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Sanger

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[54] HANDLING APPARATUS FOR LIFTING AND DISPLACING ARTICLES OF RELATIVELY GREAT WEIGHT

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[52] **U.S. Cl.** ..... **254/2 R,** 280/43.12, 180/79.2 R, 214/390

[51] **Int. Cl.** **B60p 1/00**

[58] **Field of Search** ..... 214/390, 512; 280/43.12; 180/79,2 R; 254/2 R, 2 B, 2 C; 187/9

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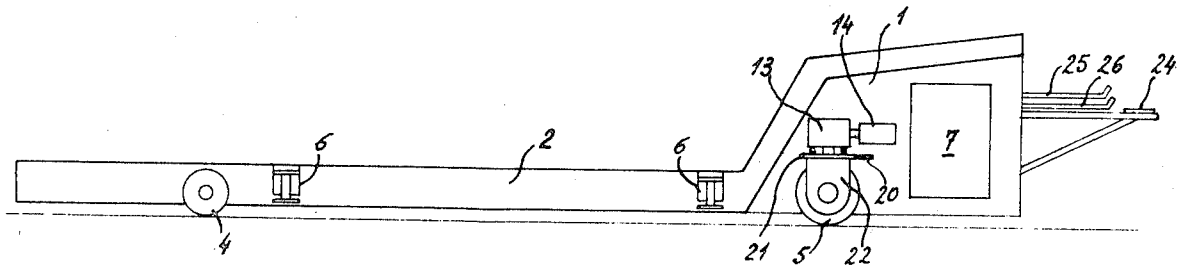
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Primary Examiner—Albert J. Makay
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[57] **ABSTRACT**

The apparatus is intended for lifting and displacing articles of relatively great weight and, more especially, of elongated shape, such as boats and other water craft, containers, and the like. To this end, the apparatus comprises a casing from which there extend a pair of parallel legs defining a free space therebetween. The legs are supported on wheels adjacent their free ends, and the casing is supported on a dirigible wheel, whereby the apparatus can travel over the ground. Each leg carries a pair of jacks, one nearer its free end and the other nearer the casing. A diesel engine is supported on the casing and drives a hydraulic pump, and the pressurized hydraulic fluid from the pump is used to operate a hydraulic motor for forward and rearward movement of the apparatus, to operate the jacks, and to operate a steering device. A support extends rearwardly from the casing and carries a seat for an operator, and control handles for the motor and the various hydraulic circuits extend rearwardly from the casing for use by the operator in controlling the vehicle. The apparatus is used to lift and displace articles by extending the pair of legs under the article, operating the jacks to lift the legs and to, in turn, lift the article off of support blocks or the like. The jacks are then operated to lower the legs so that the support wheels contact the ground and the apparatus can then transport the article to a desired location.

