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GRAB LOADER

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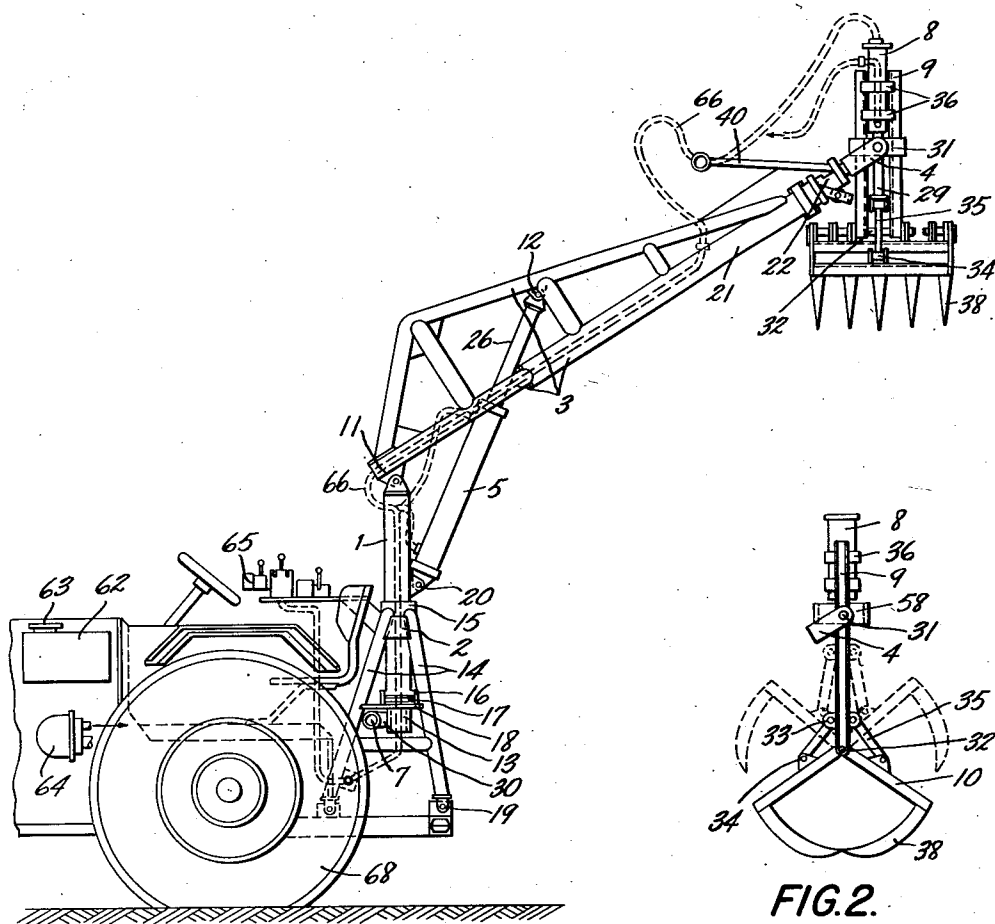


FIG. 1.

FIG. 2.

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GRAB LOADER

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2 Claims. (Cl. 214—147)

For the transportation of material of all kinds use is made of excavators and grabs which are suspended from derricks and by reason of their own weight penetrate into the material to be transported. In connection with such grabs it has been proposed to provide a link member at the end of the derrick, which is adapted to be swung down to effect a rigid connection of derrick and grab, which enables the grab to be forced upon tilting into lower loading areas of railway trucks' or ships' hatchways. But even in this case the forcing in of the grab is only effected by the weight of the derrick or of the grab.

According to the present invention a grab, for instance for transporting sand, coal, hay, dung and the like, is provided with one or more hydraulically operated working pistons which effect the opening and closing of the grab. The grab is forced, while the derrick is kept in fixed position as regards height, into the material to be transported by a hydraulically operated working piston. For enabling this to be carried out in all positions of the derrick, the pump cylinder is rotatably attached to the end of the derrick, and bar-shaped members of a kind known per se contain at their lower ends the pivot points for the grab members which are controlled by the piston of the pump cylinder by way of link members.

For bringing about or assisting the said action, according to the invention the derrick is fixed in its angle of overhang, that is in any position of height with respect to the rotary column, in such a manner that it cannot be forced upwards and thus, apart from its weight, the end of the derrick can no longer move in the vertical direction, so that the pressure piston mounted at the derrick end can bring its pressure to bear on the grab and thereby on the loose material. This fixing in any desired position of height may be effected mechanically or hydraulically and means are provided, by which the rotary column supporting the derrick can turn through 360°.

The complete apparatus may be used not only on fixed mounts, but also on vehicles, for instance it may be mounted on a tractor.

The invention is illustrated by a constructional embodiment in the accompanying drawings, in which

Fig. 1 is a side elevational view of a grab loader embodying features of the present invention showing the temporary mounting on a tractor; and

Fig. 2 is a fragmentary elevational view of the head of the loader shown in Fig. 1 but showing the tine-supporting and actuating mechanism displaced by 90° with respect to the boom.

