

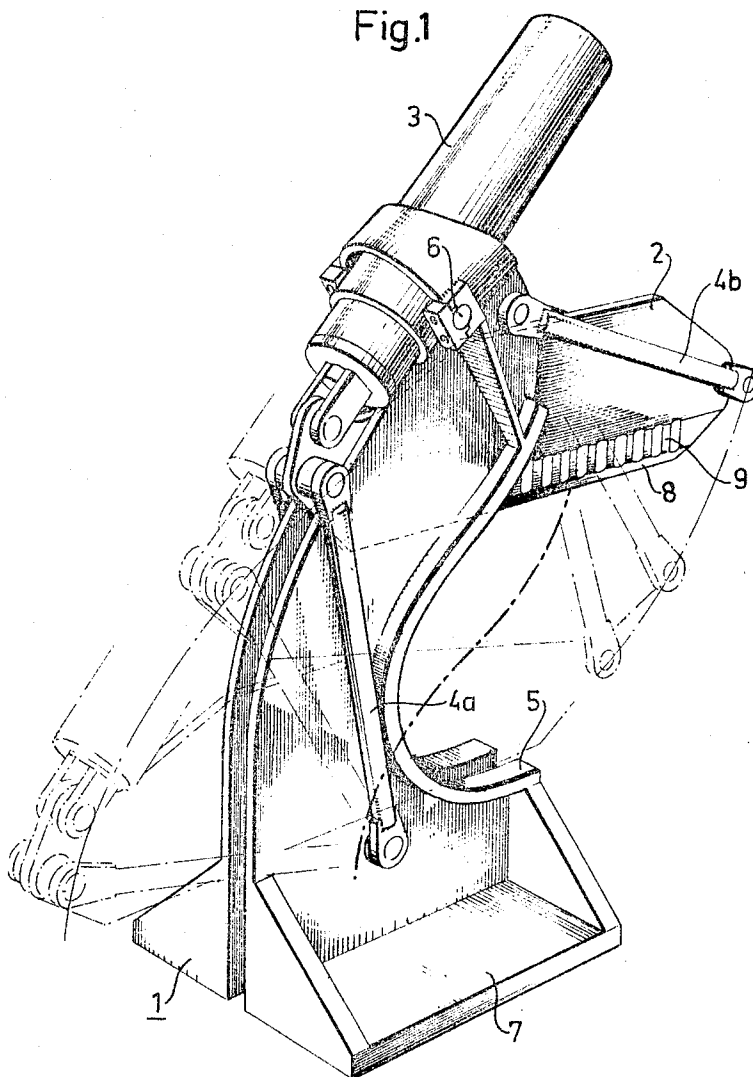
Sept. 6, 1966

D. L. REHNSTRÖM
HYDRAULICALLY OPERATED DEVICE FOR CUTTING
TREES, LOGS AND THE LIKE

3,270,787

Filed May 14, 1964

2 Sheets-Sheet 1



Sept. 6, 1966

D. L. REHNSTRÖM
HYDRAULICALLY OPERATED DEVICE FOR CUTTING
TREES, LOGS AND THE LIKE

3,270,787

Filed May 14, 1964

2 Sheets-Sheet 2

Fig.2

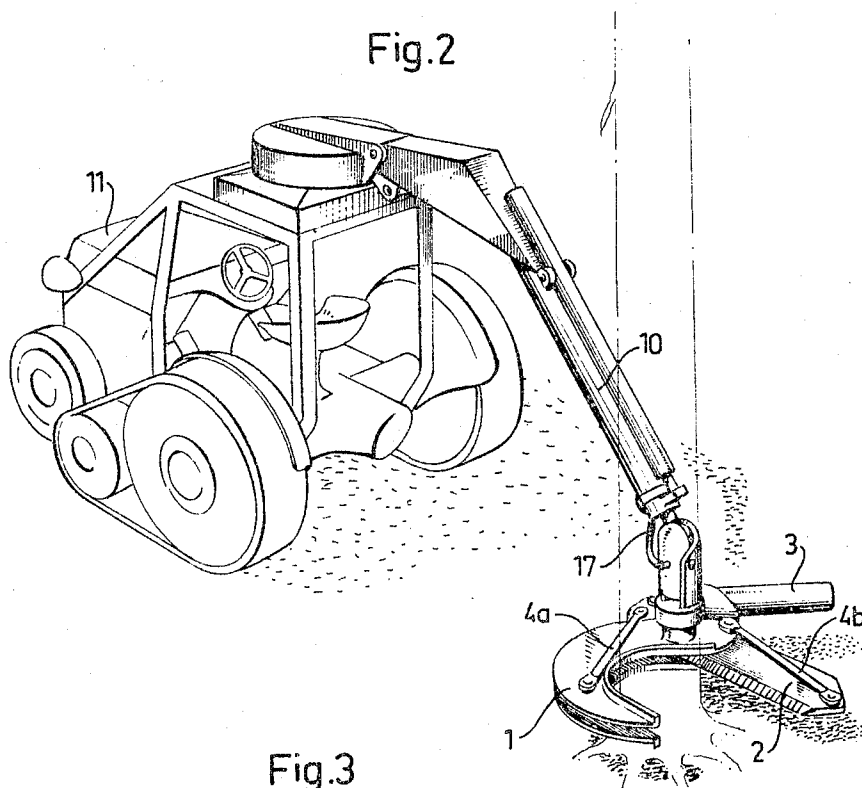
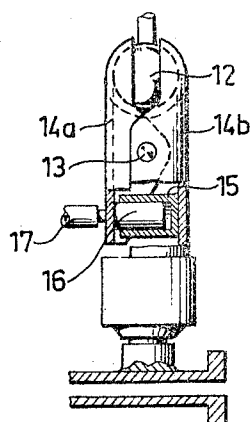