2 Claims, 7 Drawing Figures



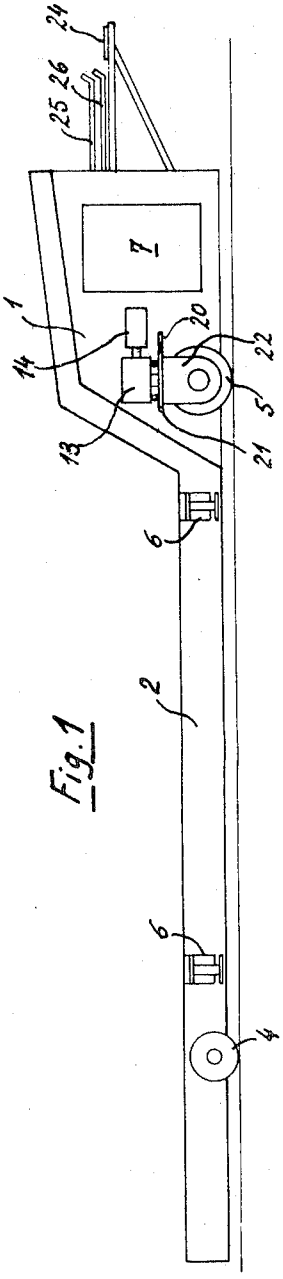


Fig. 1

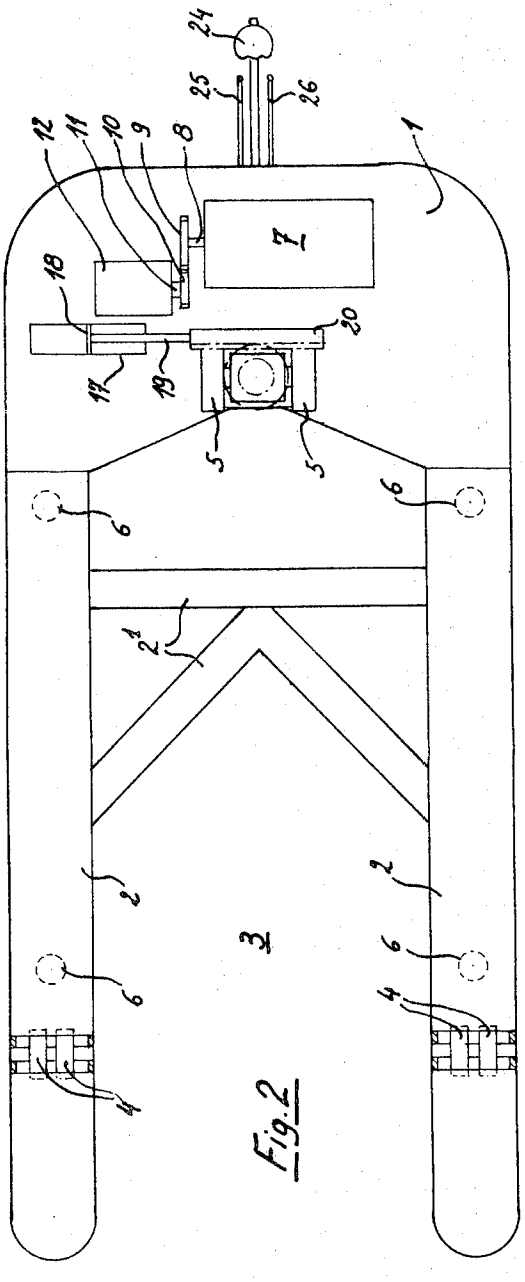


Fig. 2

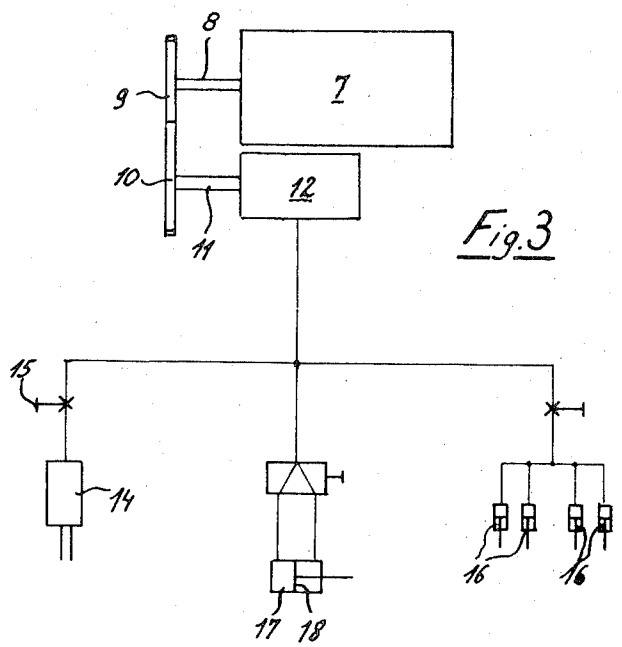


Fig. 3

Fig. 4

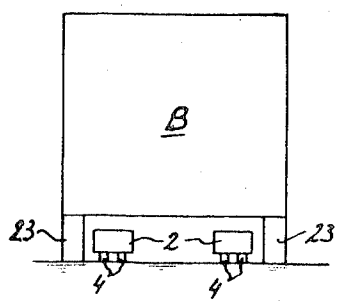


Fig. 4A

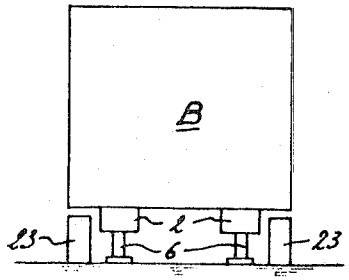


Fig. 4B

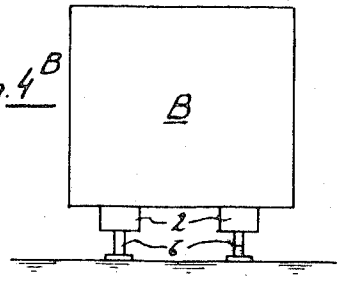
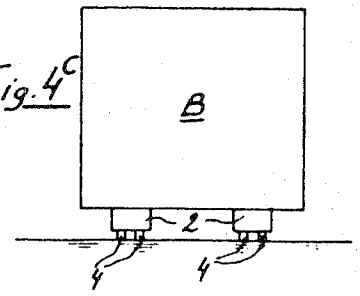


Fig. 4C



HANDLING APPARATUS FOR LIFTING AND DISPLACING ARTICLES OF RELATIVELY GREAT WEIGHT

The present invention relates to an apparatus intended to be used for the lifting and displacing of articles of relatively great weight and more especially of elongated shape, such as boats and other water craft, containers, trailers etc.

It has as its object to effect the handling of these articles in a particularly quick and practical way and, for example, in the case of a boat, to shift it to a place of storage or a place where repairs can be carried out.

With this object in view, this apparatus comprises a casing to which there are connected two bars which extend parallel in a horizontal direction leaving a free space therebetween, and which are intended to be brought under the load by displacement of the apparatus as a whole, this apparatus being provided with wheels for travelling on the ground and with jacks or similar devices for lifting purposes, and the casing containing means controlling the forward or rearward movement of the apparatus, means for controlling the lifting devices, and means controlling the orientation of the wheels.

