

Feb. 13, 1934.

J. M. JOHNSON ET AL

1,947,264

SELF LOADING PORTABLE ELEVATOR

Filed Dec. 12, 1932

3 Sheets-Sheet 1

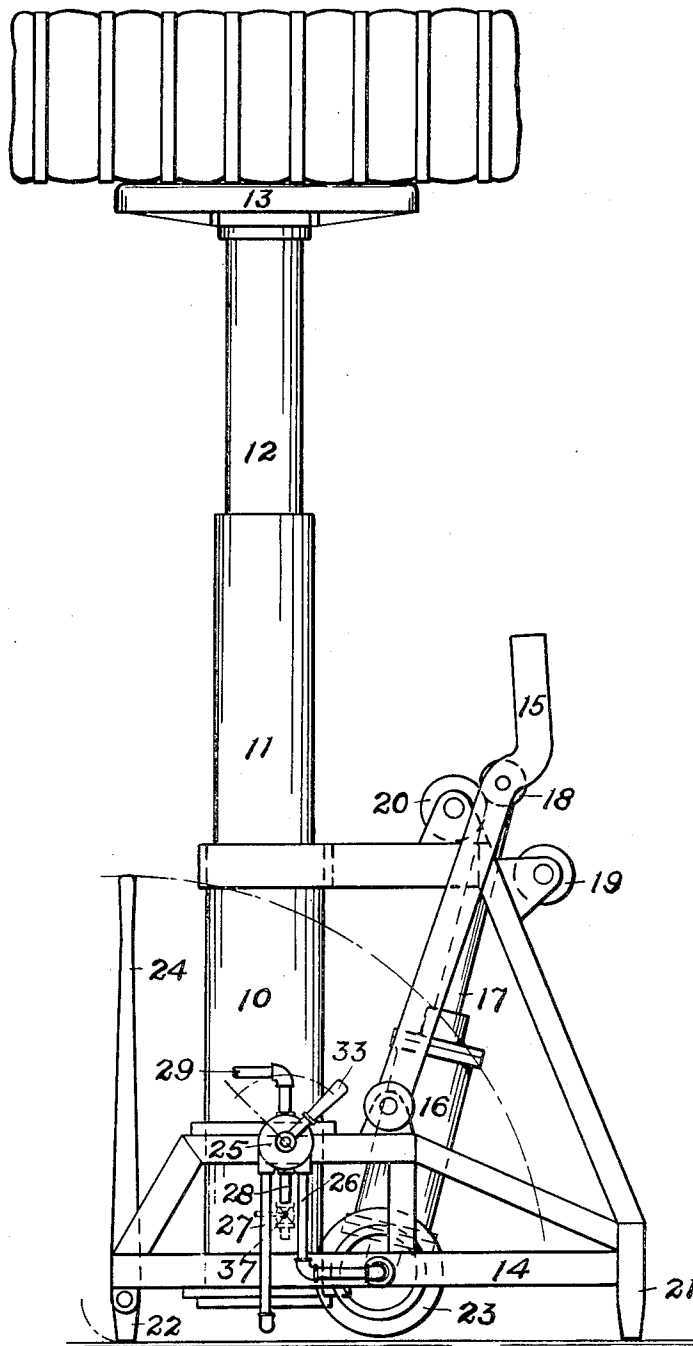


Fig. 1.