Fig.3



1

3,270,787

HYDRAULICALLY OPERATED DEVICE FOR CUTTING TREES, LOGS AND THE LIKE

Dick Lennart Rehnström, Skelleftea, Sweden, assignor to
Fabriks AB Forslund & Co., Skelleftea, Sweden

Filed May 14, 1964, Ser. No. 367,922

Claims priority, application Sweden, May 16, 1963,
5,431/63

6 Claims. (Cl. 144—34)

The present invention relates to an apparatus for cutting trees, logs and the like and comprising at least one cutting member which is movable when actuated upon by a hydraulic cylinder. The prior art devices of the kind just defined have not found any widespread use due to the fact that they exhibit some very disadvantageous characteristics. Firstly, their power consumption is disproportionately great and, secondly, the operational result has suffered from the drawback that the ends of the logs or the corresponding workpieces have been so crushed that the adjacent portions of the logs could in any case not be sawn into boards.

The main object of this invention is to eliminate both the above disadvantages by providing an apparatus which is designed in such a way that during a cutting operation each point on the blade of the cutting member carries out a movement which has a component in the longitudinal direction of said blade.

Two embodiments of the invention will now be described in greater detail, reference being made to the accompanying drawing.

FIGURE 1 shows an apparatus suitable for stationary use, e.g. out on the field or in saw-mills and similar plants.

FIGURE 2 shows an apparatus mounted on a vehicle, namely at the outer end of a crane beam carried by a semiband tractor.

FIGURE 3 is a partial sectional view showing on a larger scale the mounting device of the apparatus shown in FIGURE 2.

The fundamental design of the apparatus appears most clearly from FIGURE 1. As shown in that figure, the apparatus consists of four main portions, namely a frame 1, a cutting member 2, a hydraulic cylinder 3 and two pairs of links 4, which form a link system. Frame 1 consists of two symmetric halves which are interconnected at their top and bottom ends only whereas the remaining portions are spaced by such a distance that the cutting members 2 can freely pass therebetween. The side of the frame facing the cutting member is shaped like a substantially semi-circular support surface 5 for the log or other workpiece which is to be cut. The hydraulic cylinder 3 is by means of pivots 6 connected to the frame 1 so that it can swing somewhat in the plane of movement of the cutting member 2. The latter is shown in its one end position, where the apparatus is ready to receive a log. However, the thin dash-dot lines show the cutting member also in its opposite end position and, in addition thereto, links 4b, in an intermediary position. It appears from the drawing that during its movement from the starting position to the final position the cutting member will move substantially parallel to itself and also, that each point of the blade of the cutting member will carry out a movement having a component in the longitudinal direction of said blade. The significance thereof will be commented upon below.

The link system comprises two link pairs, to wit 4a and 4b. Each of links 4a has its top end pivotably connected to the inner end of cutting member 2 and its bottom end pivotably connected to frame 1 near the foot 7 thereof. In contrast thereto, each of links 4b has its top end pivotably connected to frame 1 and its bottom end pivotably connected to the outer end of cutting mem-

2

ber 2. Adjacent the pivot between links 4a and cutting member 2 the piston of the hydraulic cylinder 3 is pivotably connected to said cutting member. Although this does not appear from the perspective view in FIGURE 1, links 4b are somewhat longer than links 4a.

