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(54) Apparatus for cutting a workpiece.

(57) The invention relates to apparatus 1 for cutting a point on a stake 6, the apparatus having a housing 8 in which is mounted blades 12 connected by pivotable links 11 to a double acting hydraulic ram 4, there being in the housing 8 a trigger 5 which is operable by the stake 6 to actuate a control unit 17 for initiating a cutting operation.

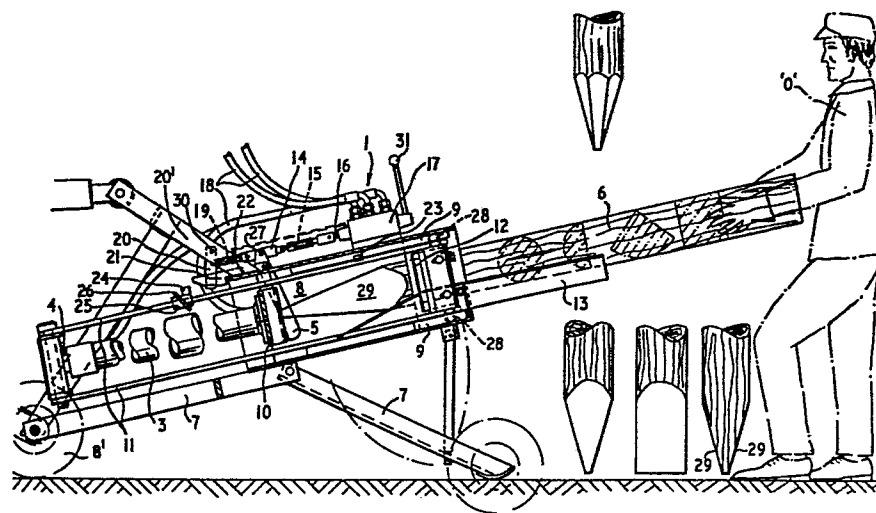


FIG.5.

"Apparatus for cutting a workpiece"

TECHNICAL FIELD OF THE INVENTION

The invention relates to apparatus for cutting a workpiece in particular an apparatus used to cut a point on a stake or other material.

BACKGROUND ART

It has been proposed to cut points on elongate members such as lengths of wood or stakes by means of a circular saw. When several hundred stakes for example are to be cut, an expensive arrangement of saw, saw table and power means has to be provided, which arrangement is bulky and requires the expenditure of a great deal of power to operate. In use, a circular saw is also noisy, dangerous, and repetitive and strenuous to use, demanding continual concentration leading to fatigue and boredom which naturally increases the danger and renders it liable to accident. Furthermore, the cut surface is rough as it is produced by sawing and hence it aids absorption of water, which leads to a rapid deterioration in the integrity of the stake in use, with consequent possible collapsing of structures such as fencing in which the stakes are used.

DISCLOSURE OF THE INVENTION

It is an object of the invention to seek to mitigate these disadvantages of the prior art.

According to the invention there is provided apparatus for cutting a workpiece, comprising a movable cutting device, a prime mover connected to or integral with the cutting device, and an actuating member which is operable by the workpiece to actuate the prime mover to move the cutting device so that the cutting device cuts the workpiece.

Using the invention it is possible to provide a relatively simple and inexpensive apparatus which provides a smooth cut surface which, in the case of a wooden workpiece, considerably improves the resistance to water absorption.

The cutting device may comprise a blade which may be moved by the prime mover to cut the workpiece. This provides a positive cutting action which ensures a smooth surface.

The apparatus may be elongate and the blade may be movable over a path which is inclined towards the longitudinal axis of the apparatus. This construction of the apparatus provides for the cutting of a point on an end of the workpiece.

There may be two blades which may be mounted on either side of the longitudinal axis and which may be drawn towards the longitudinal axis during a cutting stroke. This construction provides for the provision of two convergent cut surfaces of a workpiece.

There may be guide means for guiding the blades during a cutting stroke. This construction provides for a positive cutting action during a cutting stroke.

The prime mover may be a double acting hydraulic ram. This construction enables the apparatus to be powered from an external power source for reversible operation.

The cutting device may comprise means which accommodates movement of the cutting device in a direction inclined to the longitudinal axis of the ram and which means is connected to the ram.