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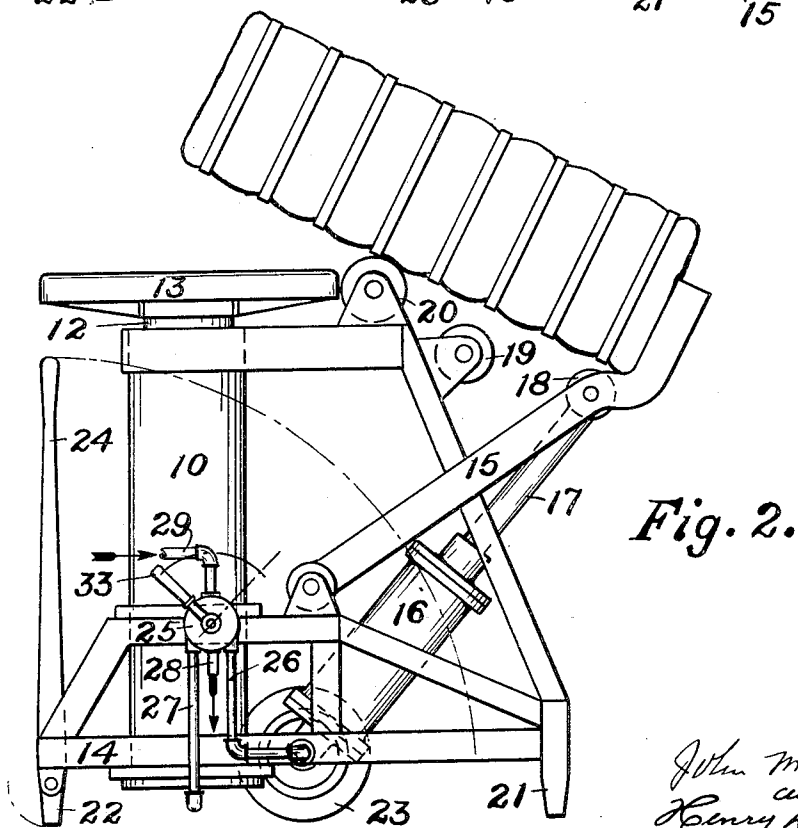
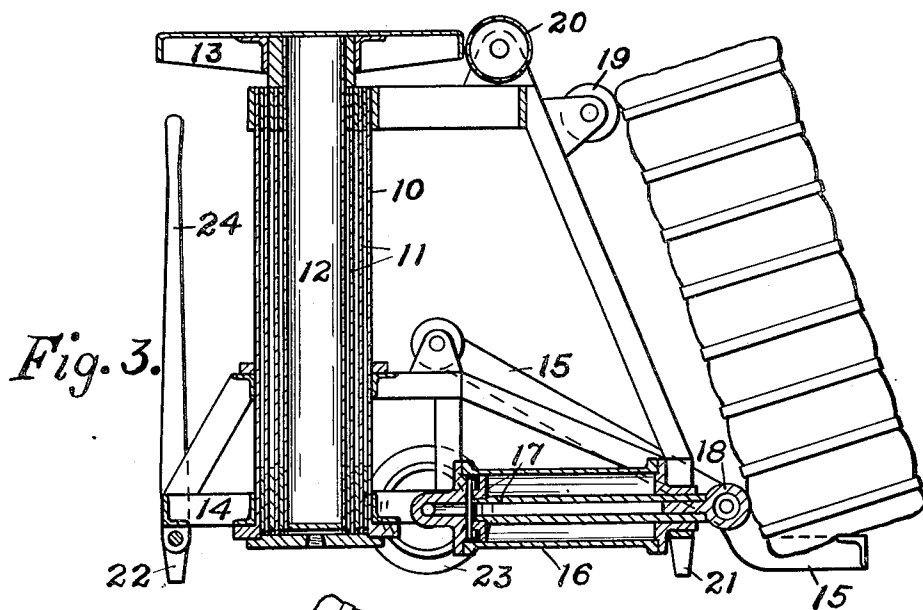
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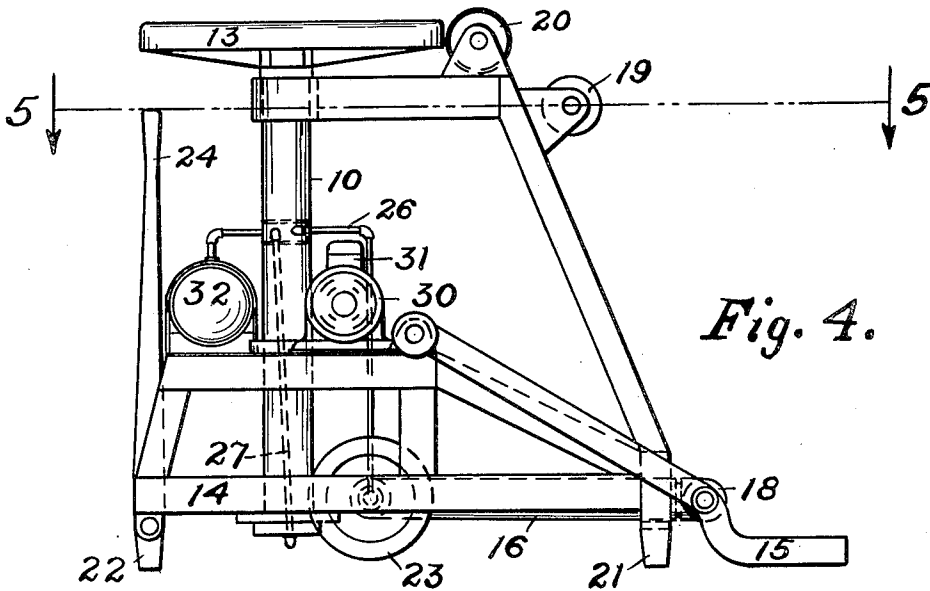


