Aug. 11, 1953 D. S. HOOVER 2,648,449

HYDRAULICALLY OPERATED LOADING APPARATUS

Filed July 22, 1949 2 Sheets-Sheet 1

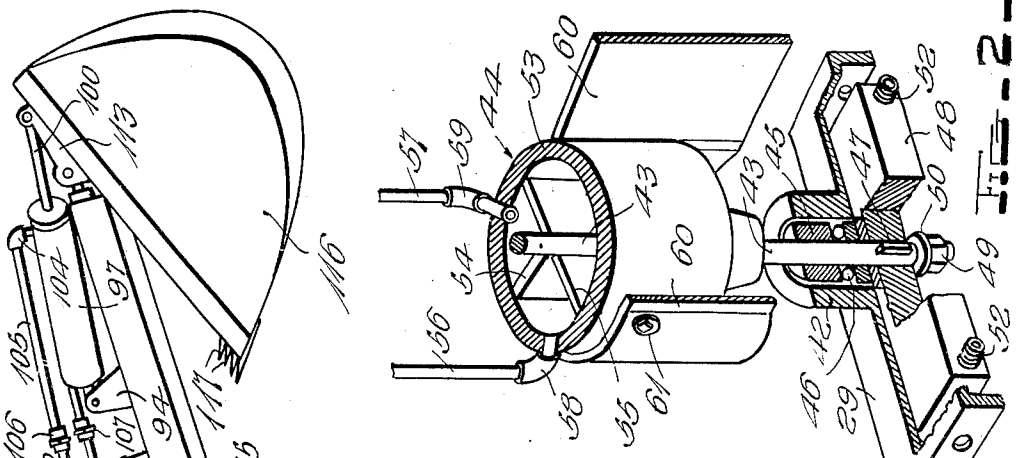

FIG. 2

FIG. 1

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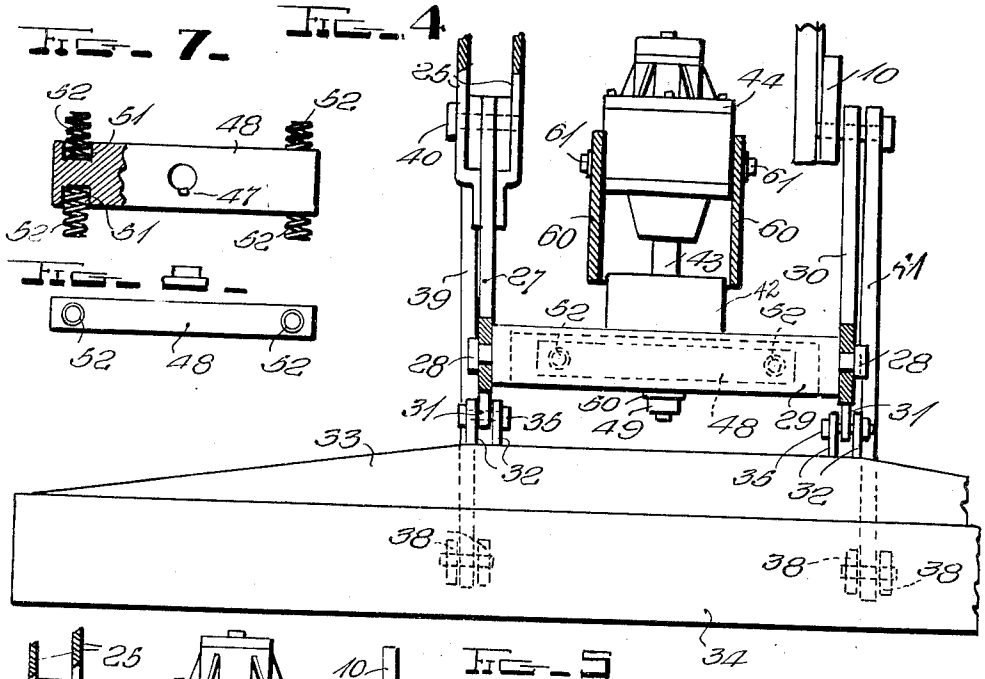

