Sept. 2, 1924. 1,507,064

J. E. JONES ET AL

HOIST

Filed May 20, 1922 4 Sheets-Sheet 1

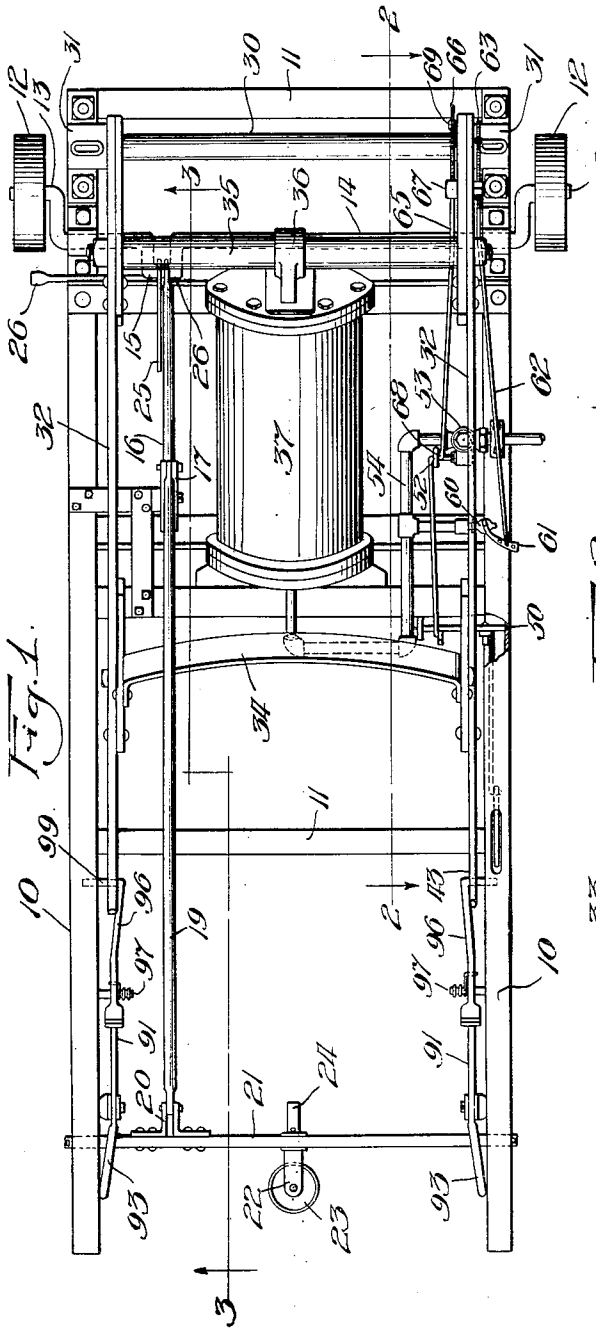


Fig. 1.

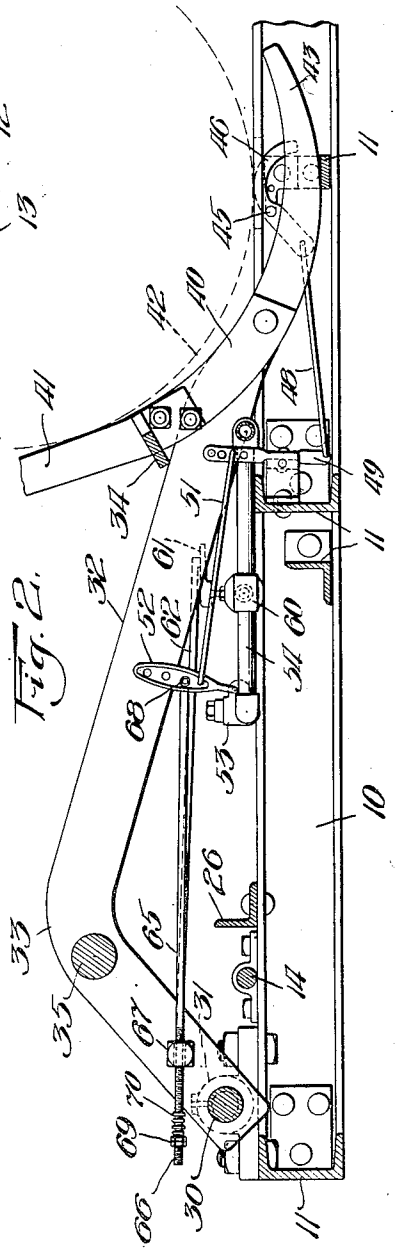


Fig. 2.