The apparatus may comprise a mechanism which is operative to reverse the prime mover on withdrawal of

the cut workpiece from the actuating member.

The apparatus may include means to adjust the length of the cutting device. This enables workpieces of different cross-sections to be cut at the optimum pace.

Apparatus embodying the invention is hereinafter described, by way of example, with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of the apparatus showing the general arrangement;

Fig. 2 is a plan view of the apparatus of Fig. 1, to a smaller scale, taken on section 'B-B' of Fig. 3;

Fig. 3 is a side elevational view of the apparatus, taken on section 'A-A' of Fig. 2, with parts removed for clarity;

Fig. 4 is an end view in the direction of arrow 'C' in Fig. 3; and Fig. 5 shows a longitudinal sectional view of the apparatus in use.

Referring to the drawings, the apparatus 1 shown comprises a movable cutting device 2, a prime mover 3 in the form of a double acting hydraulic ram 4 connected with the cutting device 2 and an actuating member in the form of a pivotable trigger 5 which is operable by a workpiece 6 to actuate the prime mover 3 to move the cutting device 2 so that the cutting device 2 cuts the workpiece.

The apparatus 1 is elongate and is mounted on ground-support struts 7 which may have wheels 8 to provide for portage of the apparatus 1. The apparatus 1 includes a housing 8 on the base and roof of which are mounted respectively two guides 9 inclined at an angle towards

the longitudinal axis 'X' of the apparatus 1. There is a transverse plate 10 forming one end of the housing 8 and to the left-hand side (as viewed) of which is secured the prime mover 3, in this case the cylinder in which ram 4 is housed. The ram 4 is connected by two upper and two lower (as viewed in Fig. 4) pivotable links 11 comprising, with two cutting blades 12, the cutting device. The links 11 are each pivoted to the ram 4 and to the respective blades 12, each of which blades 12 is inclined with their cutting edges substantially vertical, the planes of the blades themselves being included at an angle to the longitudinal axis 'X' of the apparatus 1.

A V-shape guide or support trough 13 for a workpiece projects from the right-hand (as viewed) side of the housing 8.

The trigger 5 is pivoted to a rod 14 connected via a link device including a spring 15 to a spool 16 of a hydraulic control unit 17 connected by lines 18 with a hydraulic power supply from a tractor or other source (not shown). The end of the rod 14 opposite the control unit 17 is connected by a tension spring 19 to a stirrup 20 pivoted to a support 20' and which can co-operate with a gravity latch 21 which is mounted for pivoting movement about a pivot axis 22 provided by a pin mounted on the housing 8 or support 20'. The upper links 11 carry a fixed lug or detent 23 which can engage the right-hand (as viewed) end of the latch 21, and also means to adjust the length of the stroke of the ram in the form of an upstanding boss 24 mounted on a carriage 25 which is slidable along one of the links 11 and which is securable in a desired position by a turn-screw 26.

In use to cut a point on a workpiece in the form of a wooden stake 6, the apparatus 1 is set up at a desired position which can be on inclined ground (Fig.3), and the lines 18 are connected up to a source of hydraulic power, such as a tractor (not shown). The cutting device 2 is in the position shown in full lines in the Figs., in other words, the blades 12 are at the right-hand end (as viewed) of the housing 8. A stake 6 is then offered up to the apparatus by an operator 'O' by placing it on the support trough 13 and sliding it into the housing 8 between the blades 12 until it engages the trigger 5. The stake 6 is pushed into the housing 8, so pivoting the trigger 5 clockwise (as viewed in Fig.3) until it strikes the transverse plate 10, which acts as a stop. Thus movement of the trigger 5 automatically pushes the rod 14 to which it is secured at 27 to the right as viewed in Fig. 3, so actuating the control unit 17 to admit fluid to the cylinder to move the ram 4 to the left as viewed. The movement of the ram 4 to the left to the chain-dotted line position shown in Fig. 2 draws the blades 12 and the pivoted links 11 bodily to the left, the cutting device 2 formed by the links 11 and blades 12 being guided by the guides 9 in which bosses 28 of the blades engage, the links 11 pivoting together to accommodate this drawing together of the blades 12. The bosses 28 comprise part of a replaceable phosphor-bronze guide block providing an optimum contact area for the bearing of the block on the guides and during movement of the blades.