Fig. 4.

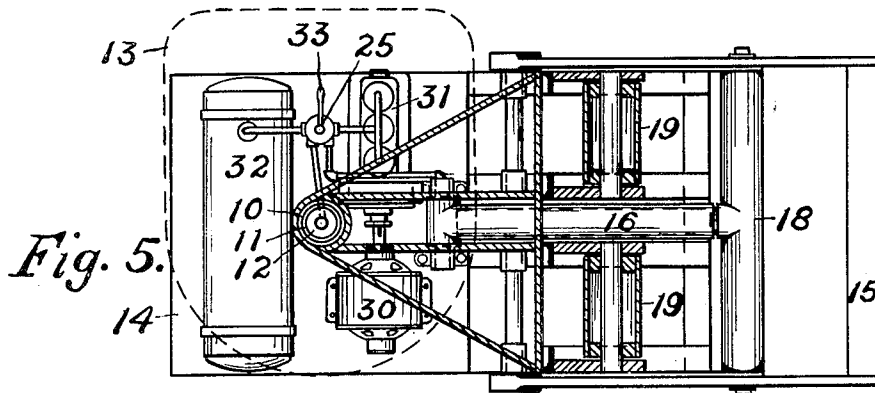


Fig. 5.

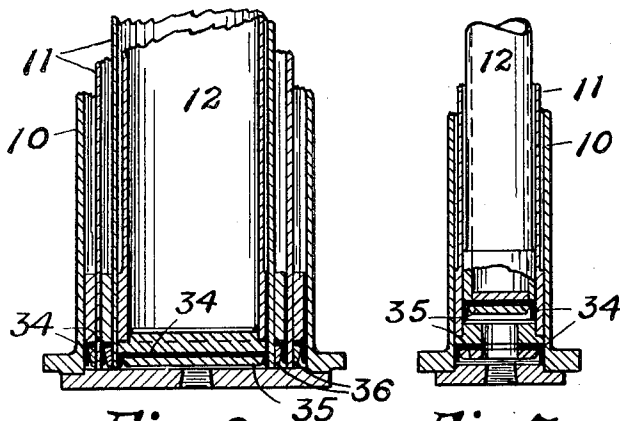


Fig. 6

Fig. 7.