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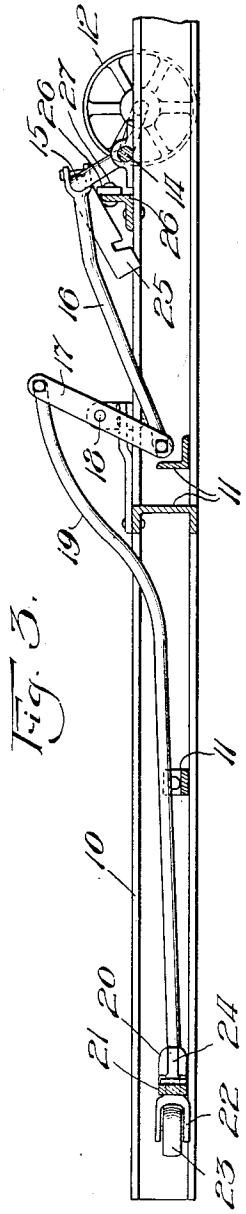


Fig. 5.

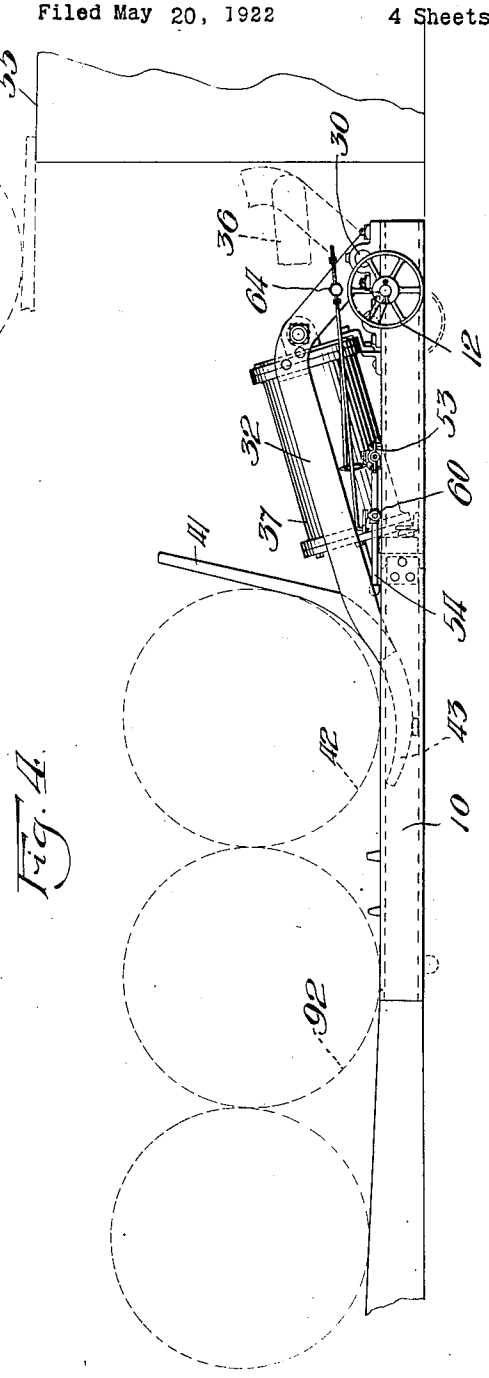


Fig. 4.

