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(71) Applicant: Zoso, Roberto
Via Bertoli 7
I-36070 Nogarole Vicentino (Vicenza)(IT)

(72) Inventor: Zoso, Roberto
Via Bertoli 7
I-36070 Nogarole Vicentino (Vicenza)(IT)

(74) Representative: Modiano, Guido et al
MODIANO, JOSIF, PISANTY & STAUB
Modiano & Associati Via Meravigli, 16
I-20123 Milan(IT)

(54) Cutting apparatus.

(57) The cutting apparatus comprises a frame (101) with an inclined-plane rest support (102) for a log (116) to be cut. A support (104) adapted to be rigidly coupled to a chainsaw (105) is pivoted to the frame (101). The support (105) bearing the chainsaw is movable downwardly against the biasing action of a spring (126) by means of a pedal (123) and/or a handle and is simultaneously actuated by means of a mechanism (129-131) associated with the chainsaw accelerator (132), thereby causing the blade (114) of the chainsaw (105) to interact with a workpiece (116) to be cut. When the workpiece (116) is cut, raising of the saw (105) is facilitated by the spring (126) and the chainsaw accelerator (132) is automatically deactivated.

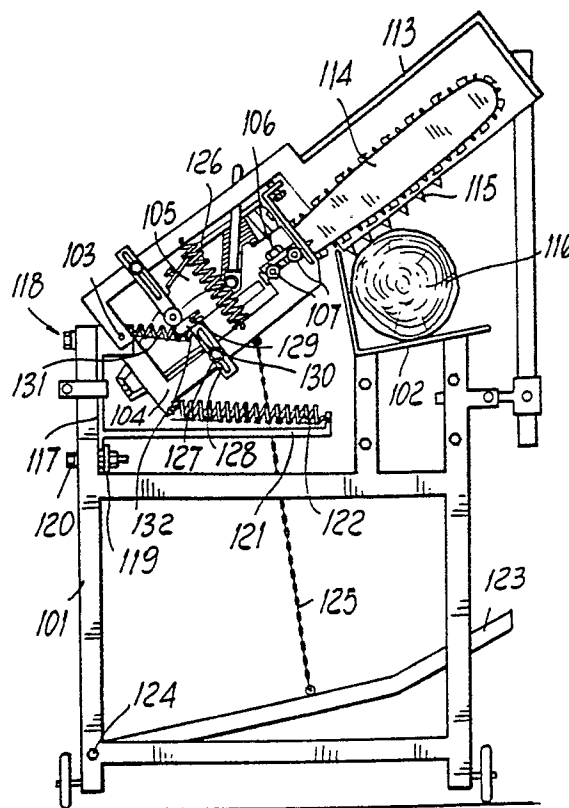


Fig. 7

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CUTTING APPARATUS

The present invention relates to a cutting apparatus particularly usable for wood bundles, tree trunks or logs, metal elements such as pipes, plates, profiled elements, slab-like elements etc.

Portable chainsaws are currently used to cut tree trunks or logs; such chainsaws comprise a box like body which is fitted with grip means, contains actuation means and has a cutting blade which extends from said body.

Such chainsaws are characterized by considerable discomfort in use, especially for cutting logs resting on the ground.

It is furthermore known that the log cutting operation generally requires two people, one for cutting and one for securing the log during the operation.

Due to their intrinsic constitution, said known types of chainsaws furthermore do not allow the repeatability and automation of the cutting operation, so that their use necessarily entails a considerable waste of time.

Bench-mounted circular saws or bench-mounted band saws are furthermore known which allow a certain increase in the speed of the cutting operation, but they are affected by the disadvantage that they are heavy and bulky and can be installed only inside carpenter's shops or workshops and cannot therefore be moved, for example, to a wood-shed.

The aim of the present invention is to solve the disadvantages described above in the known art by providing a cutting apparatus on which any kind of known portable chainsaw can be coupled, said apparatus allowing comfort in operation for its operator and providing a certain repeatability in its operations, with consequent time saving.

Within the scope of the above described aim, an important object is to provide an apparatus which requires only one person for the cutting operations.

Another important object is to provide a cutting apparatus the use whereof eliminates the danger due to breakages of the cutting elements which normally occur when portable chainsaws are used on the ground.

Still another object is to provide an apparatus which is suitable for cutting wood, metal pipes or profiled elements and slab materials.

Yet another object is to provide an apparatus which reduces the consumption of the fuel used to operate the chainsaw.

A further object is to provide an apparatus which is safe for the operator in use.

Not least object is to provide a cutting apparatus executable at low cost with easily commercially

available elements.

This aim, these objects and others which will become apparent hereinafter are achieved by a cutting apparatus, characterized in that it comprises a frame having inclined-plane resting means for the element to be cut, a support adapted to be rigidly coupled with a chainsaw and being pivoted to said frame, actuating means for causing movement of said support, thereby causing the chainsaw blade to interact with an element to be cut.

Further characteristics and advantages of the invention will become apparent from the detailed description of some preferred embodiments thereof, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

figure 1 is a side view of a first embodiment of the apparatus according to the invention, shown at rest;

figure 2 is a rear perspective view of the apparatus of figure 1;

figure 3 is a schematic front view of the apparatus of figure 1;

figure 4 is a schematic side view of the apparatus of figure 1;

figures 5 and 6 are views of the apparatus of figure 1 during cutting;

figure 7 is a side view of a further embodiment of the apparatus according to the invention, shown at rest;

figure 8 is a view of the apparatus of figure 7 during cutting;

figures 9-11 are views of details comprised in the apparatus of figure 7.

With reference to the above described figures 1 to 6, the apparatus according to the invention comprises, in a first embodiment, a frame 1 composed of rod-like metal elements welded to one another to form a substantially parallelepipedal bench-like structure.

A rest support 2, for example for a log to be cut 3, is arranged above said frame 1 in a forward longitudinal position and has an L-shaped cross section which is slightly inclined with respect to a horizontal plane and is preferably obtained from folded sheet metal with panels made of wood or other suitable material rigidly upwardly coupled to said support.

A support 5 for a known type of chainsaw 6 is pivoted to a pin 4 in a rearward longitudinal position above said frame 1; said chainsaw can be fixed to said support with its motor body 7 by means of known couplings, so that the cutting blade 8 can oscillate on a vertical plane transversely to said support 2 without interfering there-

with by virtue of a gap in the resting table of the log 3.