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1,947,264

SELF LOADING, PORTABLE ELEVATOR

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Application December 12, 1932
Serial No. 646,834

1 Claim. (Cl. 214—95)

It is the object of our invention to provide a portable, self contained, self loading elevating machine capable of vertically elevating packages, boxes, bales, etc. from substantially floor level to ceiling or to any desired height between. Another object is to provide a machine which will occupy comparatively small floor space so that it may be used in narrow aisles, alleys or other crowded spaces and yet be low enough to pass easily under low doorways, craneways, sprinkler pipes or other overhanging objects. A further object is to provide means of elevating packages in such manner that no part of the machine will be above such package thus providing maximum loading height below the ceiling or roof under which the material is being stored and of accomplishing this object without material change in stability or increased tendency to overturn. Another object is to provide a comparatively low elevating device which yet may raise objects a vertical distance several times its own initial height by means of the telescopic component parts of its structure. A further object is to provide such a machine which may be loaded in the direction best suited to its location but may be unloaded from any other relative direction; or, in other words, one in which the direction of loading and unloading may be at right angles or opposite, one to the other. A further object is to provide such a self contained fluid operated machine, requiring a minimum number of operating parts, which may be moved at will from place to place and set in operation by simply making proper connection by means of flexible tubing to any convenient source of fluid under pressure, such as air, steam, oil or water. An alternate form carries its own motor, pump and storage tank and may be used by merely plugging in the motor line extension to any convenient electric socket or similar connection.

In its simplest form our invention consists of a low wheeled frame provided with a vertically disposed telescopic cylinder upon which an elevating platform is mounted. A loading arm or frame is hinged at one end to the main frame, the opposite or free end normally resting on the floor. By means of an oscillating cylinder having hinged connection to the main frame and pin connection of an associated piston rod to the loading frame, the loading frame may be caused to lift and transfer any load placed upon it to the elevating platform. Both the telescopic elevating cylinder and the loading frame cylinder may be operated by any desired fluid, such as compressed air, steam, or liquid under pressure.

Our invention is clearly shown in the accompanying drawings, in which Fig. 1 discloses a side elevation of the elevator as it would appear when raising a load. Fig. 2, another side elevation, shows the load being transferred from the lifting frame to the elevator platform. Fig. 3, a sectional view, the section being made by a plane passing vertically through the centers of both cylinders. Fig. 4 shows a more complete unit provided with motor, pump, and storage tank. Fig. 5 is a horizontal section taken along the line 5—5 of Fig. 4. Fig. 6 shows a fragmentary vertical section through the lower part of the telescopic cylinder intended for operation with compressed air. Fig. 7 discloses a similar section through a telescopic cylinder intended for operation by hydraulic means.

The construction and operation of our portable, self loading elevator will be readily understood on reference to the following explanation in which the parts referred to may be identified by given numerals, similar numerals indicating similar parts throughout this discussion.

Referring now to the drawings, and especially to Fig. 3, the portable elevator consists of a telescopic cylinder comprising an outer section 10 which is rigidly mounted on the frame 14, one or more intermediate sections 11, 11 slidably mounted therein and arranged to slide one within the other, and an inner section or plunger 12 upon which an elevator platform 13 is secured. A loading arm 15 is hinged at its inner end to frame 14 to permit a swinging upward movement of its outer end which normally rests upon the floor. This upward swinging or lifting of loading arm 15 is accomplished by means of the oscillating cylinder 16 which is hinged to the frame at a point below the hinge point of the loading arm and the co-operative action of the plunger 17 which slides in cylinder 16 and is secured to the cross arm 18, the latter being connected to the loading arm 15 by proper pin connection. The short rollers 19 and long roller 20 are rotatably mounted near the upper part of frame 14 for the purpose of guiding any load being transferred from the loading arm 15 to the elevator platform 13.

Frame 14 is supported by the corner posts 21 and tilting legs 22. It is also provided with a pair of wheels 23 which normally do not touch the floor but are useful in moving the machine from place to place. To enable these wheels to function the lever 24 is shifted downward thus causing outward swinging of tilting legs 22 to which the lever is connected, and thereby lower-

ing the machine upon the wheels 23, which are preferably located substantially below the center of gravity of the entire machine.