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The blades 12 engage the stake and as they continue to the left they move over an inclined path towards the axis 'X' and slice smoothly into the stake, so providing two smooth, convergent surfaces 29 (Fig.5). The wood shaved off by this cutting process falls away from the apparatus 1 through the open sides of the housing 8. At the completion of the stroke (chain-dotted line position in Fig. 2) the stake has a two-sided point.

Towards the end of the cutting stroke, the lugs 23 move to engage the stirrup 20 rotating it anti-clockwise about the pivot 30 until the latch 21 drops into the position shown and the spring 19 is placed under tension.

The cut stake is now removed by withdrawing by the operator 'O' to the right, as viewed. This movement therefore releases the trigger 5 which is pivoted in an anti-clockwise direction by the spring 19 to pull the spool 16 to the left and so reverse the flow of fluid to the ram 4 which therefore moves the cutting device 2 to the right (as viewed) to the full line position again. At the end of this stroke, the boss 24 raises the latch 21 to release the stirrup from the latched position shown so that the spring (not shown) in the control unit overcomes the spring 19 and returns the spool to the neutral position, at the same time pivoting the stirrup 20 anti-clockwise as viewed about a pivot 30.

The apparatus 1 is then ready to carry out a further cutting operation. It will be understood that the acts of inserting and removing the stake 6 effect working of the apparatus, which carries out automatically a working (cutting) stroke and a return stroke.

A four-sided point is cut by rotating the cut stake 6 and re-inserting it in the apparatus so that the uncut part is cut.

The length of the return stroke can be adjusted by adjusting the position of the boss 24 by sliding the carriage 25 along the link 11 on which it is mounted for reciprocation. The nearer the boss 24 is to the plate 10 the shorter the working and return strokes, which may be advantageous when stakes 6 of relatively small cross-section are being cut so reducing the cycle time.

The control unit 17 has a manually operable lever 31 which may be used to override the automatic operation, through compression of the spring 15 in the link device.

The apparatus has guard grilles 32 at each side. It will be understood that the apparatus 1 shown and above described can be modified. For example, there may be only one blade 12, or there may be a plurality of blades, for example three or four instead of the two shown. The blades 12 may be adjustable in inclination and they may also be demountable for replacement by other blades depending on the characteristics of the material being cut. Also, the prime mover 3 may be any suitable one for example, a mechanical one such as a screw or an electrical or electro-mechanical one. Also, the control unit 17 may be replaced by a motor carried by the apparatus for driving the prime mover, for example an electrical motor or internal combustion engine. The guide 9 may also be of any suitable form rather than the parallel bars forming a channel as shown. The guides 9 may have any desired configuration other than straight, for example curvilinear in order to provide a desired profile of cut surface.

In every embodiment, the apparatus can cut one, two, three, four-sided or eight-sided points as shown in Fig. 5. Further, although wooden stakes have been referred to, the apparatus can be used to cut any suitable material such as rubber, plastics or metal providing suitable blades are used depending on the characteristics of the particular material being cut. In every embodiment, the blade or blades is or are moved bodily by the prime mover to perform a cutting action.

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In the embodiment shown, the cut end does not terminate in a fine point, rather it is squared off as shown in Fig.

5. This provides for a strong point which does not break or bend when the cut stake is driven into the ground, which may have stones in it.

It will also be understood that the struts 7 and support 20' may be used to mount the apparatus 1 on the three-point linkage of a tractor or other vehicle, or other static installations.

The invention shown in the drawings and above described may be modified. For example, the tension spring 19 may be replaced by a compression spring. Also, the abutment plate 10 in the embodiment illustrated has two plates defining a slot in which the trigger 12 is mounted. In order to avoid jamming of a stake which is inserted below plate 10 this plate 10 is positioned about 3mm above the lower links 11 and a further plate (not shown) may be secured as by welding centrally below the trigger to the trough 13 so making it impossible to insert an end of an uncut stake below the plate 10, so obviating jamming.

The apparatus may be made portable by securing handles, preferably two, to the right hand end (as viewed in Fig. 2) of the trough 13.