For an understanding of the principles of the invention, reference is made to the following description of a typical embodiment thereof as illustrated in the accompanying drawings.

FIG. 1 is a side elevation view of the apparatus;

FIG. 2 is a plan view;

FIG. 3 is a diagrammatic view showing the hydraulic fluid supply circuit for various means provided in the apparatus ; and

FIGS. 4, 4A, 4B and 4C are diagrammatic views showing the method of using the apparatus.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The apparatus comprises an assembly comprising substantially a casing 1 with which there are integrally connected two bars 2 which extend parallel and in a horizontal direction, leaving between themselves a space 3. Bars 2 are generally connected by struts 2^1.

This assembly can travel over the ground by means of pairs of wheels 4 carried by each of the bars 2, and two wheels 5 provided under the casing 1.

Also provided on each of the bars 2 are lifting jacks 6 arranged on the one hand usually in the vicinity of the pairs of wheels 4 and on the other hand in the vicinity of the casing 1.

Contained in the casing 1 is a drive 7 which may be, for example, a diesel engine and whose shaft 8 carries a gear 9 engaging with a gear 10 fixed on the shaft 11 of a hydraulic pump 12 (FIGS. 2 and 3).

This pump 12 takes its fluid from a tank (not shown) and supplies various means as follows:

1. a hydraulic motor 14 which, by way of a differential 13, controls the forward or rearward movement of the assembly (1–2) at a speed which is regulated by a valve 15 (FIG. 3) whose action on the rate of flow causes an acceleration or reduction of the speed of this motor;

2. the cylinders 16 of the lifting jacks 6 (FIG. 3);

3. a jack 17 containing a piston 18 whose rod 19 drives a rack 20 which engages with an annulus 21 forming part of a differential 22 which controls the orientation of the wheels 5.

The following is a brief description of the operation of the apparatus (see FIGS. 4, 4A, 4B, 4C), assuming that the machine is to lift and shift a load which may be, for example, a boat or a container represented at B.

For this purpose, first of all there are arranged in parallel fashion on the ground two beams or blocks 23 in such a manner that the load B bears on these (FIG. 4).

1. The assembly 1–2 is then shifted over the ground by means of wheels 4 and 5 and the bars 2 are introduced under the load B so as to come to be situated between the beams 23 (FIG. 4).

2. The jacks 6 are then operated in such a manner as to effect the lifting of the load B and make the load B move off the beams 23 (FIG. 4A) and away from them.

3. These beams are then removed (FIG. 4B) while the load B continues to be supported by the jacks 6.

4. The jacks are retracted so as to allow the load to descend slightly. The assembly then occupies the position shown in FIG. 4C where the assembly bears on the wheels of the apparatus.

5. The load B may then be made to travel over the ground by means of the rolling movement of the wheels 4.

The apparatus may be supplemented by a seat 24 and control handles 25–26 provided on the casing 1 for forward and rearward movement, regulation of speed and steering control.

What I claim is:

1. A lift truck, for lifting a load and then transporting the load to a destination, comprising, in combination, a casing; a pair of parallel laterally spaced bars extending forwardly from said casing and defining a space therebetween, said bars being integral with said casing; wheels supporting each bar adjacent its free end; a dirigible wheel beneath and supporting said casing; a respective pair of jacks on each bar, one adjacent but rearwardly of the associated wheels and the other adjacent the junction of the associated bar with said casing, said jacks being extendable to lift said truck and a load thereon; a motor-driven hydraulic pump in said casing; a hydraulic motor operable to drive said dirigible wheel to move said lift truck over the ground; hydraulically operable steering means operatively associated with said dirigible wheel to steer the lift truck; said hydraulic pump being connected to said hydraulic motor, to said steering means and to said jacks; said steering means comprising a piston-cylinder hydraulic actuator, a rack connected to the piston of said hydraulic actuator, and a differential device connecting said rack to said dirigible wheel; a cantilever support extending rearwardly from said casing at the upper part of the latter; an operator's seat on said support; and control handles, operating fluid flow control means in the connections of said hydraulic pump to the hydraulically operated components of said lift truck, extending rearwardly from said casing, at a level slightly above said support, to a position adjacent said operator's seat, whereby an operator occupying said seat may control the speed of movement of said lift truck, the direction of movement of said lift truck, and extension and retraction of said jacks; whereby an operator, seated on said operator's seat, by manipulating said control handles, may direct said lift truck to extend said bars beneath a load sup-

ported on support blocks, extend said jacks to lift said lift truck and the load while the support blocks are removed, retract said jacks to reengage said wheels with the ground, and drive said lift truck to transport the load to its destination.

2. A lift truck, as claimed in claim **1**, including a valve interposed between said hydraulic pump and said hydraulic motor and operable to control the rate of flow of hydraulic fluid to said hydraulic motor.

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