Referring to the drawings, the grab loader of the invention includes a main column 1 which is pivotally mounted in the supporting pedestal 2. At the upper end of column 1 is mounted a boom 3 which is pivoted to column 1 about the horizontal axis 11. The outer end of boom 3 is formed by a tubular member 21 which telescopically receives an inner tubular member 22. A fork 4, which extends into the head of tubular member 22, supports the working head of the grab loader on the end of the boom.

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Adjustment of the length of the boom by moving tubular member 22 relatively to tubular member 21 may be effected in any convenient manner, e. g. hydraulically.

The hydraulic hoisting cylinder 5, which is of any known construction, has a piston rod 26 and connects the boom arm 3 with the main column 1, the cylinder 5 being connected to the main column 1 at 12 and the piston rod 26 being connected to the boom arm 3 at 20. The cylinder 5 with its associated piston rod effects the elevational adjustment of the boom arm 3 and keeps the boom in any desired elevated position resistant to pressure from above or from below.

Rotational movement of the main column 1 is effected by means of hydraulic cylinder 7. The double-action pump cylinder 7 is clamped between the legs 14 and effects rotation of the main column, and of the boom which is carried by it, by the engagement of a rack 30 which is secured to cylinder 7 with a pinion 13 which is secured to the lower end of the main column 1.

The supporting structure consists of the four legs 14 which are connected by cross struts 14a and are secured to the vehicle at 19 by means of removable pins so that the loader can be easily mounted and removed. The upper ends of the supports 14 terminate in a collar bearing ring 15 in which the main column 1 is guided. The main column 1 in turn rests on a thrust bearing 17 which is held by the step bearing 16 on the supporting plate 18 carried by legs 14 so that the column is pivotally mounted. The column 10 can be turned through an angle of 360° by means of the pump cylinder 7 and the rack 30 and its associated pinion.

The working head of the grab loader, which is supported by the boom 3, includes means for engaging and holding the material being loaded and in the embodiment illustrated this means includes tines 38 which are connected to arms 10 pivotally mounted at 32 to a pair of side bars 9 which are interconnected by braces 36. For actuating the tines there are provided links 35 pivotally connected at 34 to the arms 10 and to a head 33 which is mounted on the end of a piston 29 which cooperates with a hydraulic cylinder 8. The cylinder 8 is mounted between side bars 9 as shown in Fig. 1 and the side bar assembly is in turn connected to the fork 4 of the boom 3 by means of the pivot 31.

It will be seen that the fluid for actuating the piston of cylinder 8 passes through a hose 66 which extends through boom 3 for a substantial distance and emerges near its outer end to form a flexible connection to the top of cylinder 8. A supporting arm 40 is provided at the end of boom 3 in order to prevent knotting of the oil hose 66 during movement of the grab loader head. The hoses which supply the cylinders 5 and 8 are supplied with fluid, e. g. oil, from a pump 64 which is connected with oil tank 62 having an inlet 63 and flow of fluid is controlled by valves 65. The oil pump may be driven from the engine of the tractor 68 or by a separate motor.

It will be apparent that various changes and modifications may be made in the embodiment described and illustrated without departing from the scope of the invention as defined in the appended claims and it is intended, therefore, that all matter contained in the foregoing description and in the drawings shall be interpreted as illustrative only.

I claim:

1. In a grab portable loader adapted to be removably secured to a tractor and like vehicle, a supporting post, a support in which said supporting post is rotatably mounted, said support having legs securable to the frame of the vehicle, a boom pivotally connected at one end to the top of said supporting post for vertical movement

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with respect to said post and adapted to rotated with said supporting post through an angle of 360°, said supporting post extending upwardly a sufficient height that the boom when rotated will be above the highest point of the vehicle, a grab pivotally connected to the opposite end of said boom, said grab having displaceable cooperating tines, first hydraulic piston means for displacing said tines, and second hydraulic piston means for pivoting said boom relative to said supporting post and maintaining said boom in predetermined fixed position against upward and downward pivotal movement, said second hydraulic piston means including a hydraulic cylinder member and a piston member reciprocable in said cylinder member, one of said members being secured to said boom and the other of said members being secured to said supporting post, a conduit for conveying hydraulic fluid to said first hydraulic piston, and said boom being provided with an opening for receiving said conduit, and said conduit passing through said boom.

2. In a grab portable loader adapted to be removably secured to a tractor and like vehicle, a supporting post, a support including an annular member in which said supporting post is rotatably mounted, said support having a plurality of legs securable to the frame of the vehicle, said legs being secured to said annular member and being interconnected intermediate their ends to provide a support for the bottom end of said rotatable supporting post, a boom pivotally connected at one end to the top of said supporting post for vertical movement with respect to said

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post and adapted to rotate with said supporting post through an angle of 360°, said supporting post extending upwardly a sufficient height that the boom when rotated will be above the highest point of the vehicle, a grab pivotally connected to the opposite end of said boom, said grab having displaceable cooperating tines, first hydraulic piston means for displacing said tines, and second hydraulic piston means for pivoting said boom relative to said supporting post and maintaining said boom in predetermined fixed position against upward and downward pivotal movement, said second hydraulic piston means including a hydraulic cylinder member and a piston member reciprocable in said cylinder member, one of said members being secured to said boom and the other of said members being secured to said supporting post.

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