An element 9, composed of mutually welded rod-like portions, is also pivoted to said pin 4 and extends above said support 5 up to the front part of said frame 1; said element supports a protection lamina 10 parallel to said cutting tool 8 in a closely adjacent position.

A grip handle 12 is pivoted to the element 9 above said lamina 10 by means of a pin 11 and extends on the opposite side of said lamina 10 with respect to the cutting tool 8; a stop element 13 for the log 3 to be cut is downwardly rigidly coupled to said handle 12.

A lever element 15 is pivoted to a pin 14 in a downward longitudinal position at the rear portion of said frame 1, extends up to the front portion of said frame 1 and ends with an actuation pedal 16.

Said lever element 15 is rigidly associated, in a middle position, with the lower ends of a vertical traction spring 17 which has its upper end rigidly associated with said frame 1 and is adapted to ensure an elastic return of the lever 15 after a pressure has been exerted on the pedal 16 with the foot.

Said actuation pedal 16 is rigidly coupled to said support 5, and the ends of a rod-like connecting element 18 are hinged therebetween so that a downward oscillation of the lever element 15 correspondingly lowers the support 5.

A lever system 19 is rigidly coupled in a middle position of said support 5 on the side corresponding to the region of the accelerator of the chainsaw 6, and its fulcrum 20 coincides with the rotational fulcrum of said accelerator; said lever system co-operates with an element 21 rigidly coupled to the rod-like element 9 so that the motor of the chainsaw 6 accelerates when the pedal 16 is lowered.

A cable 22 is rigidly circumferentially associated with said pin 11 and is slidable inside a sheath 23; said cable is connected to a retractable pin 24 for securing said pedal 16, and the lowering of said grip handle 12 pulls the cable and therefore disengages the pin 24 of the pedal 16.

A counterweight 25 rigidly associated with the support 5 and adapted to facilitate manual movements may be provided.

It is also possible to downwardly provide the frame with wheels so as to facilitate its transport.

The operation of the above described first embodiment of the apparatus according to the invention comprises the loading of the log 3 on the support 2 after starting the chainsaw and the gripping of the handle 12 with both hands, pressing on the log 3 with the stop element 13.

The rotation of the handle 12 around the pivot 11 disengages retractable pin 24 from the pedal

16, which lowers the support 5 and simultaneously accelerates the motor of the chainsaw 6.

As the pressure on the pedal continues, the operator, indicated by the reference numeral 26 in figures 5 and 6, moves the cutting blade 8 to interact with the log 3 and cut it.

With reference to the previously mentioned figures 7 to 11, the apparatus according to the invention comprises, in a further embodiment thereof, a frame now indicated by the reference numeral 101, above which a support 102 for resting the logs to be cut is arranged in a frontward longitudinal position.

A support 104 for fixing a chainsaw 105 is furthermore pivoted to a pin 103 above the frame 101 in a rearward longitudinal position; said chainsaw is fixed by means of a quick coupling bracket system generally indicated by 106.

As illustrated in figure 11, the quick coupling bracket system 106 comprises a pair of hexagonal nuts 107 screwed on two complementarily threaded pivots 108 which protrude in a parallel manner from the chainsaw 105 in a horizontal arrangement.

Said hexagonal nuts 107 have, in their middle region, a machined cylindrical shape 109 enclosed between an upper bracket 110 and a lower bracket 111 rigidly associated with the support 104; the upper bracket and the lower bracket are mutually coupled by a fixing screw 112.

A housing 113 is upwardly fixed to said articulation pivot 103 independently from said chainsaw 105 and houses the blade 114 of the chainsaw, leaving only its lower portion free; said housing has a lower set of teeth 115 adapted to lock the element to be cut, now indicated by the reference numeral 116, spacing the blade 114 by such a distance as to allow the startup of the motor of the chainsaw 105 so that it reaches its normal rpm when cutting starts.

Said pin 103 is pivoted on a bracket 117 which is in turn rotatably associated with said frame 101 by means of another hinge pin 118 which is arranged orthogonally to said pivot 103 and allows to rotate the chainsaw 105 for refuelling.

A bracket 119 with a locking screw 120 normally keeps said bracket 117 in its working position.

As can be seen from the drawing figures, a tab 121 extends substantially horizontally from the bracket 117, and a spring 122 is rigidly coupled between the end of said tab and said support 104; said spring is adapted to hinder the clockwise rotation of said support, actuated by a lever pedal 123 downwardly pivoted to the frame 101 by means of a pin 124, and said pedal 123 is connected to the support 104 by means of a chain 125 or by means of a rod.

Another spring 126 is fixed between said sup-

port 104 and said housing 113 and keeps them substantially parallel until the blade interacts with the element to be cut.

As can be seen in the figures, a support member 128 extends orthogonally from said support 104 and is fixed thereto by a screw 127; a pivot 129 is articulated at the upper end of said support member 128, and said pivot supports a bracket 130 on one side and, on the other side, the end of a spring 131 fixed on the bracket 119 proximate to the pin 103.

The rotation of the bracket 130 exerts a pressure on the accelerator 132 of the chainsaw 105.

Another support member 133 extends orthogonally from said housing 113 and is rigidly coupled therewith by means of a screw 134; said support member is adapted to stop the rotation of said bracket 130 in the direction of deceleration at the required intensity of the tension of the spring 131.

The operation of this second embodiment of the apparatus according to the invention is similar to the preceding one, as it is sufficient to place the piece to be cut on the support 102 and to lower the support 104 and the associated chainsaw 105 by means of the pedal 123.

Once the piece has been locked by the housing 113, the pressure on the pedal 123 is continued, accelerating the chainsaw and simultaneously lowering it to cut.

The apparatus returns to its original position by releasing the pedal.

From what has been described it is therefore evident that the invention fully achieves the intended aim and objects, a cutting apparatus having been provided which requires a single operator, working in an upright position and in extremely comfortable conditions, for its use.

The apparatus allows an adequate repeatability of the cutting operation so as to reduce work times.

The apparatus according to the invention is suitable in both illustrated embodiments for any kind of chainsaw currently commercially available, whether electric or mixed-fuel powered.

It is furthermore manufactured with elements easily commercially available at a low price.

The invention thus conceived is susceptible to numerous modifications and variations, all of which are within the scope of the inventive concept.

All the details may furthermore be replaced with other technically equivalent elements.

In practice, any materials and dimensions may be employed according to requirements.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have

any limiting effect on the scope of each element identified by way of example by such reference signs.