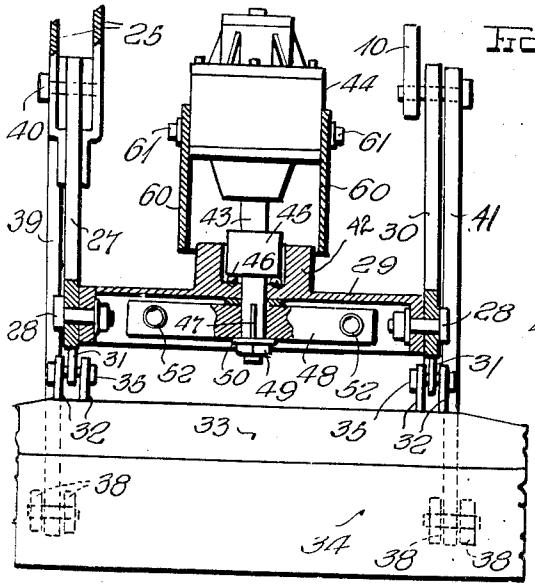

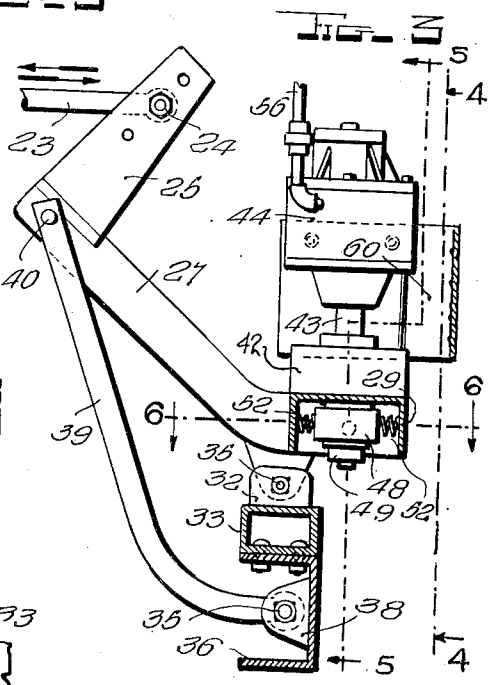

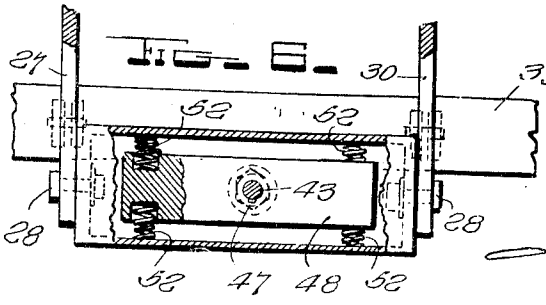

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UNITED STATES PATENT OFFICE

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HYDRAULICALLY OPERATED LOADING APPARATUS

Daniel S. Hoover, Mansfield, Ohio

Application July 22, 1949, Serial No. 106,211

1 Claim. (Cl. 214—138)

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The present invention relates to hydraulically operated loading apparatus and it consists in the combinations, constructions and arrangements of parts herein described and claimed.

Generally there is provided an hydraulically operated loading apparatus which is unitary in its character—that is to say, the apparatus consists of a framework into which a conventional tractor may be driven and, through a few simple connecting operations, be securely fastened thereto so that the apparatus becomes de facto a part of the tractor. Forwardly of the front end of the framework is a transversely extending vertically movable platform which is interconnected with the front end of the frame by means of a pair of links and eccentrically mounted atop the platform is a vertically extending mast which is movable by an hydraulically operated motor also mounted atop the platform and connected to the lower end of the mast by a pair of forwardly extending arms. A novel means is provided for the absorption of shock due to inertia when the mast and its attendant mechanism is swung upon its axis.

It is accordingly an object of the invention to provide an apparatus of the character set forth which may be quickly and easily attached to or detached from a conventional tractor.

Another object of the invention is the provision of an apparatus of the character set forth which is wholly operable by hydraulic means.

Another object of the invention is the provision of novel remotely controlled mechanisms for actuating the aforementioned hydraulic means.

A further object of the invention is the provision of a novel mounting for a mast forming a part of the invention and novel means for moving the same.

Other and further objects of the invention will become apparent from a reading of the following specification taken in conjunction with the drawings, in which:

Figure 1 is a perspective view of an apparatus including an embodiment of the present invention,

Figure 2 is a fragmentary perspective view, partly broken away, of an hydraulic turning motor and shock-absorbing mechanism, both forming a part of the invention,

Figure 3 is a fragmentary elevational view, partly in section, disclosing certain details of the invention,

Figure 4 is a sectional view taken substantially along line 4—4 of Figure 3,

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Figure 5 is a sectional view taken substantially along line 5—5 of Figure 3,

Figure 6 is a sectional view taken substantially along line 6—6 of Figure 3,

Figure 7 is a plan view, partly broken away, of certain elements of a shock absorbing mechanism forming a part of the invention, and

Figure 8 is a side elevational view of Figure 7.