CLAIMS

1. Apparatus for cutting a workpiece, comprising a movable cutting device, and a prime mover connected to or integral with the cutting device, characterised by an actuating member (12) operatively connected to the prime mover (3) and operable by a workpiece (6) to actuate the prime mover (3) to move the cutting device (2) to cut the workpiece (6).
2. Apparatus according to Claim 1, characterised in that the cutting device (2) comprises a blade (12) which is movable bodily by the prime mover (3).
3. Apparatus according to Claim 2, characterised in that the apparatus (1) is elongate and in that the blade (12) is movable over an inclined path defined by converging guides (9).
4. Apparatus according to Claim 3, characterised by two blades (12).
5. Apparatus according to Claim 4, characterised by the prime mover (3) comprising a double acting hydraulic ram (4) and by pivotable links (11) connecting the blades (12) and hydraulic ram (4).
6. Apparatus according to any preceding claim, characterised by a mechanism (16, 19, 20, 21, 23) operative to reverse the prime mover (3) on withdrawal of a cut workpiece (6) from the actuating member (12).
7. Apparatus according to any preceding claim, characterised in that there is an adjustment means (24, 25) to adjust the working stroke of the cutting device (2).

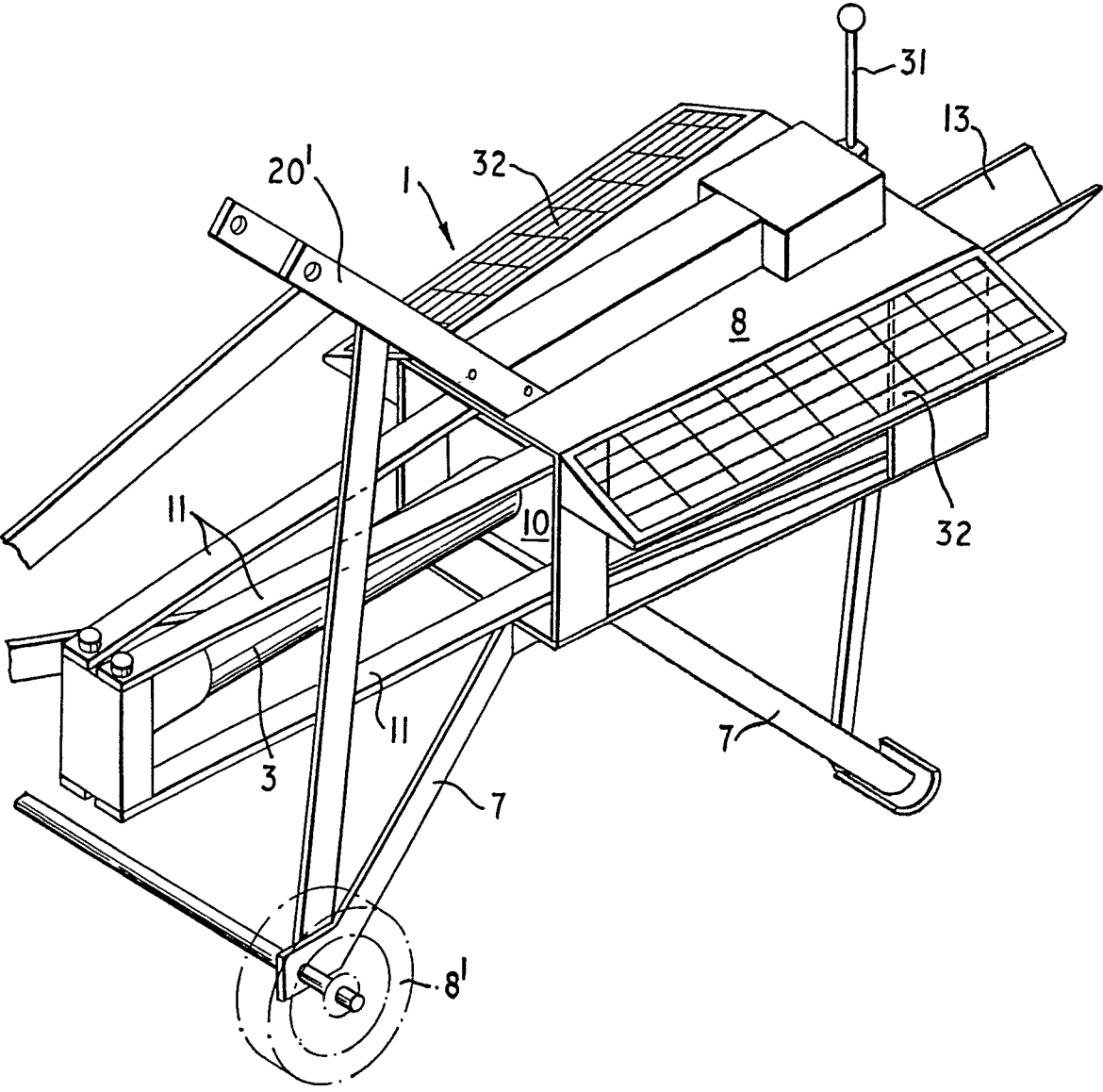


FIG.1.