Claims

1. Cutting apparatus, characterized in that it comprises a frame having inclined-plane resting means for the element to be cut, a support adapted to be rigidly coupled to a chainsaw and being pivoted to said frame, the motion of said chainsaw, actuation means for causing movement of said support, thereby causing the blade to interact with an element to be cut.

2. Apparatus according to claim 1, characterized in that said frame is composed of preferably metallic elements welded to one another to provide a substantially parallelepipedal structure in the shape of a bench, a substantially L-shaped resting support for an element to be cut being arranged above said frame in a frontward longitudinal position.

3. Apparatus according to one or more of the preceding claims, characterized in that said support is adapted to be rigidly coupled to a chainsaw and is pivoted to a pin arranged in a rear longitudinal region of said frame, said chainsaw being fixable to said support by means of couplings so that the blade can oscillate on a transverse vertical plane.

4. Apparatus according to one or more of the preceding claims, characterized in that said pin for said chainsaw support can be rigidly coupled to a bracket which is in turn pivoted to said frame by means of a further pin orthogonal to the previous one.

5. Apparatus according to one or more of the preceding claims, characterized in that an element composed of mutually welded rod-like portions is pivoted to said pin for said chainsaw support and extends above said support up to the front portion of said frame, said element bearing a protection housing, which encloses said blade except for its lower portion, or a parallel protection lamina.

6. Apparatus according to one or more of the preceding claims, characterized in that a grip handle can be pivoted, by means of a pivot, to said element supporting said housing or said protection lamina.

7. Cutting apparatus according to one or more of the preceding claims, characterized in that said housing has a lower set of teeth adapted to lock the element to be cut on its support and to space the blade by a distance suitable to allow, during the oscillating motion of the chainsaw, the actuation of the motor so that it reaches its normal rpm rate when cutting begins.

8. Apparatus according to one or more of the preceding claims, characterized in that a lever element is pivoted to a pin at the rear portion of said frame in a downward longitudinal position, said lever element extending up to the front portion of said frame and ending with said actuation pedal. 5

9. Apparatus according to one or more of the preceding claims, characterized in that said pedal is rigidly coupled to said chainsaw support, the ends of an element being pivoted therebetween. 10

10. Apparatus according to one or more of the preceding claims, characterized in that a lever system is coupled in a middle position of said chainsaw support on the side corresponding to the accelerator region and is connected to said pedal or to said housing so that acceleration is achieved by pressing with the foot or by rotating said chainsaw support. 15

11. Apparatus according to one or more of the preceding claims, characterized in that said handle can be articulated to a pin, a cable being rigidly coupled to said pivot and being slidable inside a sheath and connected to said pedal by means of a retractable locking element, said pedal being therefore lowerable only after rotating said handle. 20 25