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HOIST

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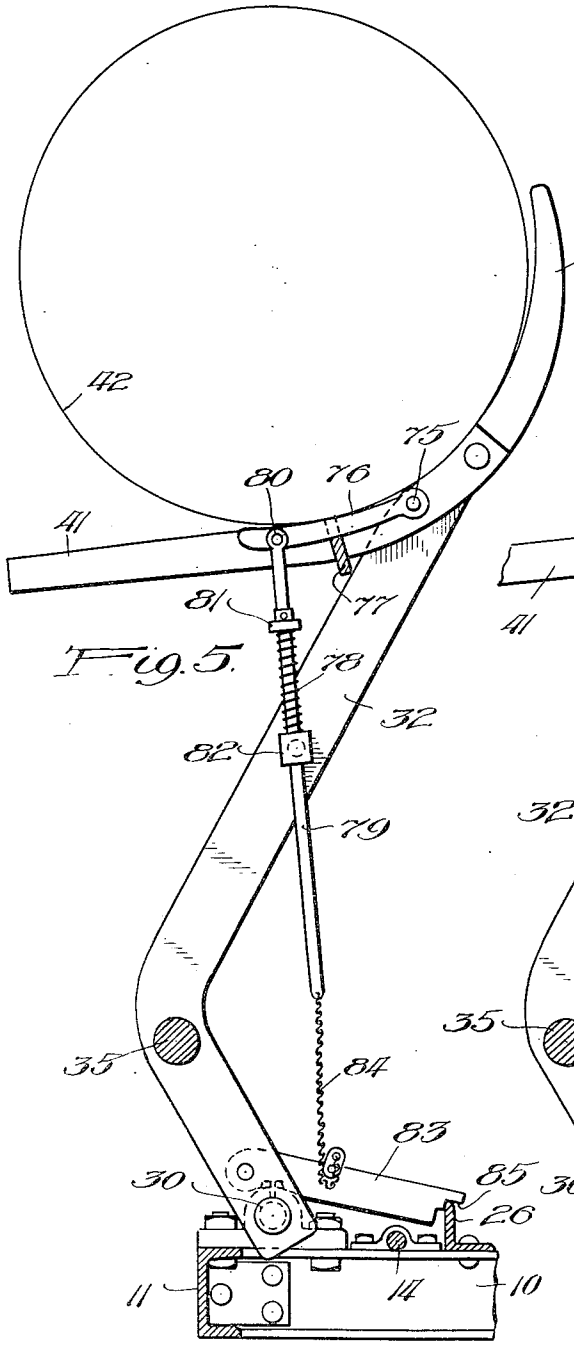


Fig. 5.

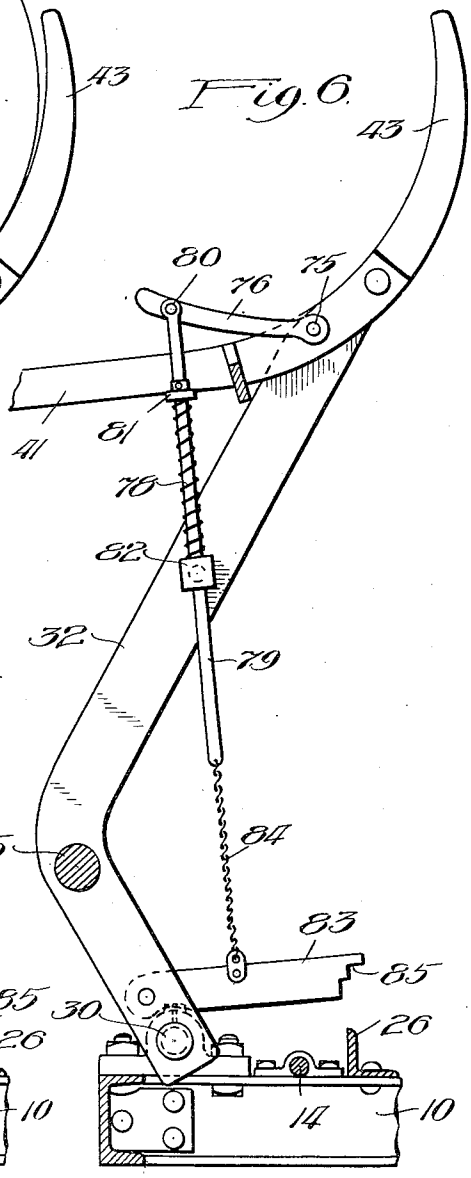


Fig. 6.