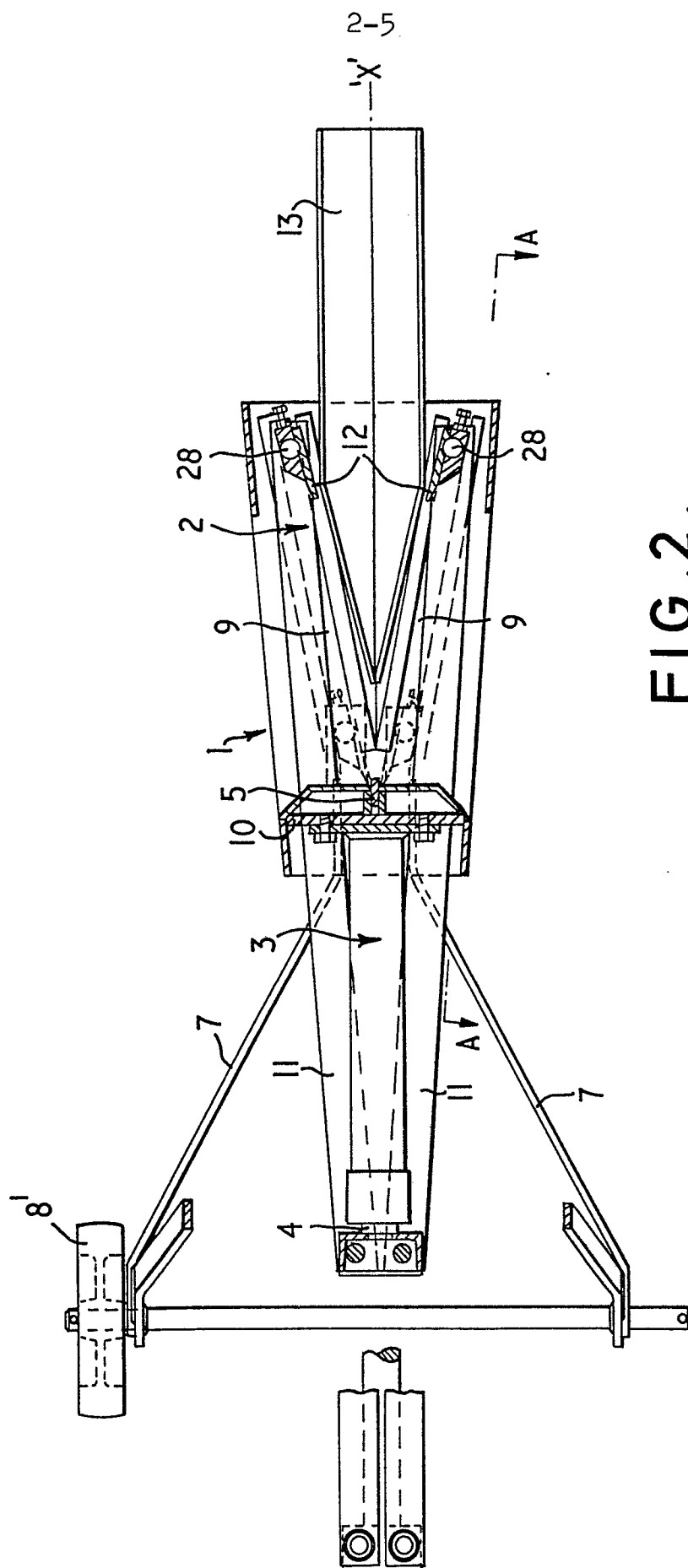