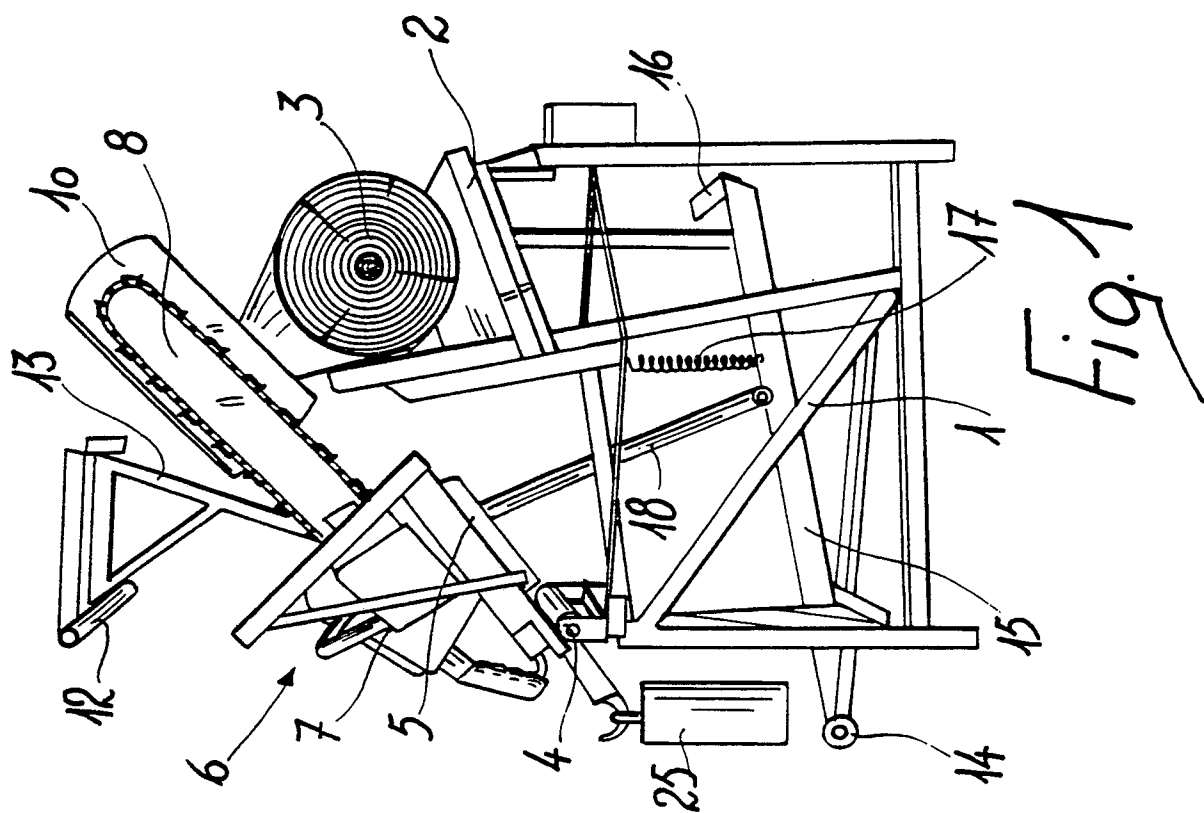
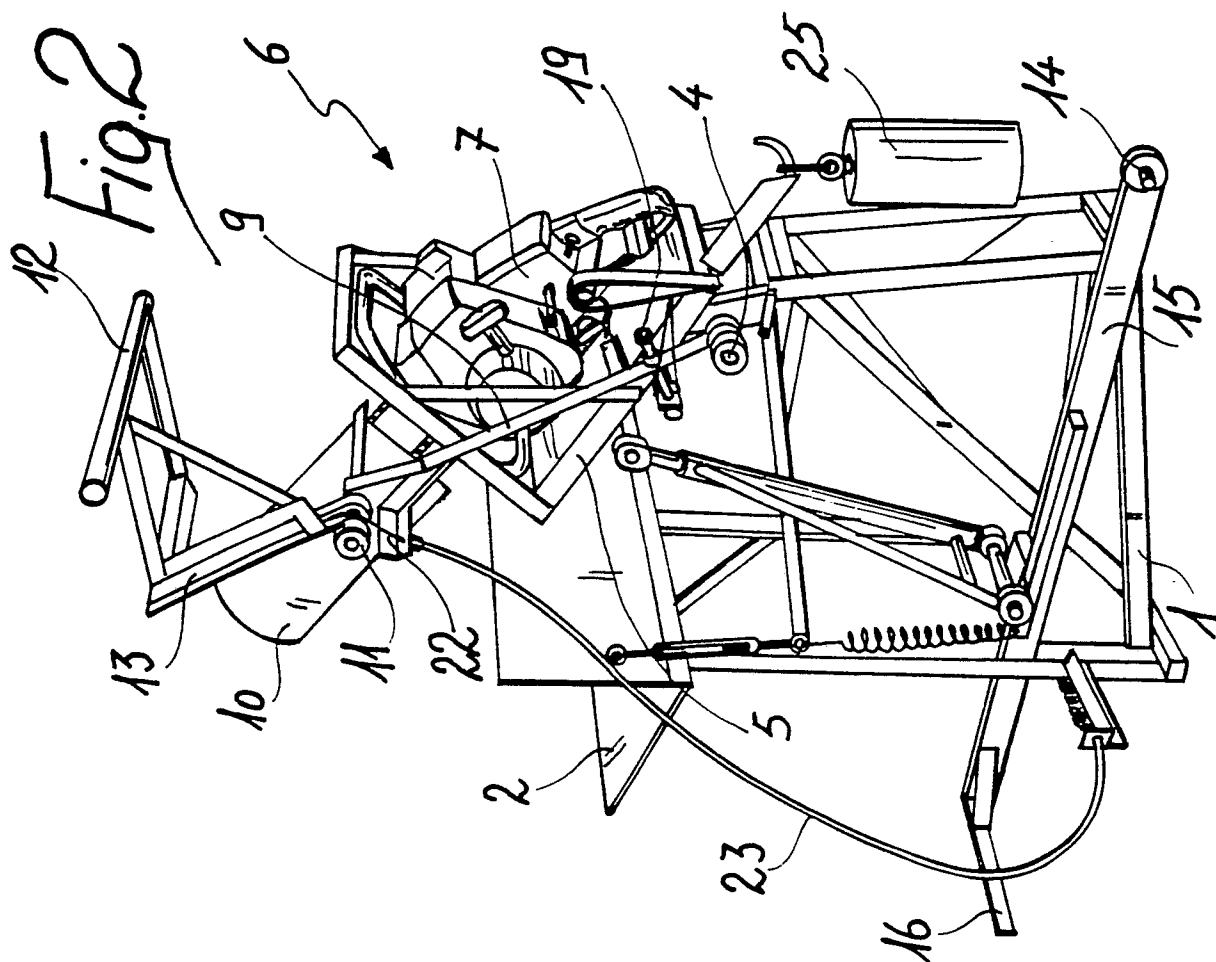
12. Apparatus according to one or more of the preceding claims, characterized in that said chainsaw support and said housing are independently coupled to a same axis of rotation and are associated by a traction spring which normally keeps them in a parallel arrangement, the downward rotation of the chainsaw support being prevented by another spring acting against the action of said pedal. 30