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HOIST

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Fig. 7.

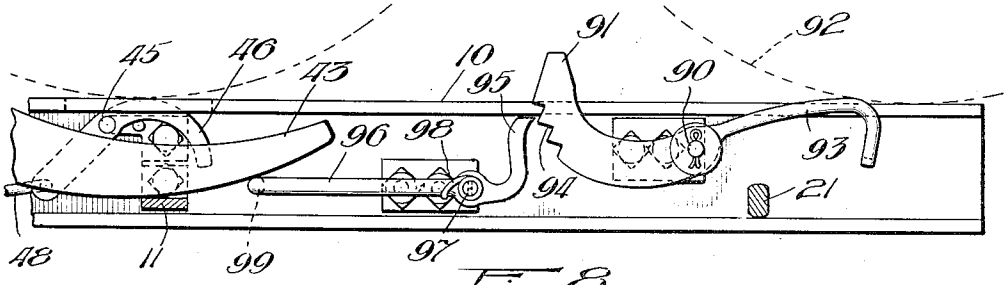


Fig. 8.

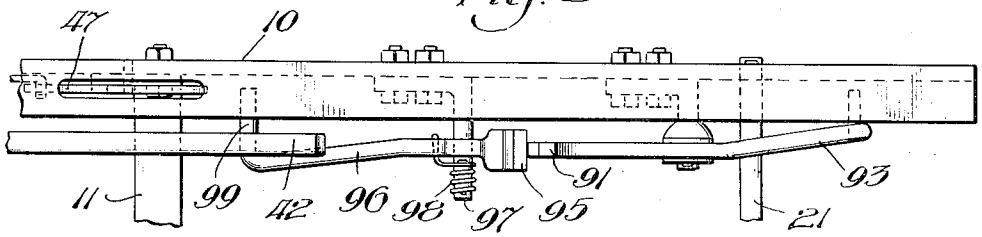
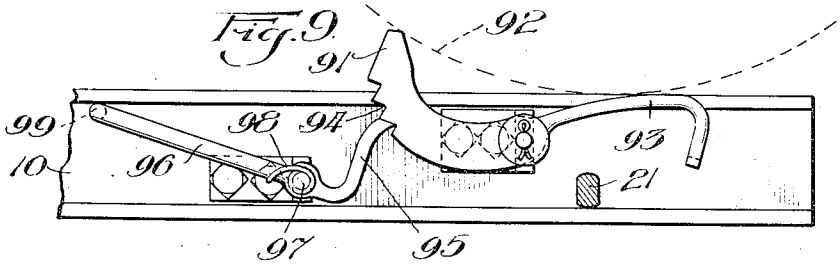


Fig. 9.



Inventors:
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Patented Sept. 2, 1924. 1,507,064

UNITED STATES PATENT OFFICE.

JAMES E. JONES AND WILHELM OTTO GRUENEWALD, OF CHICAGO, ILLINOIS; SAID GRUENEWALD ASSIGNOR OF FIFTY-ONE PER CENT TO SAID JONES.

HOIST.

Application filed May 20, 1922. Serial No. 562,336.

To all whom it may concern:

Be it known that we, JAMES E. JONES and WILHELM O. GRUENEWALD, both citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Hoists, of which the following is a specification.

This invention relates to a power hoist adapted to move a load from a first to a second position; more particularly it has reference to an apparatus of this kind which includes in its mechanism a pair of swinging arms adapted to carry on their free ends a load, such as a barrel, for example, for deposit upon an elevated structure, and means by which the operating power is automatically controlled.

