 13 hanged to the hook 11 as described previously.

[0028] 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, a flexible and at least partially extensible element such as band or rope provided with an elastic portion and with end eyelets suitable to be inserted into at least one releasable hooking member provided on the wood log splitting machine can be provided instead of the chain 13.

[0029] Though the following invention has been described and illustrated concerning a vertical wood log splitting machine, it can also be applied in horizontal wood log splitting machines.

Claims

1. Wood log or stub splitting machine comprising a linear actuator (7) having a splitting blade (6) displaceable between an inoperative retracted position and an advanced splitting position relatively to a base (4) for supporting a piece of wood (P) to be split, a unit for actuating the linear actuator (7), means for controlling said actuation unit to displace said splitting blade (6) from said retracted position to said advanced position and vice versa, said control means including safety means requiring the action of both operator's hands to perform the splitting operation, wherein said actuation unit is susceptible to be rendered operational by means of said control means, in order to initially move said splitting blade (6) from the retracted position to a rest position corresponding to the contact between the splitting blade (6) and an end of the piece of wood (P) to be split, said wood log splitting machine being provided with a temporary retaining device (13) suitable to maintain said piece of wood (P) to be split on said support base (4) in a position aligned with the splitting blade (6) during the displacement of said splitting blade (6) from the retracted position towards the rest position and arranged to release the piece of wood (P) during the splitting carried out by said splitting blade (6) **characterised in that** said retaining device comprises a flexible element (13) at least partly removably connected to hooking members (11,12) arranged on said wood log splitting machine, said hooking members (11, 12) being mutually arranged so that said flexible element (13) at least partly surrounds the piece of wood (P) to be split.
2. Wood log splitting machine according to claim 1, **characterised in that** said retaining device (13) comprises an at least partially elastically extensible element (14).
3. Wood log splitting machine according to claims 1 or 2, **characterised in that** said retaining device (13) comprises a chain and at least one of said hooking members (11, 12) being designed so as to automatically disengage said chain (13) when the splitting blade (6) is displaced from said rest position to said

advanced splitting position.

4. Wood log splitting machine according to claim 3, **characterised in that** said chain (13) comprises an elastic portion, for example a helical spring (14) or an elastically extensible band.
5. Wood log splitting machine according to any one of the preceding claims, **characterised in that** at least one of said hooking members (11, 12) is open towards said support base (4).
6. Wood log splitting machine according to any one of the preceding claims, **characterised in that** the disengagement of said retaining device (13) from the piece of wood (P) to be split occurs by means of the thrust of an appendage (15) movable together with the splitting blade (6) against a portion of said retaining device (13) when said blade (6) advances from said rest position towards said advanced splitting position.
7. Wood log splitting machine according to any one of the preceding claims, **characterised in that** the disengagement of said retaining device (13) from the piece of wood (P) to be split occurs in the initial section of the displacement of said splitting blade (6) from the rest position to the advanced splitting position.
8. Wood log splitting machine according to claims 1, 2 and 5 to 7, **characterised in that** said flexible element is any type of rope.