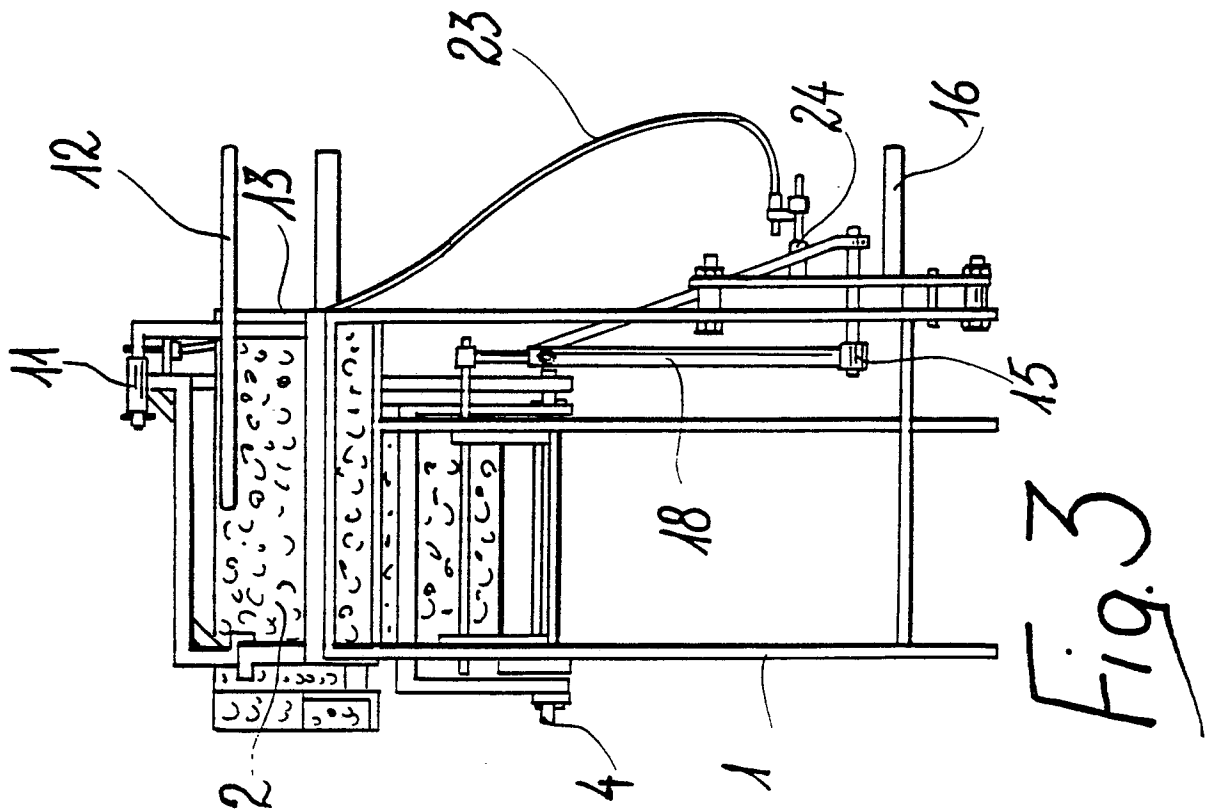
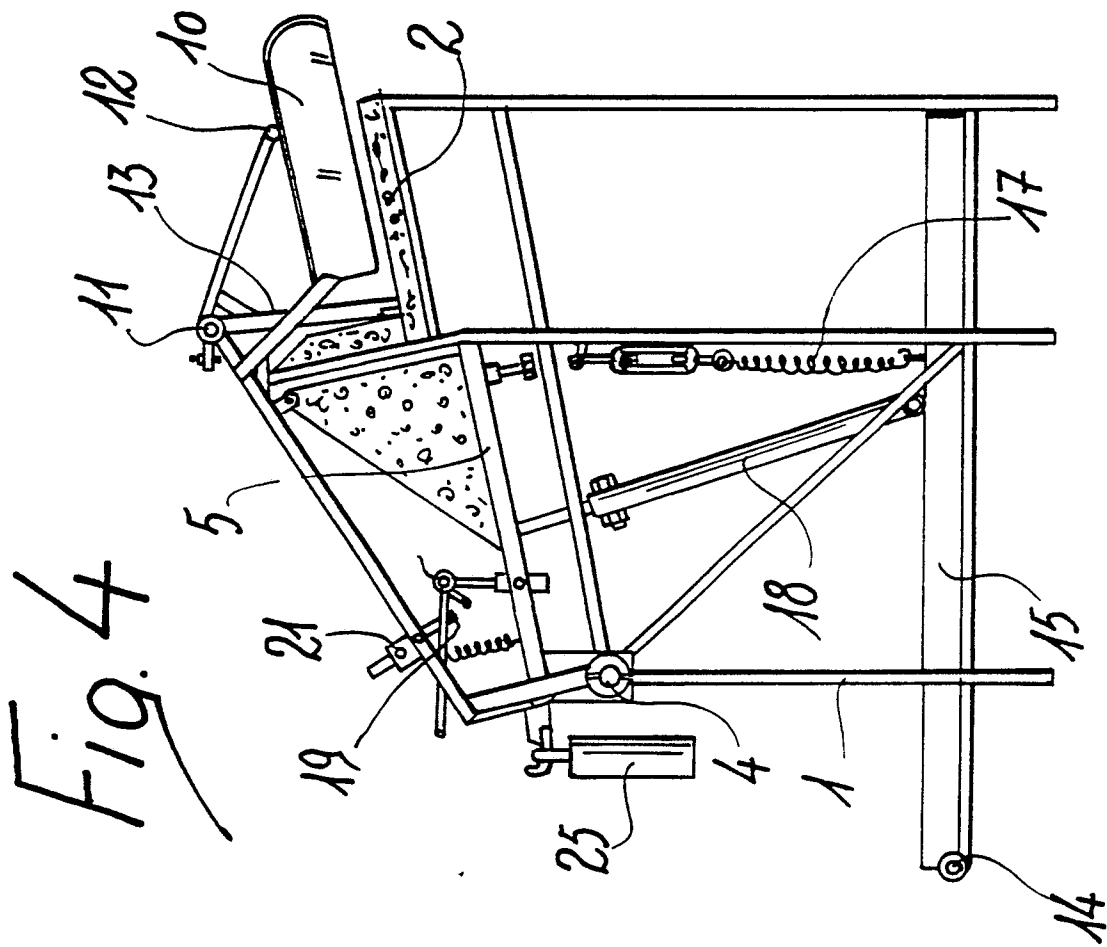
13. Apparatus according to one or more of the preceding claims, characterized in that said chainsaw is locked on its support by means of a quick coupling composed of a pair of hexagonal nuts screwed on two parallel horizontal pins which extend from the chainsaw, said nuts having, in their middle region, a machined cylindrical shape enclosed between a lower bracket rigidly associated with said support and an upper coupling bracket, said ledge and said bracket being mutually fixed by a screw which traverses them. 35 40 45