An exemplification of our invention is shown in the accompanying drawings in the manner following:

Figure 1 is a plan view of the hoist;

Fig. 2 is a longitudinal section therethrough on line 2—2 of Fig. 1;

Fig. 3 is a similar view taken on line 3—3 of Fig. 1;

Fig. 4 is a side elevation of the hoist arranged adjacent a platform upon which the load may be deposited;

Fig. 5 is a detail in longitudinal section of certain parts at the pivoted end of the arms;

Fig. 6 is a similar view showing the relation of the parts when the load is removed;

Fig. 7 is a detail in elevation of the receiving end of the hoist showing certain parts which control the rolling of the load thereupon;

Fig. 8 is a plan view thereof; and

Fig. 9 is a view similar to Fig. 7, with the parts in the position which is assumed when one load is in process of being hoisted, and another load is awaiting its turn.

As shown, the hoist of our invention makes use of a frame composed of a pair of channel members 10 extending for the length of the apparatus and connected by suitable cross braces 11. To facilitate movement of this frame upon the floor, we have shown at its forward end a pair of wheels 12 mounted upon the ends 13 of a crank axle 14. Formed in the axle is a second crank 15 to which is connected a link 16 (see Fig. 3) pivoted to one end of a rocker arm 17 mounted to rotate about an axis 18. At its opposite end the rocker arm connects with a second link 19 which extends rearwardly for pivotal connection with a bracket 20 projecting laterally from a bar 21 which is mounted rotatably between the channel members. A yoke 22 having a swiveled mounting on the bar carries a third wheel 23, and by means of a crank (not shown) applied to the yoke head 24 the bar or the wheel or both may be rotated. By rotating the bar, the parts associated therewith, including the crank axle, are also moved with the result that the crank axle is rotated to lift the wheels 12 from the ground, allowing the frame in consequence to rest thereupon. It should be noted that in these movements the bar and crank axle are turned in opposite directions, thereby moving the wheels 12 and wheel 23 toward or from each other; this results in a minimum longitudinal movement on the part of the frame. When in raised position, the parts are maintained stationary as through the medium of a notched latch bar 25 adapted to drop over one edge of an angle iron 26 extending between the side members of the frame. The release of this latch bar from locking position may be effected with the aid of a treadle 26 pivoted as at 27 and engaging with one end the latch bar so as to raise the same. The construction just described affords one convenient means by which the frame may be moved about conveniently preliminary to being rested upon the floor for operation.

The hoist proper includes a shaft 30 rotatably journaled in suitable bearings 31 one arranged at the forward end of each member; a pair of lifting arms 32 each having one end mounted on the shaft, the arms being preferably arched or bent as at 33 so as to proceed rearwardly from the shaft first in an upward direction and thereafter in a downward direction; and suitable braces 34 and 35 extend between the arms, the latter being in the form of a bar or shaft. Connected with this bar is the outer end of a plunger 36 with which is associated a piston (not shown) adapted to reciprocate in a cylinder 37 to which a fluid pressure is admitted. The cylinder is suitably mounted upon the framework so as to present its axis both upwardly and forwardly, the power in consequence being applied in a corresponding direction.

At its free end each lifting arm is provided with an upward extension 41 which provides a stop for the cylindrical body of the load 42 when received on the arms for purposes of hoisting. At its extremity 43 each arm curves downwardly to lie just below the upper face of the frame member 10, and thence upwardly so as to form a seat or cradle for the load when the lifting arms are raised. Between the two side members of the frame is pivoted, as at 45, an arm having a bend in the general form of a bell crank. One end 46 of this arm normally protrudes in the path of the load when received upon the cradled arms, the result being that the crank is shifted to a position such as is shown in Fig. 2. Connecting with the opposite end 47 of this crank arm is a link 48 which connects also with a rocker arm 49 pivoted as at 50. Extending from the opposite end of the rocker arm is a second link 51 which connects also with a handle 52 controlling a valve 53 in a pipe line 54 through which fluid pressure is led to the cylinder 37. By moving the controlling handle 52 through operation of the parts connected therewith which are set in motion by the weight of the load upon the hoisting arms, the piston mechanism is operated to lift the arms with the load thereon so as to deposit the same upon a higher elevation such as the platform 55 (see Fig. 4). The connections leading to the handle 52 may be adjusted in any of the usual manners so as to ensure proper efficiency in operation.

