

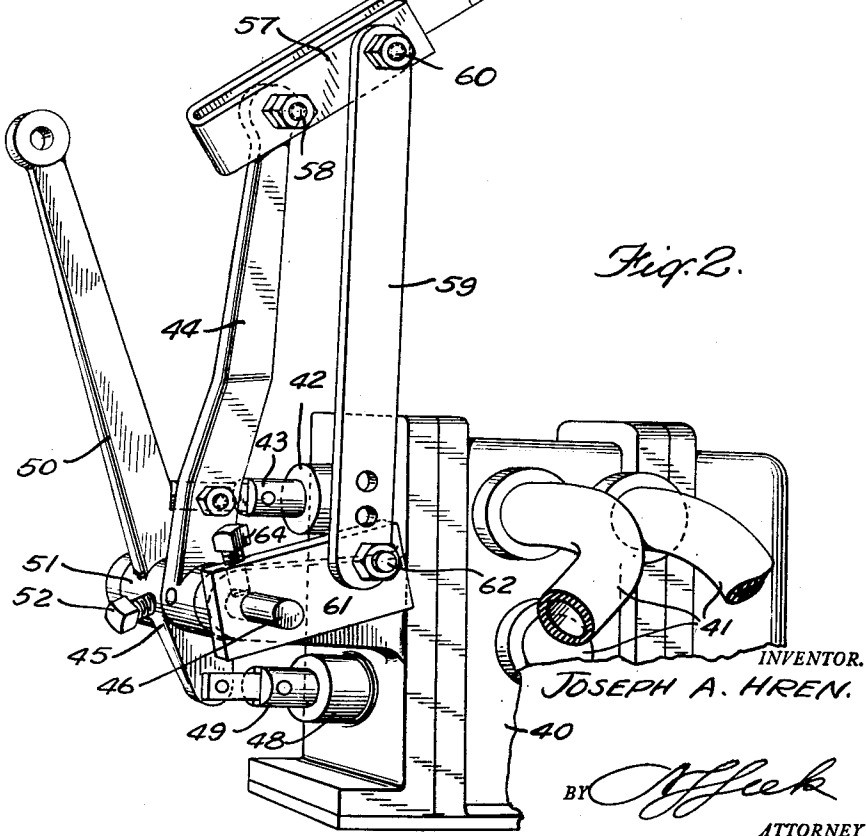
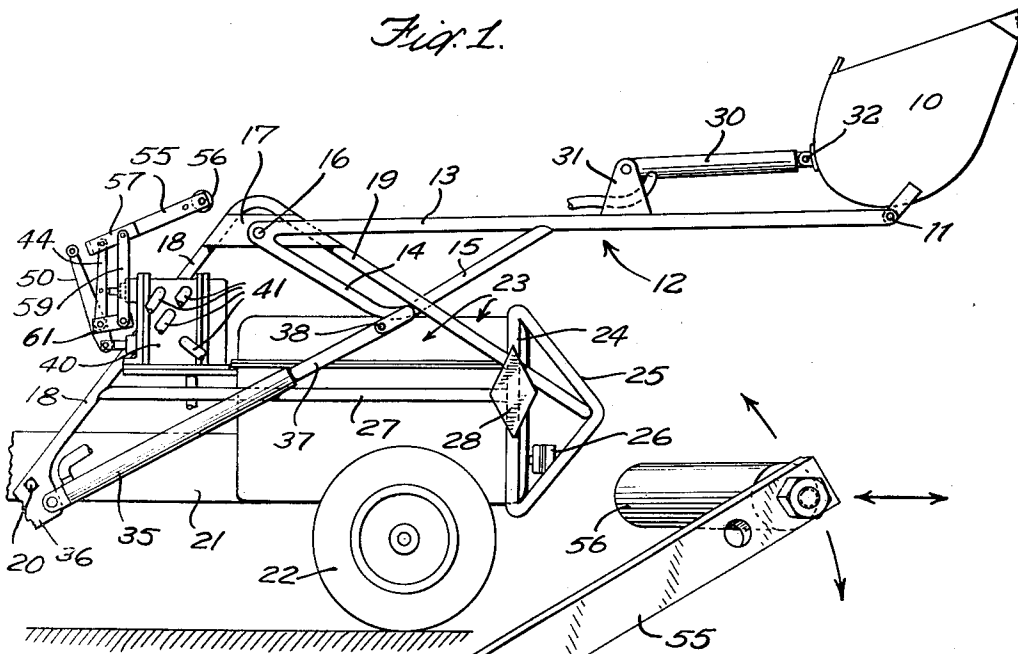
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CONTROL MECHANISM

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CONTROL MECHANISM

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This invention relates to control mechanism of the type used for controlling a plurality of individual movements and has for an object to provide a unitary control wherein a single control handle can be used for the control of such movements.