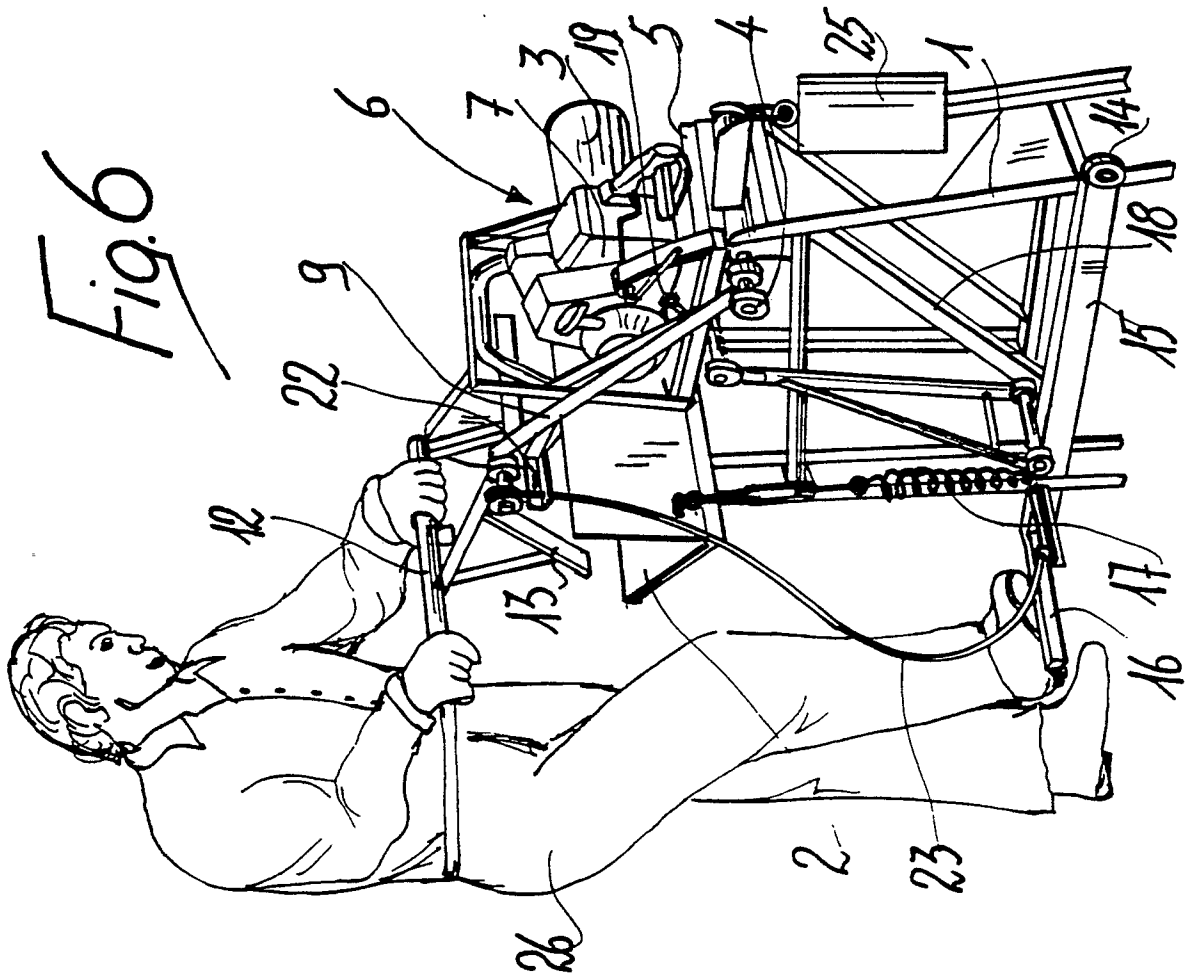
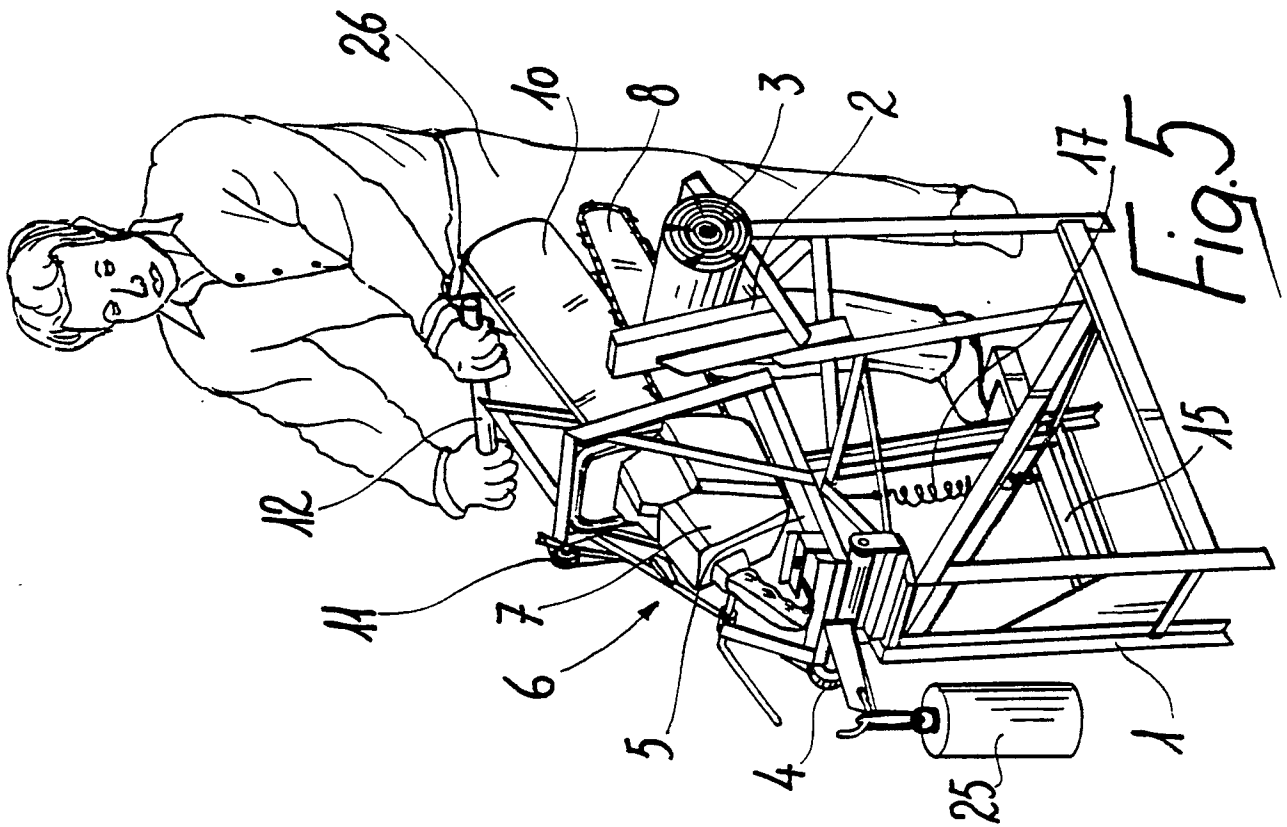
14. Apparatus according to one or more of the preceding claims, characterized in that said frame has wheels adapted to facilitate its movement.

15. Apparatus according to one or more of the preceding claims, characterized in that it can be actuated exclusively by moving said grip handle. 50