Connected with the pipe line 54 is an exhaust valve 60, the operation of which is automatically controlled by the movement of the hoisting arms, as is also the closing of the inlet valve 53. The means for accomplishing this includes an exhaust valve operating handle 61 with which is connected a rod 62 having one end threaded as at 63; this rod end is slidably extended through a block 64 that is swivelly mounted on one of the hoisting arms near its pivoted end. A second rod 65 also threaded at one end 66 is slidably extended through another block 67 also swivelly secured to the hoisting arm, this last rod being connected as at 68 with the controlling handle 52 of the inlet valve. Upon the threaded end of each rod are lock nuts 69, and interposed between these nuts and the associated block 64 or 67 are coiled springs 70. As the hoisting arms approach their highest positions, the gap between each spring 70 and the guide block associated therewith is reduced until finally one contacts with the other, thereby imparting to the two rods 62 and 65 a linear movement such as to pull both valve handles at the same time. With operation of the inlet valve, the flow of pressure medium to the cylinder is checked, while with operation of the other valve a passage is opened up for the exhaust of the pressure theretofore admitted to the cylinder. Preferably the operation of these valves is so timed and their action is so correlated with the aid of the two springs 70, that inflow of pressure medium is checked before the lifting arms have completed their hoisting movement, the operation of the exhaust valve being delayed until the load is deposited upon the platform and the hoisting arms are ready for return movement.

Referring now to Figs. 5 and 6 where the hoisting arms are shown in a position of maximum height, it will be noted in the former figure that the load is still carried on the lifting arms. Upon one of these arms is pivoted, as at 75, a link 76 adapted to rest against a stop 77 when held thereupon by the load. Normally, however, the link is maintained in the position of Fig. 6, as through the medium of a spring 78 which is coiled around a rod 79 connected at 80 with a link 76; and one end of the spring bears against a collar 81 which surrounds the rod while the other spring end engages a guide block 82 through which the rod is freely extended. Near the pivoted end of the hoisting arm is swingingly mounted a latch bar 83 having a flexible connection 84 with the rod 79. At its acting end the latch bar is notched, as at 85, so as to engage with the angle iron 26 extending transversely between the frame members, when the parts are in the relation shown in Fig. 5. The hoisting arms are here represented as ready to deposit the load upon the elevated platform, this transfer being accomplished by gravity due to the downward inclination of the extension arms 41 when in this position. During the unloading operation the hoisting arms are prevented from oscillating back due to the action of the latch bar 83. With release of the load, however, the spring 78 operates to lift the rod 79 and with it the latch bar 83 (see Fig. 6), thereby permitting the hoisting arms to drop back to horizontal position, as shown in Fig. 2. This return movement of the hoisting arms is accomplished by gravity, since the preponderance of their weight remains always to the rear side of the shaft 30.

In Figs. 7 to 9 inclusive, we have shown a means for controlling the movement of rolling loads to position upon the hoisting arms. With the use of such a device, a number of barrels, for instance, may be arranged one behind the other upon inclined rails, so as to roll by gravity upon the hoisting arms and be successively carried thereby to an elevated platform, all without manual regulation or attention.

Adjacent the rear end of the frame there is mounted as at 90 a rocker arm of which

one end 91 upstands to form a stop for a barrel 92 when moved to a position just preliminary to rolling upon the lifting arms. The other end 93 of the rocker arm lies beneath the barrel to be engaged thereby so as to maintain the stop end 91 in upright position. In addition we have formed on the front edge of the arm end 91 one or more teeth 94 with which may engage a hook 95 forming part of an arm 96 which rocks about a pivot 97, a spring 98 serving normally to maintain the hook end of this arm in engaging relation with the toothed end of the rocker arm first mentioned. Extending laterally from the arm 96 is a head 99 which lies beneath the arm extremities 43 so as to be engaged thereby when the hoisting arms are in lowermost position (see Fig. 7). When so related, the hook 95 becomes disengaged from the teeth 94 permitting the stop 91 to drop down with forward movement of the barrel. Thereafter when the barrel 92 is received on the cradle arms and the hoisting operation is under way, the stop 91 will again rise up under the action of the spring actuated arm 96 whose hook end will reengage the teeth 94 for this purpose.