FIG. 1

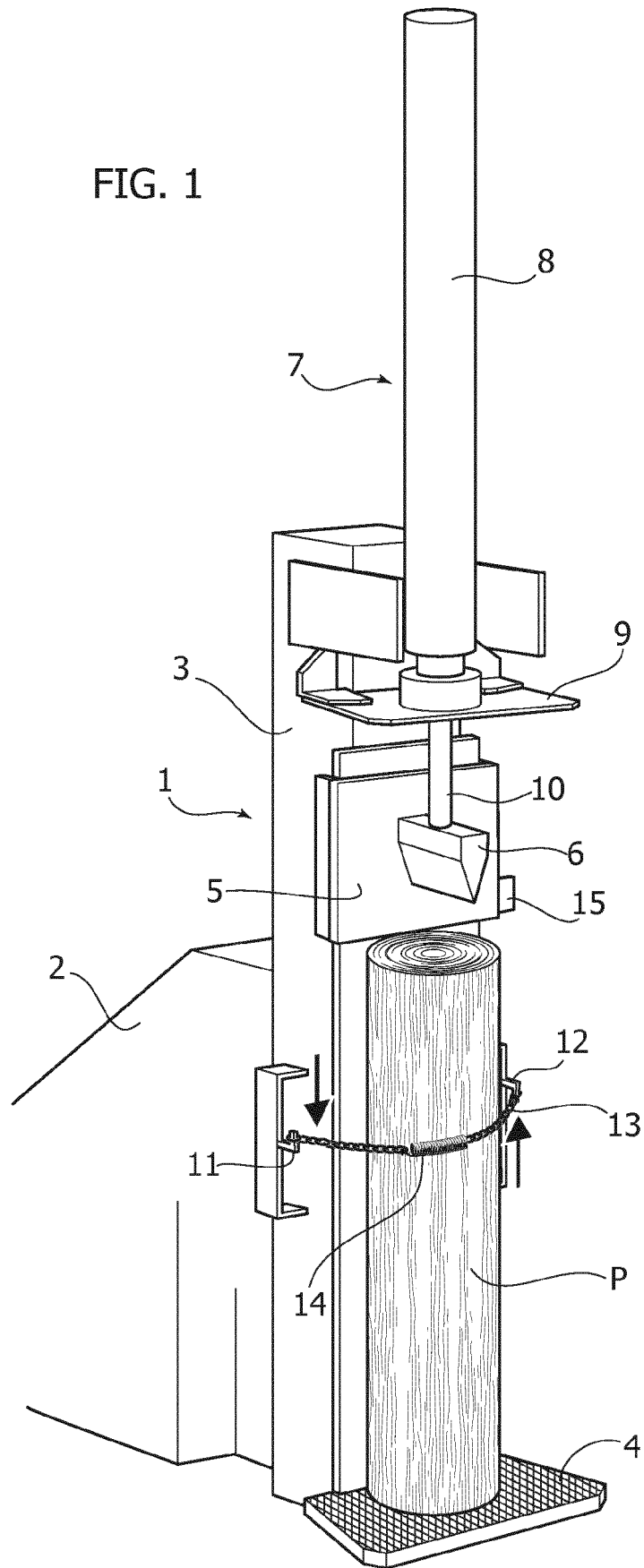


FIG. 2

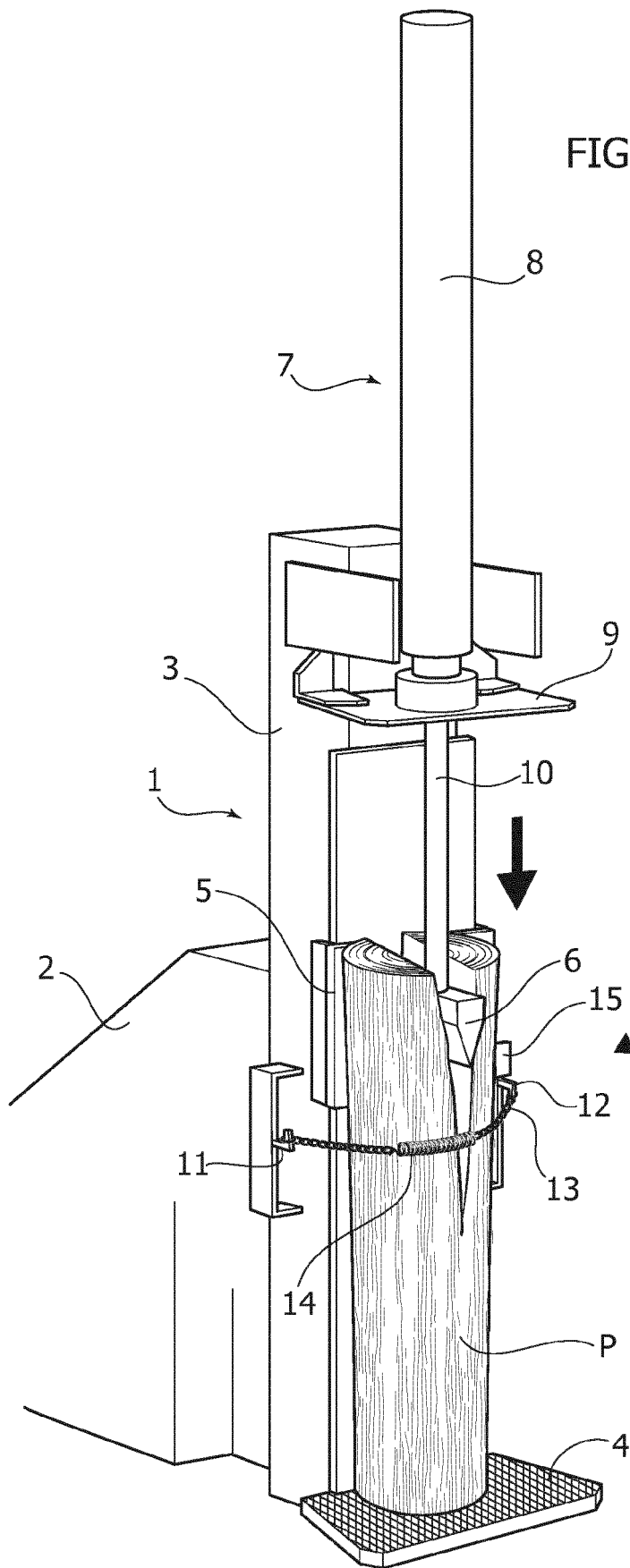