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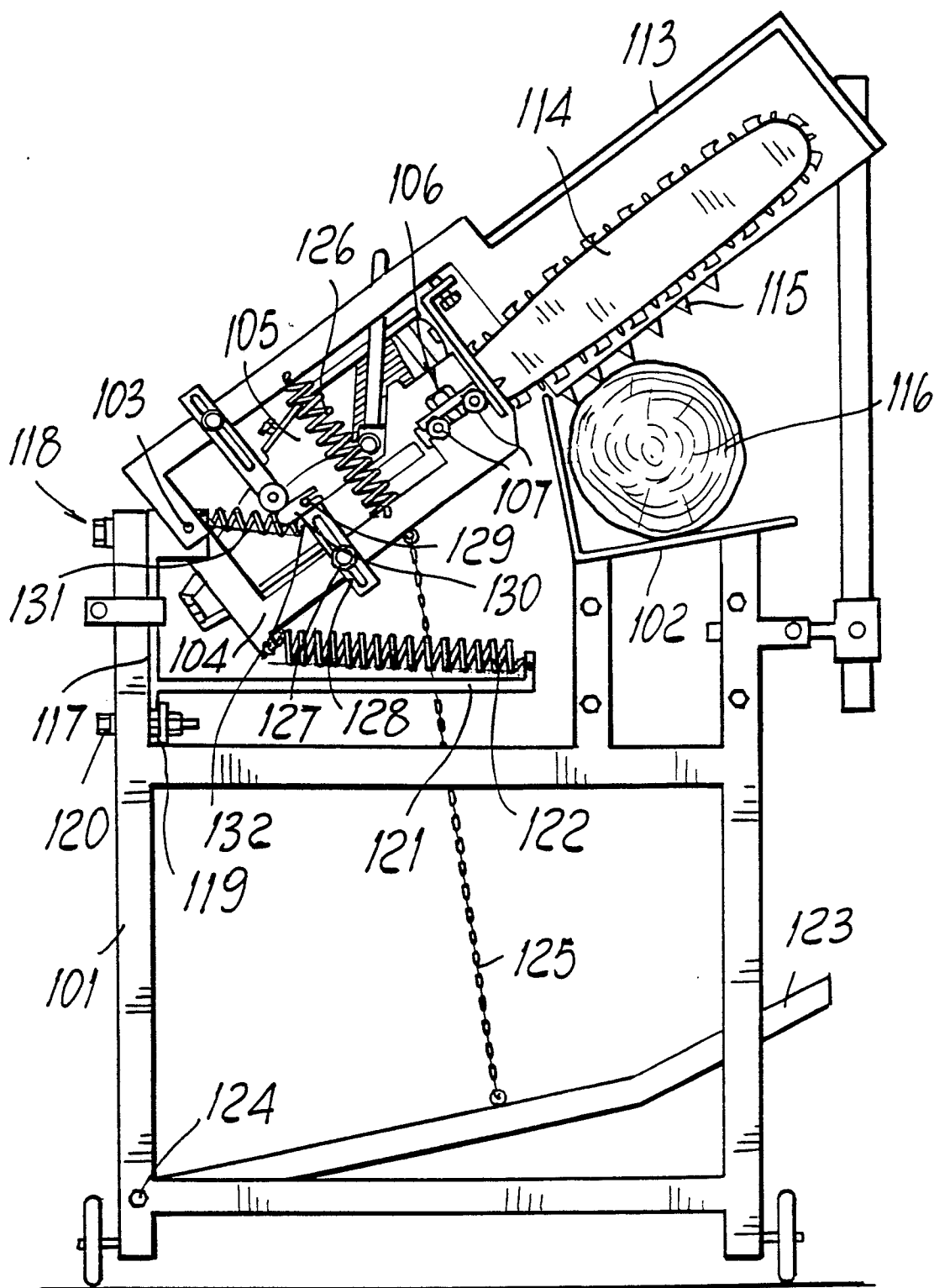