The drawings show a four way valve 25 attached to frame 10 by means of which fluid may be directed either to the oscillating loading cylinder 16 through line 26 or the telescopic elevator cylinder 10 through line 27, or discharged from either through the same lines to the outlet line 28, the fluid being received through the inlet line 29 which may be flexibly connected to any convenient source of fluid supply.

Our method of sealing the plunger 12 and intermediate cylinders 11, 11 is shown in Figs. 6 and 7. It is a conventional method, each cylinder end being fitted with the usual leather cup 34 and held in place by a plate 35 or ring 36. Piston rings may be substituted for the leather cups to suit other fluid conditions.

The foregoing discussion relates to a fluid operated portable elevating machine in which the fluid supply is obtained from some source outside of the machine but Figs. 4 and 5 disclose a more completely self contained unit comprising a self contained motor 30 and pump or compressor 31, and a fluid container 32 as required for either a hydraulic or pneumatically operated machine.

Figs. 4, 2 and 1 show the various stages of operation. In Fig. 4 the machine is empty, ready to receive a load on the loading arm 15. Fig. 2 shows the load being transferred to the elevator platform 13, and Fig. 1 shows the load being elevated.

To operate, the machine (Figs. 1 to 3) is first delivered to the desired location and connected to a convenient fluid supply outlet by means of a flexible tube or hose. A load is then placed on the loading arm 15, after which the operator moves valve lever 33 to the left to form unrestricted communication between the inlet line 29 and the oscillating cylinder 16 thus permitting free passage of the compressed fluid to that cylinder. Plunger 17 is thereby forced outward, lifting the loading arm 15 to which it is connected. This swinging upward movement continues until the end of the plunger stroke at which time the load has been transferred to the elevator platform 13. The operator now shifts valve lever 33 to the right thereby forming communication between the telescopic cylinder 10 and the fluid supply and at the same time releasing the pressure in the oscillating cylinder to the discharge outlet 28. Pressure within cylinder 10 now acts upon the plunger 12 (and intermediate cylinders 11, 11) forcing these members upward thereby

raising the load. When the load has been elevated to the proper height for unloading valve lever 33 is shifted slightly to the left thereby closing the cylinder against inward or outward movement of the fluid and the load may be removed after which the platform is lowered by releasing the entrapped fluid through a further movement of lever 33 to the vertical position.

When operating with an expansible fluid, such as compressed air, the platform 13 is made of an irregular shape as indicated by the broken lines of Fig. 5 and after being elevated to the proper height this platform (and the plunger 12 to which it is secured) is given a quarter turn movement so that the overhanging edge will then overlap the surface on which the load is being discharged. Pressure in the cylinder is then released until the platform is lowered and somewhat supported by the intervening surface. This is done to avoid having the plunger shot upward with the platform after the load is removed.

As a further safeguard the spring loaded valve 37 may be provided, this valve being preloaded sufficiently to close automatically when the pressure in the cylinder has been released sufficiently to leave exactly the proper pressure to sustain the weight of plungers and platform without any other load.

To operate the more completely self contained machine of Figs. 5 and 6, the fluid line connections being already complete within the unit, involves only proper connection of the motor 30 to any convenient electric socket by means of a line extension attached to the motor. Operation of the motor drives the pump (or compressor) and thereby furnishes the proper fluid pressure for use in the cylinders.

What is claimed is:—

In a self loading elevator the combination of a main frame, a vertically disposed cylinder supported thereon, a co-acting plunger, one end of which projects outwardly above the cylinder, and a platform secured to the projecting end of the plunger; a loading frame hinged near one end to the main frame, an oscillating cylinder also hinged to the main frame at a point below the hinge point of the loading frame, and a co-acting plunger hinged to said loading frame near the free end thereof, said oscillating cylinder and co-acting plunger thereby forming means to lift the free end of the loading frame for the purpose specified.

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