The invention is particularly applicable to the control of hydraulically operated loading devices having a boom to be raised and lowered and a bucket to be tilted for loading or dumping, and provides a single control handle which may be moved vertically or horizontally to control both the elevation of the boom and the tilting of the bucket.

Another object is to provide a control mechanism which may be applied as an attachment to mechanism of the type having two or more control levers for the independent control of the elevation of the boom and the tilting bucket.

Another object is to provide a novel and improved control handle of the above type which may be applied to standard control mechanisms without undue alteration or modification thereof.

Another object is to improve the ease of control of mechanism of the above type.

Various other objects and advantages will be apparent as the nature of the invention is more fully disclosed.

The present invention is applicable generally to mechanisms having two or more movable elements which are controlled by separate control levers positioned to be actuated independently of each other. In one embodiment, the invention is applied to a hydraulic loader having a boom which is hydraulically elevated and carrying a tiltable bucket which is also hydraulically operated and is tiltable independently of the movement of the boom. In standard units of this type the hydraulic control is actuated by valves which are located in a valve block and are controlled by individual handles which are arranged side by side and in a position accessible to the operator of the loader. One type of such mechanism is manufactured by The Wagner Iron Works of Milwaukee, Wisconsin, as an attachment for Ford and Ferguson tractors. It is to be understood, however, that the invention is applicable to various types of control mechanisms which are normally actuated by a pair of adjacent control levers and is not to be restricted to the particular mechanism above referred to.

The mechanism according to the present invention includes a parallelogram type linkage actuated by a handle. The handle is connected to one of the control levers, for example to the

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lever controlling the tilting movement of the bucket and the parallelogram linkage is connected to actuate the shaft of the other control lever, for example the lever controlling the raising and lowering of the boom. The arrangement is thus such that lateral movement of the handle actuates the first lever for tilting the bucket and raising and lowering of the handle actuates the second control lever for raising and lowering the boom. In this way the bucket in effect is caused to duplicate the movement of the handle so that the manual operation is greatly simplified.

The features of the invention will be better understood by referring to the following description, taken in connection with the accompanying drawing in which a specific embodiment has been set forth for purposes of illustration.

In the drawing:

Fig. 1 is an elevation on a small scale of a portion of a loading apparatus embodying the present invention; and

Fig. 2 is a perspective view on a much larger scale showing the construction and operation of the control handle.

Referring to the drawing more in detail, the invention is shown as applied to a loader comprising a bucket 10 pivotally mounted at 11 to the end of boom 12 having a beam 13 and girders 14 and 15 forming a structural truss. The boom 12 is pivoted at 16 to a fixed plate 17 mounted on rods 18 and 19. The lower end of the rod 18 is secured as by bolt 20 to the chassis 21 of a tractor having front wheels 22 and a head 23 containing a motor. The front end of the rod 19 is secured to a frame comprising a strap member 24 extending over the front end of the head 23 which carries the weight of the loader and having front braces 25 secured thereto. The front braces 25 support a hydraulic pump 26 in a position to be connected to be driven by the front end of the crank shaft of the tractor motor. The front end of the rod 19 projects past the strap 24 and is attached to the front braces 25. A stay 27 connects the rods 18 and 19 to provide a rigid assembly. A gusset plate 28 connects the rod 18, stay 27 and strap 24.

The arrangement is such that the loader may be applied as an attachment to a standard truck or tractor.

The bucket 10 is actuated by a hydraulic cylinder 30 connected at one end to a bracket 31 on the beam 12 and having a piston connected at 32 to the bucket. The boom 12 is actuated by a hydraulic cylinder 35 connected to a gusset 36 attached to the rod 18 and having a piston

37 connected at 38 to the member 15. The cylinders and pistons are pivotally connected to the respective parts so that the bucket 10 may be tilted about the pivot 11 by hydraulic pressure applied to the cylinder 30 and the beam 12 may be raised or lowered about the pivot 16 by hydraulic pressure applied to the cylinder 35.