FIG. 7

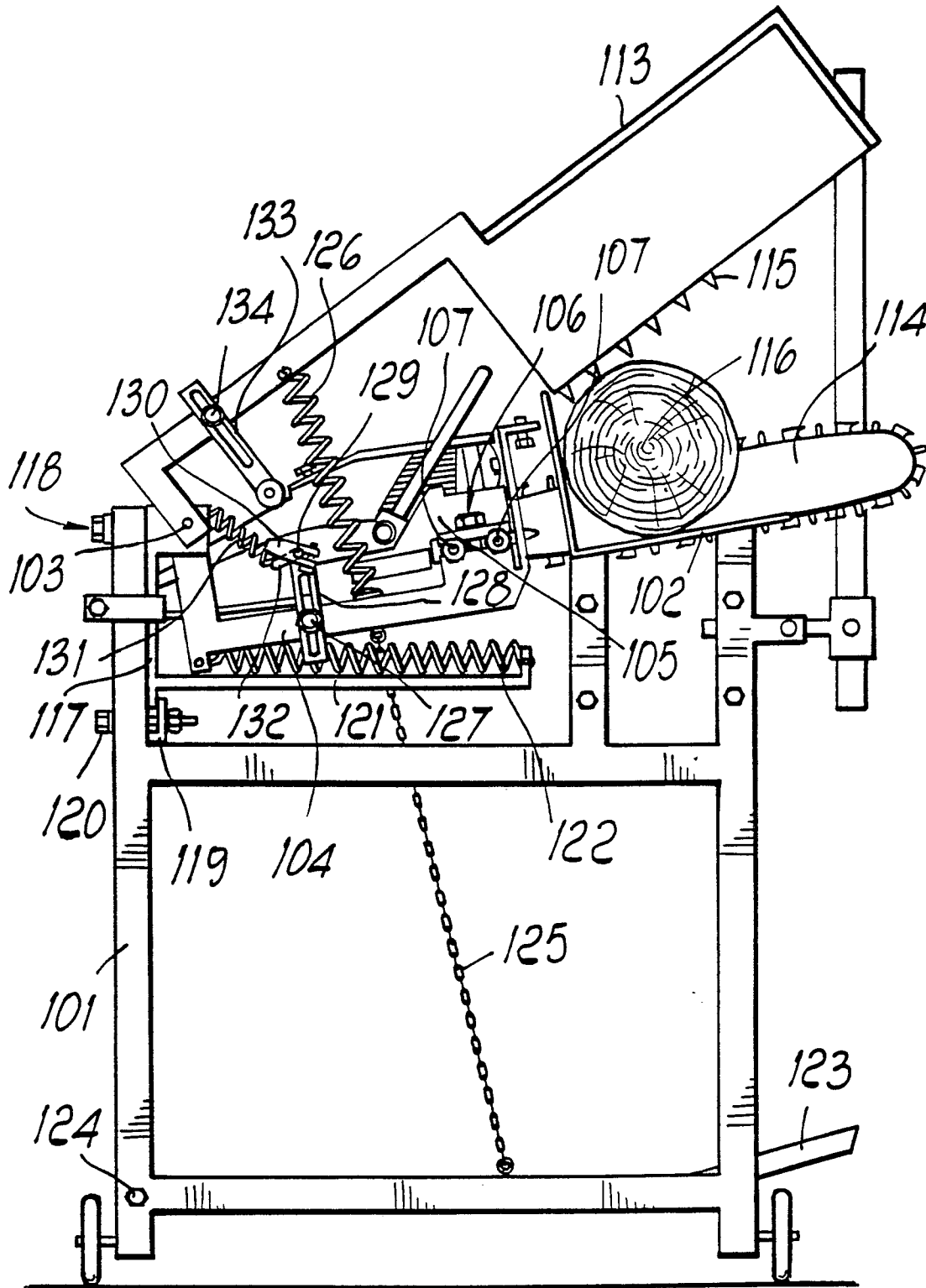


Fig. 8

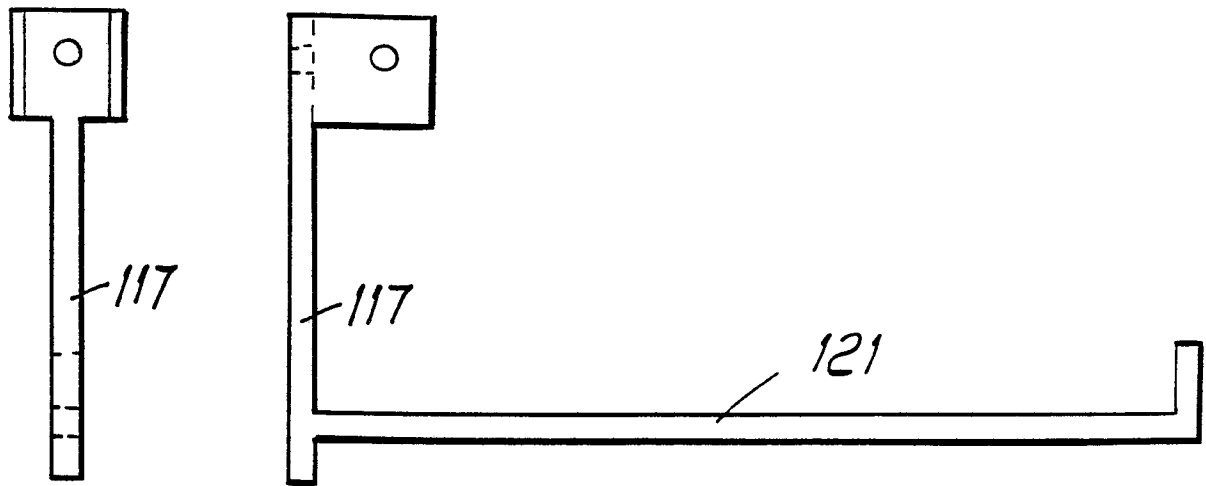


Fig. 9

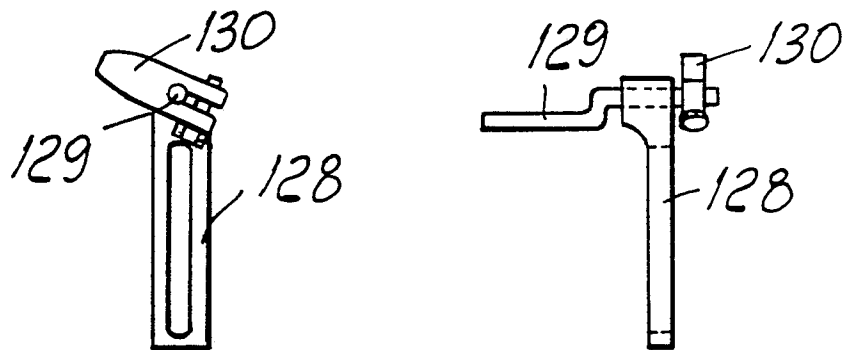


Fig. 10

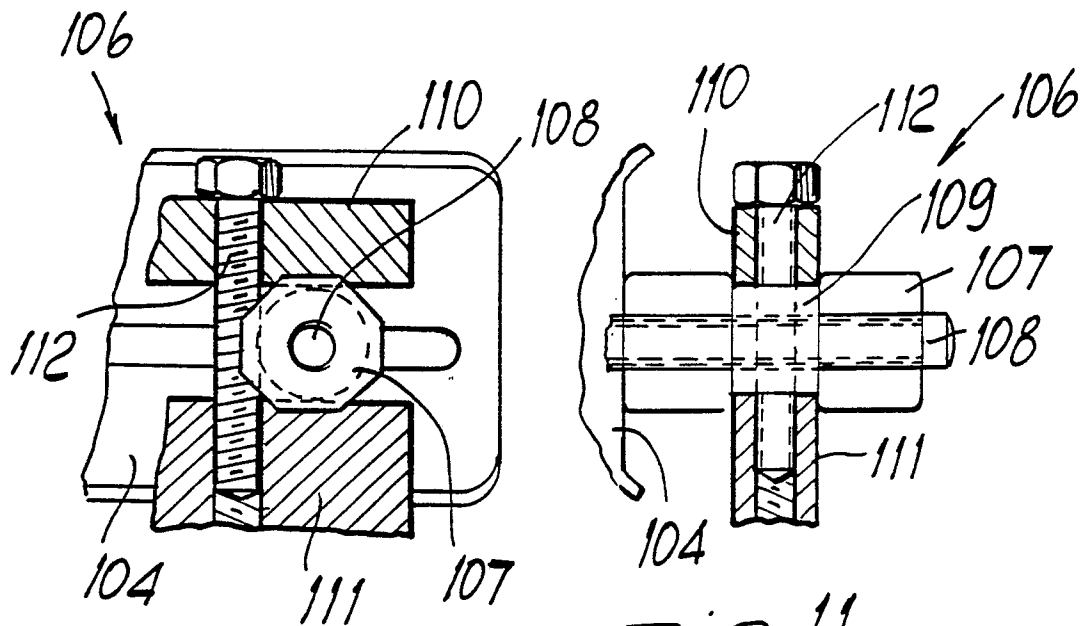


Fig. 11



DOCUMENTS CONSIDERED TO BE RELEVANT			EP 89103903.4
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
X	<u>US - A - 4 538 494</u> (WIRFELT) * Totality * --	1-4	B 27 B 17/08
X	<u>US - A - 4 606 252</u> (LAHTI) * Totality * --	1-4	
X	<u>DE - A1 - 3 105 416</u> (MAFELL) * Totality * --	1-4	
X	<u>DE - A1 - 3 111 641</u> (HORNDASCH) * Totality * -----	1-4	
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			B 27 B 17/00 B 27 G 29/00
The present search report has been drawn up for all claims			
Place of search VIENNA		Date of completion of the search 30-05-1989	Examiner TRATTNER
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	