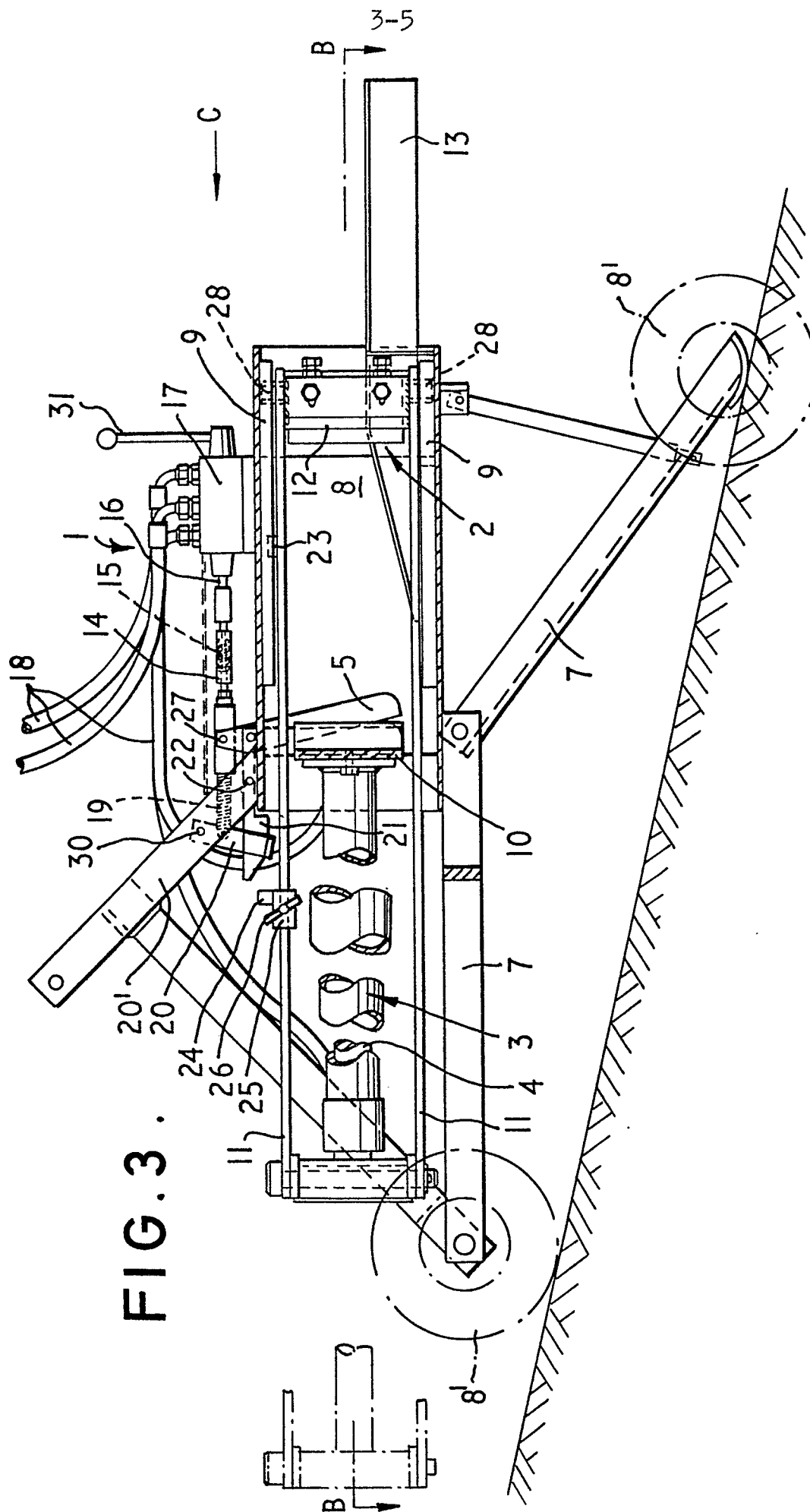