FIG. 3

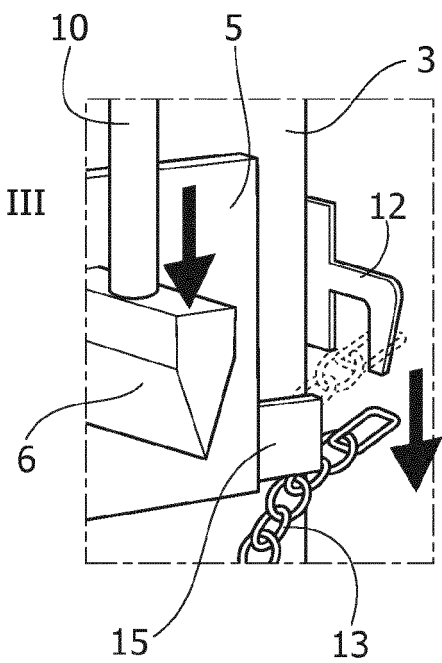
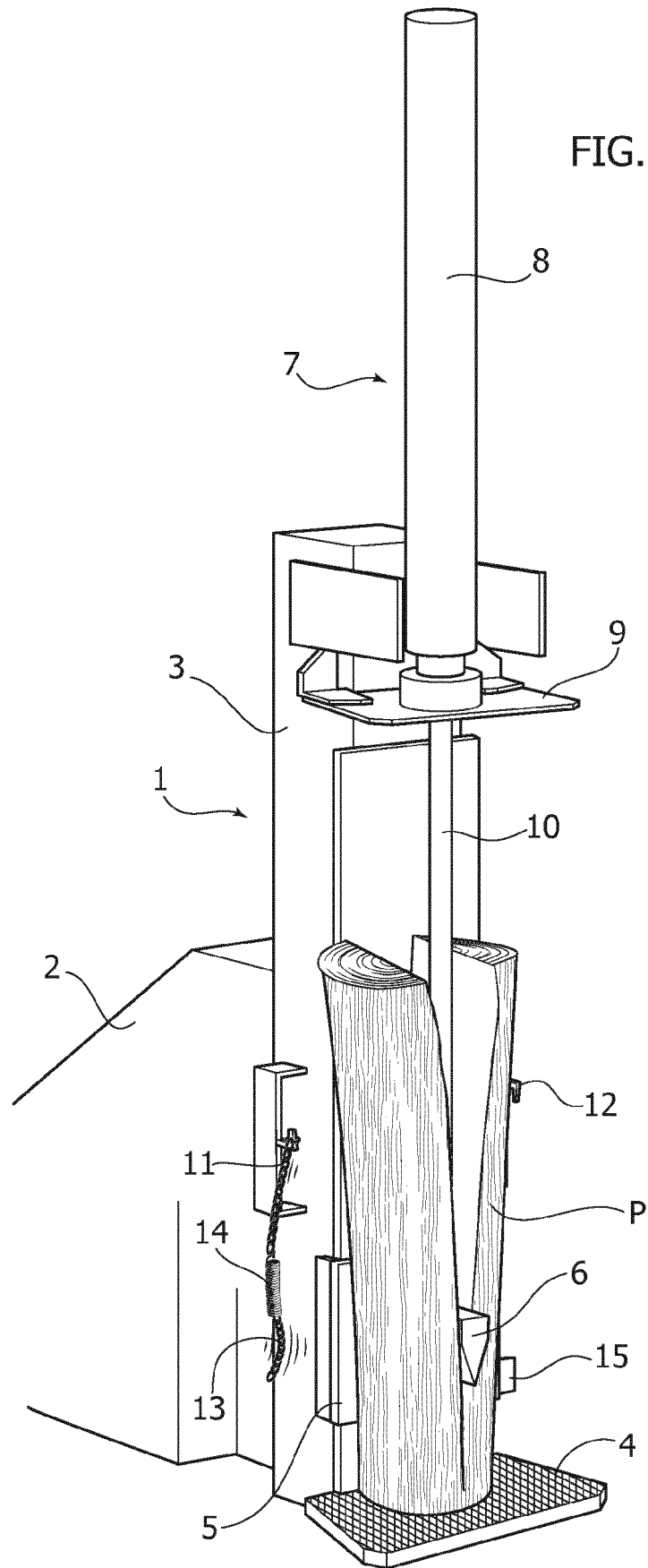