The above description of the structural nature of the apparatus will also suffice to convey an understanding of its function. However, as a matter of explanation it should be added that thanks to the fact that the cutting member is not only moved at right angles to the workpiece but at the same time also displaced in its own plane, a very considerable reduction of the friction between the cutting member and the workpiece is attained. That reduction does in turn make possible a corresponding decrease of the total power that the hydraulic cylinder 3 has to develop. The explanation is that the operational lines of the friction force and the cutting force do no longer coincide but form a certain angle to each other so that the corresponding forces are not added algebraically but geometrically. The just-mentioned advantageous effect can be still more amplified by the choice of a suitable shape for the blade 8 of the cutting member 2 and of the portion 9 located immediately inside the blade. As shown on the drawing, that portion is provided with a number of evenly spaced grooves perpendicular to the edge of the blade. These grooves cause a reduction of the friction power by affording a space into which resin and the like can penetrate.

According to the embodiment shown in FIGURE 2 the apparatus is mounted on a vehicle in such a manner that the plane of movement of the cutting member 2 becomes substantially horizontal. The apparatus is secured to the outer end of a crane beam 10 suitably composed by two or more pivotably interconnected sections and having its inner end carried by a device mounted on top of the roof of the driver's cabin.

The cutting apparatus shown in FIGURE 2 is suspended from beam 10 in its center of gravity. Thanks to that construction the cutting member will automatically assume a horizontal position in the absence of any external forces. However, sometimes it is advantageous that the apparatus can be positively forced into its operational position when passing bushes and similar minor vegetation. This can be achieved by means of some suitable locking device mounted between the cutting apparatus and the crane beam 10. FIGURE 3 shows such an interconnecting device comprising a ball 12 mounted at the outer end of beam 10 and forming a ball-joint together with two levers 14a and 14b, the top ends of which have internal, semi-spherical recesses corresponding to and contacting the ball. Levers 14 are swingable round a pivot 13 below which there is a hydraulic cylinder 15 having a piston 16. When via connection 17 pressure oil is forced into the space at the right hand side of piston 16, the two levers 14a and 14b will obviously become locked with respect to ball 12.

The two embodiments of the invention above described and shown on the drawing are only intended to exemplify the broad inventive concept which can in several respects be modified within the scope of the claims. By way of example, it could be mentioned that it is often advantageous to equip both halves of the frame with cutting members. This avoids the risk of the log being otherwise crushed due to the reaction forces from the portion of the frame which does not have any cutter. Moreover, when such an arrangement is used, the dimensions of the apparatus can be reduced both as far as the cutting members proper are concerned as in respect of the hydraulic cylinders. Finally, it should be mentioned that an apparatus designed according to this invention can also be equipped with several cutting members, the planes of movements of which are parallel but not coinciding.

3

These cutting members can be arranged for synchronous operation or, alternatively, have some other pattern of movement. The reaction force above referred to may also be partially absorbed by a chain-like device mounted between the cutting members and yielding contact against all of the corresponding portion of the circumference of the log irrespective of variations in the log diameter and of irregular log cross-sections.

What is claimed is:

1. An apparatus for cutting trees, logs and similar objects, comprising at least one cutting member having a blade and controlled by hydraulic power means, characterized therein that each cutting member is mounted in a link system having two sets of links and arranged so that any point on its blade carries out a movement, which has a component in the longitudinal direction of said blade.

2. An apparatus as claimed in claim 1, characterized therein that the cutting member is shaped like an oblong plate the one end of which is pivotably connected both to said hydraulic power means and to the one set of links and the opposite end of which is pivotably connected to the other set of links.

3. An apparatus as claimed in claim 1, characterized therein that said hydraulic power means comprise a hydraulic cylinder mounted for swingable motion in the plane of movement of the cutting member.

4. An apparatus as claimed in claim 1, characterized therein that the portion of the cutting member located immediately inside the blade has a cross-section which periodically varies in the longitudinal direction of said blade due to the presence of a number of spaced grooves.

5. An apparatus as claimed in claim 1, characterized

4

therein that it is mounted on a vehicle such as a tractor.

6. An apparatus for cutting trees, logs and similar objects comprising in combination

(a) a frame member consisting of two substantially symmetrical halves that are maintained a fixed distance apart,

(b) a cutting member that is disposed in the plane passing between the symmetrical halves of said frame member,

(c) a hydraulic power means comprising a cylinder portion and a piston portion that is attached to one extremity of said cutting member,

(d) the cylinder portion of said hydraulic power means being pivotally mounted on said frame member so that said cylinder portion can swing at least a limited distance in the plane passing between the symmetrical halves of said frame member,

(e) a first pivotable link having one end attached adjacent to the same extremity of said cutting member to which said piston portion is attached and the other end of said link being attached to said frame member, and

(f) a second pivotable link having one end attached adjacent to the other extremity of said cutting member and the other end of said link being attached to another portion of said frame member.

No references cited.

WILLIAM W. DYER, JR., *Primary Examiner*

W. D. BRAY, *Assistant Examiner*.