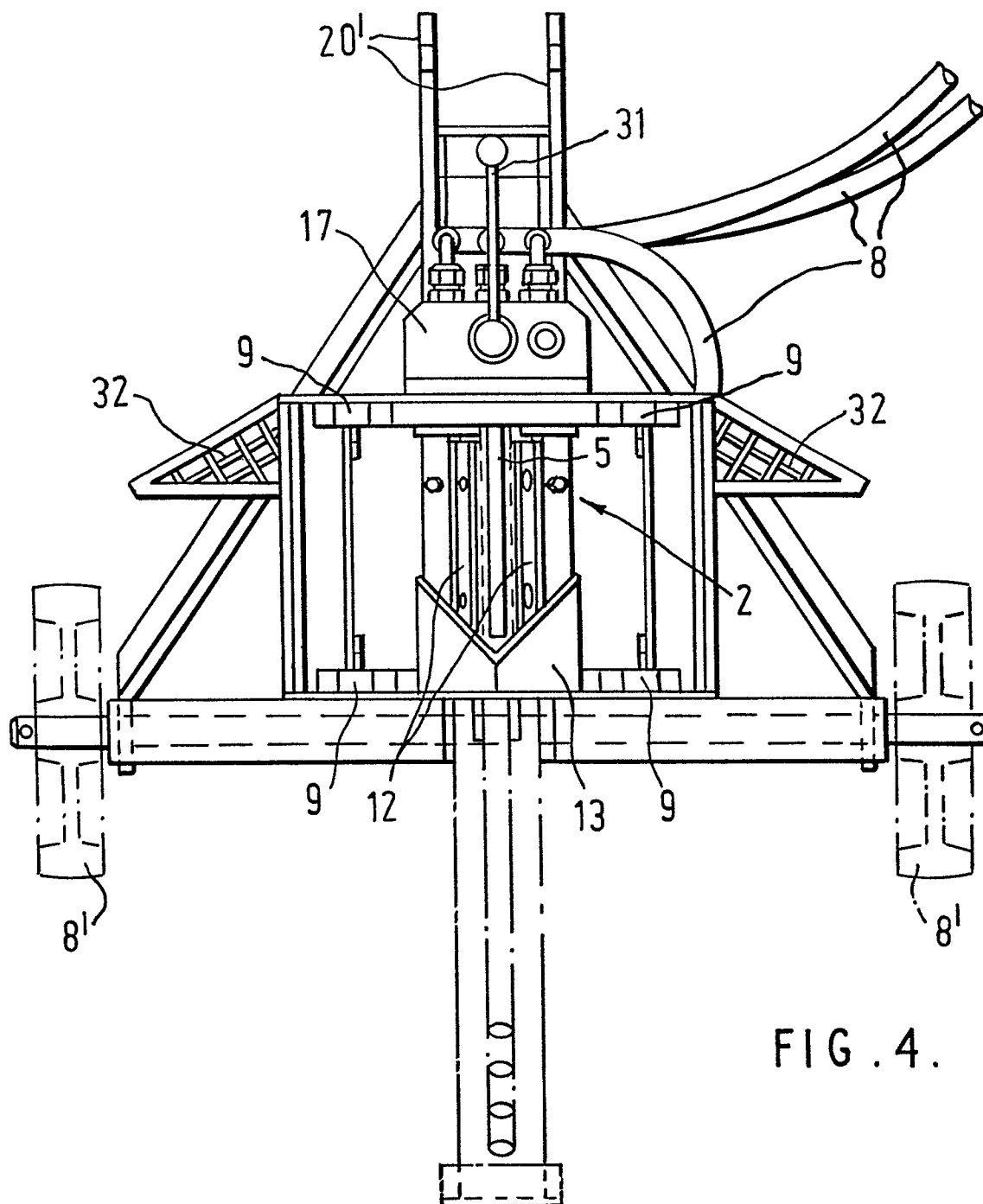