A hoist answering to the preceding description may be advantageously used for lifting barrels or other loads from a first to a second position. As a suitable pressure medium for operating the piston mechanism, compressed air is suggested but it should be borne in mind that the particular kind of power medium or form of power device used to effect the lifting of the hoisting arms is relatively immaterial to this invention. Of more importance is the construction and arrangement of the various parts in their special relation to each other for the purpose of controlling automatically the operation of the hoisting arms, and of guarding against accident during the intervals when the load is being received or discharged.

We claim:

1. In a hoist, the combination with a frame of a pair of hoisting arms pivotally mounted thereon, each of the arms being extended from its pivotal connection first upwardly and rearwardly and then downwardly and rearwardly, whereby a bend is formed intermediate of its ends, means on the free ends of the arms for carrying a load, a connection between the arms in the region of the bend in each, piston mechanism mounted on the frame and adapted to exert an upward and forward force against the connection between the arms, means for admitting fluid pressure to and exhausting the same from the piston mechanism, controlling means therefor, including an inlet valve and an outlet valve, and means for imparting movements to the two valves, having connections, one adapted to be engaged by the load when received on the hoisting arms, whereby the inlet valve is opened to cause said arms to rise, and the other adapted to be engaged by the arms when the same have risen to a desired point whereby the exhaust valve is opened to permit a return movement of the arms, substantially as described.

2. In a hoist, the combination with a frame having two side members of a pair of load receiving hoisting arms pivoted to one end of the frame and adapted to swing upwardly from a substantially horizontal position thereupon, the hoisting arms being disposed to the inside of the frame members and having connections with each other such as to move in unison, means carried on the swinging ends of the arms adapted to receive thereon a load, pressure operated piston mechanism adapted to lift the arms together with the load thereon, and other means controlling the pressure acting on the piston mechanism having a connection with the frame at a point adjacent to the position wherein the load is received on the arms for hoisting, said connection being engageable by the load to acuate the controlling means whereby the piston mechanism is caused to operate, substantially as described.

3. In a hoist, the combination with a frame of a hoisting means movably mounted thereon, a seat on said means for receiving a load, a valve controlled piston mechanism for operating the hoisting means, and a pair of connections from the piston mechanism controlling valve adapted for successive engagement, one by the load when positioned on its seat and the other by the hoisting means when elevated to a desired point, the said successive engagements with the valve connections operating to effect through the piston mechanism a single complete cycle of movement of the hoisting means, substantially as described.

4. In a hoist, the combination of a pivoted hoisting arm adapted to swing from a load receiving to a load discharging position, power mechanism operatively connected therewith, a controlling device for the power mechanism, having a connection with the arm such as to arrest operation of the power mechanism when the arm has reached its load discharging position, means carried by the arm forming a support for the load, a latch for restraining the arm in its load discharging position, and a connection with the latch acted upon by the load when discharged from the arm such as to release the arm for return movement to its load receiving position, substantially as described.

5. In a hoist, the combination of a frame whereon is a pivoted load-receiving arm having a power mechanism for moving the same upwardly from a substantially hori-

zontal position, controlling devices for regulating the action of the power mechanism, and connections from said devices, one which is loose extending to the arm, and another to the frame in a manner to be engaged by a load when positioned on the arm, whereby one of the controlling devices is acuated to start operation of the power mechanism, the other connection which is loose with respect to the arm being thereafter moved by the arm to stop operation of the power mechanism at a desired point in the cycle of the arm movement, substantially as described.

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Witness:
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