Hydraulic pressure is supplied by the pump 26 which is connected by a pipe not shown to a central housing 40 which is connected to the respective cylinders by pipes 41 (shown broken off for clarity). The hydraulic pressure to the cylinder 30 is controlled by a valve 42 having a plunger 43 actuated by a handle lever 44 having a hub 45 journaled about shaft 46. The connections are such that movement of the lever 44 toward the operator (to the left in the figures) causes the bucket 10 to tilt forwardly (clockwise in the figures) for dumping and movement of the hand lever 44 away from the operator (to the right in the figures) causes the bucket to tilt backwardly into the position shown in Fig. 1 for loading.

The hydraulic pressure to the cylinder 35 is controlled by a valve 48 having a plunger 49 actuated by a hand lever 50 having a boss 51 which is fixed to the shaft 46 by a set screw 52.

The arrangement is such that movement of the lever 50 away from the operator (to the right in the figures) controls the hydraulic pressure in the cylinder 35 in a sense to lower the boom 12 and movement of the hand lever 50 toward the operator (to the left in the figures) results in raising the boom 12.

The mechanism thus far described is of standard construction and only so much has been set forth herein as is necessary to an understanding of this invention.

The control mechanism of the present invention comprises an arm 55 having a handle 56 at one end and having its other end U-shaped to form a flange 57. The U-shaped end is disposed around the end of the lever 44 and pivotally secured thereto by a bolt 58. A link 59 is pivoted to the end of the flange 57 by bolt 60, and extends generally parallel to the lever 44. The free end of the link 59 is pivoted to an arm 61 by a bolt 62. The arm 61 is fixed to the shaft 46 by a set screw 64.

The arm 55, link 59, arm 61 and lever 44 constitute a parallelogram which provides for parallel motion of the arms 55 and 61 although it is not necessary that exact parallelism be maintained. The length may accordingly be varied somewhat if desired. The arm 55 may extend to the right or left (as seen in Fig. 1) according to the side of the operator on which it is positioned. The housing 40 may of course be reversed in position if desired.

In operation the handle 56 constitutes the manual control device for actuating the bucket and boom in unison. In the embodiment above described downward movement of the handle 56 causes the arm 55 to pivot about the bolt 58,

thereby moving the link 59 downwardly and causing clockwise movement of the arm 61 which produces similar movement of the shaft 46 and hand lever 50. This, as above described, causes the boom 12 to lower. Conversely, raising of the handle 56 produces counterclockwise movement of the handle 50 and raises the boom 12.

Lateral movement of the handle to the left (in the figures) moves the hand lever 44 to the left and causes the bucket 10 to tilt forwardly for dumping. Lateral movement of the handle 56 to the right causes a corresponding movement of the handle 44 and tilts the bucket to upright position for loading.

Hence the handle 56 constitutes a unitary control for the loader in which the bucket in general follows the movement of the handle. If the handle is moved downwardly and toward the operator the boom is lowered and the bucket tilted at the same time.

This unitary control is particularly advantageous in connection with a truck or tractor as it leaves one hand of the operator free to operate the vehicle.

The invention is not to be restricted to the embodiment disclosed but may be adapted to various uses as will be apparent to a person skilled in the art. The invention is only to be restricted in accordance with the scope of the following claim.

What is claimed is:

A control mechanism for a loader having a boom mounted for vertical movement and carrying a bucket pivoted for tilting movement thereon and having hydraulic valves including sliding pistons connected respectively to control the raising and lowering of said boom and to control the tilting of said bucket, said control mechanism comprising a pair of levers mounted side by side to swing about a common shaft and carrying links connected respectively to actuate said sliding pistons, an arm pivotally connected to the free end of one of said levers and carrying an actuating handle, the second lever being fixed to said shaft, a second arm fixed to said shaft and extending generally parallel to said first arm, a link interconnecting said arms, said lever, said link and said arms substantially forming a parallelogram whereby pivotal movement of said first arm actuates said shaft to control the raising and lowering of said boom and lateral movement of said first arm actuates said first lever to control the tilting of said bucket.

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