FIG. 4





EUROPEAN SEARCH REPORT

Application Number
EP 19 17 5147

5

10

15

20

25

30

35

40

45

50

55

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A,D	DE 94 19 074 U1 (BINDERBERGER KARL [AT]) 26 January 1995 (1995-01-26) * page 5, line 19 - page 6, line 13; figure 2 *	1	INV. B27L7/00
A	DE 10 2012 017993 A1 (DIER GEORG [DE]) 13 March 2014 (2014-03-13) * claim 1; figures *	1	
A	US 1 307 714 A (SLYKE LELAND M VAN [US]) 24 June 1919 (1919-06-24) * page 2, line 54 - line 81 * * figures 1-3 *	1	
A	DE 20 2016 106089 U1 (BELL SRL [IT]) 15 November 2016 (2016-11-15) * paragraph [0006] * * paragraph [0027] - paragraph [0032] * * figures *	1	
A	FR 2 845 027 A1 (RABAUD SA [FR]) 2 April 2004 (2004-04-02) * figures 1-3 *	1	TECHNICAL FIELDS SEARCHED (IPC)
A	DE 20 2012 005222 U1 (FALLER ALEXANDER MICHAEL [DE]) 24 July 2012 (2012-07-24) * paragraph [0014] - paragraph [0015] * * figure 2 *	1	B27L
A	DE 10 2006 001190 A1 (KOPPOLD JOHANN [DE]) 12 July 2007 (2007-07-12) * claim 1; figures *	1	
A	DE 296 01 139 U1 (KNABL STEFAN ING [AT]) 7 March 1996 (1996-03-07) * figures *	1	
		-/--	
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 21 October 2019	Examiner Huggins, Jonathan
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			

EPO FORM 1503 03/82 (P04C01)



EUROPEAN SEARCH REPORT

Application Number
EP 19 17 5147

5

10

15

20

25

30

35

40

45

50

55

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	DE 200 19 857 U1 (KAESBERGER FRANZ [DE]) 7 June 2001 (2001-06-07) * figure 1 * -----	1	
			TECHNICAL FIELDS SEARCHED (IPC)
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 21 October 2019	Examiner Huggins, Jonathan
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 19 17 5147

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

21-10-2019

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 9419074 U1	26-01-1995	NONE	
DE 102012017993 A1	13-03-2014	NONE	
US 1307714 A	24-06-1919	NONE	
DE 202016106089 U1	15-11-2016	DE 202016106089 U1 IT UB201586610 U1	15-11-2016 06-05-2017
FR 2845027 A1	02-04-2004	NONE	
DE 202012005222 U1	24-07-2012	NONE	
DE 102006001190 A1	12-07-2007	NONE	
DE 29601139 U1	07-03-1996	AT 402037 B DE 29601139 U1	27-01-1997 07-03-1996
DE 20019857 U1	07-06-2001	NONE	

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- DE 9419074 U1 [0006]