FIG. 2.





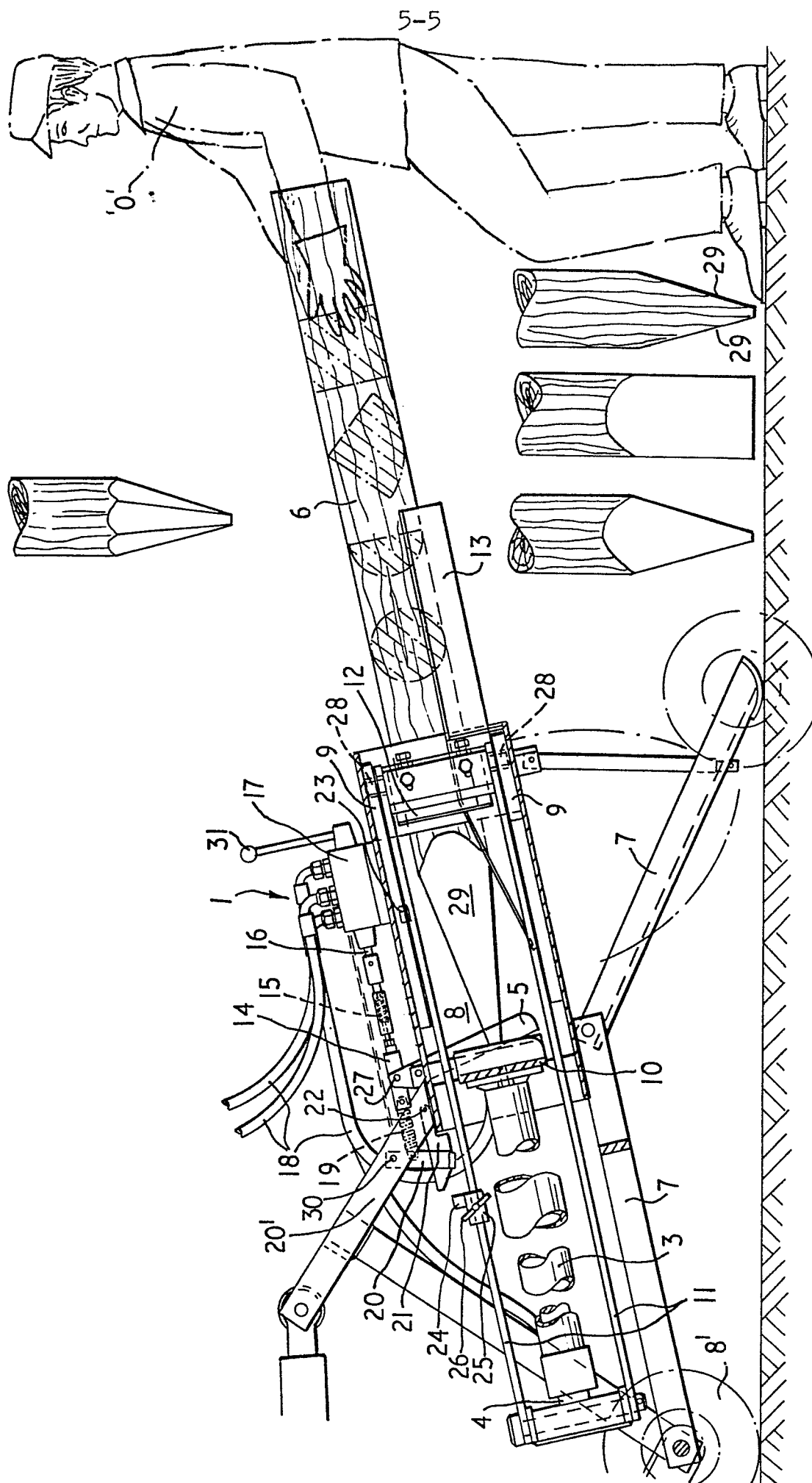


FIG. 5.



European Patent
Office

EUROPEAN SEARCH REPORT

0066368

Application number

EP 82 30 2179

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)
X	FR-A-2 440 257 (LEFORT) * Page 1, lines 25-40; page 2, lines 1-10 *	1-6	B 27 M 3/32 B 27 M 1/00
A	DE-C- 908 790 (HOSCHLE) * Claims 3,5,17 *	1,2,4-6	
A	FR-A- 573 531 (POURIAU) * Page 2, lines 29-36 *	7	
A	US-A-3 719 216 (TRACY)		
			TECHNICAL FIELDS SEARCHED (Int. Cl. 3)
			B 27 M 3/00 B 27 M 1/00 B 43 L 23/00
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 31-08-1982	Examiner DE GUSSEM J.L.
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	