Referring more particularly to the drawings, there is shown therein an hydraulically operated loading apparatus having a framework into the rear end of which a conventional tractor is adapted to be driven. The frame consists of a pair of horizontal side pieces 10, to the front end of each of which is connected an upright member 11. The uprights are interconnected at their upper ends with a cross bar 12 and at their lower ends by a cross bar 13. A truss 14 interconnects the upper end of each of the uprights with the rearward ends of its associated horizontal frame member 10 and each of the members 14 is interconnected with its associated member 10 with a vertically extending brace rod 15. A pair of trusses 16 interconnects the inner sides of the vertical members 11.

Affixed to the outer side of one of the horizontal members 10 is a bracket 19 having a forwardly extending ear 20 to which is pivotally connected an ear 21 of an hydraulic press having a cylinder 22 which extends forwardly of the frame and has reciprocally mounted in its forward end a rod 23 to the outer end of which is pivotally connected, as indicated at 24, a pair of upper arms 25 of a bell-crank lever which is pivoted to the frame member 10, as indicated at 26, and which is provided with a lower arm 27 the outer end of which is pivotally connected, as indicated at 28, to one side of a platform 29. A link member 30, similar in size to the lower arm 27, is pivotally connected to the forward end of the frame member 10 opposite to that to which the bell-crank lever is pivoted.

Centrally mounted and extending upwardly from the platform 29 is a cylindrical bearing housing 42 through which a shaft 43 of an hydromotor 44 extends. Affixed to the shaft 43 within the housing 42 is a cylindrical bearing block 45 between which and the lower end of the casing 42 is interposed a plurality of ball bearings 46. The shaft 43 extends through the platform 29 into the hollow interior thereof where it is keyed, as indicated at 47, to a rectangular block 48 whose edges are spaced from the inner edges of the platform 29 and which block is held in position by a nut 49 threadably

mounted upon the lower end of the shaft **43** and having a washer **50** interposed between the block **48** and the nut **49**.

Adjacent each end of the longer sides of the block **48** is a recess **51** and a compression spring **52** is mounted in each of the recesses and is adapted, in each case, to bear against the inner end thereof and against the adjacent side wall of the platform **29**.

The hydromotor **44** is provided with a cylindrical casing **53** having a conventional abutment **54** affixed thereto and a pair of vanes **55** are affixed to the shaft **43**. Suitable flexible pressure lines **56** and **57** are connected with the hydromotor by means of fittings **58** and **59**, respectively.

A pair of horizontally and outwardly extending bracket arms **60** is affixed by means of bolts **61** or the like to the housing **53** and each has affixed thereto at its outer end the lower end of a vertically extending mast **62** which is U-shaped in cross sectional area, and has the legs **63** thereof extending forwardly.

It will be apparent that when the rod **23** is manipulated into and out of the cylinder **22** that the platform **29** will be raised and lowered and that the stabilizer **34** will also be raised and lowered as well as the mast **62** and its associated mechanisms including the boom **75**, dipper stick **78** and the attached scoop. Application of fluid in lines **56** or **57** will cause a movement of the casing **53** around the shaft **43** and consequently a rotation of the mast **62** to left or right with the shaft **43** acting as a center for such movement.

Referring now to the shock-absorbing apparatus shown, for example, in Figure 2 and in Figures 3 to 7, inclusive, it will be seen that when the mast **62** and the various mechanisms carried thereby is turned in one direction or another about the shaft **43** to a desired point, that a very considerable inertia is built up during such movement and it will be understood that without some means for absorbing such momentum, great damage might result to those parts of the apparatus which might otherwise be forced to absorb the shock of the sudden cessation of movement. It will be seen that the block **48** is keyed to the shaft **43** and that hence the same does not move during the rotation of the shaft **62**. Upon the stopping of such rotation by means of the valves controlling the flow of fluid through line **56** or line **57**, the further movement of the mast **62** and its appurtenances due to inertia will be absorbed by the springs **52** when torque is applied to the shaft **43** and consequently to the block **48**.

While but one form of the invention has been shown and described herein, it will be readily apparent to those skilled in the art that many minor modifications may be made without departing from the spirit of the invention or the scope of the appended claim.

What is claimed is:

In an apparatus of the character described, including a frame attachable to a tractor, a hollow rectangular platform carried by said frame, an hydraulic motor having a housing and a vertically dependent shaft, a rectangular block positioned within the platform in spaced relation thereto and affixed to said shaft, a bearing mounted atop said platform, a bearing block affixed to said shaft and revolubly mounted in and supported by said bearing, a mast affixed to said housing, and compression springs interposed between the longer sides of the rectangular block and the longer inner sides of said platform adjacent each end thereof.

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