

Aug. 30, 1949.

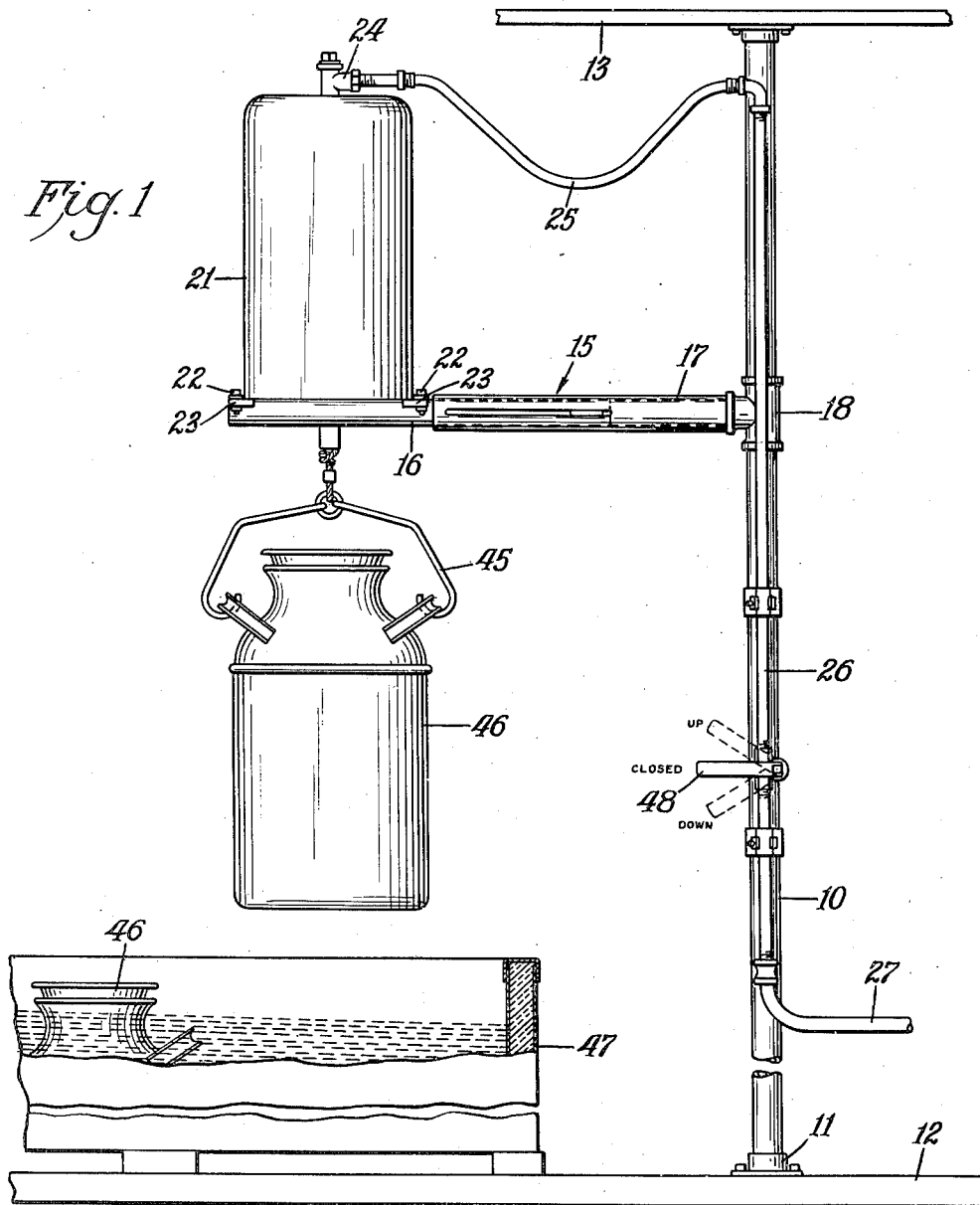
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LIFTING DEVICE

Filed Nov. 14, 1945

2 Sheets-Sheet 1



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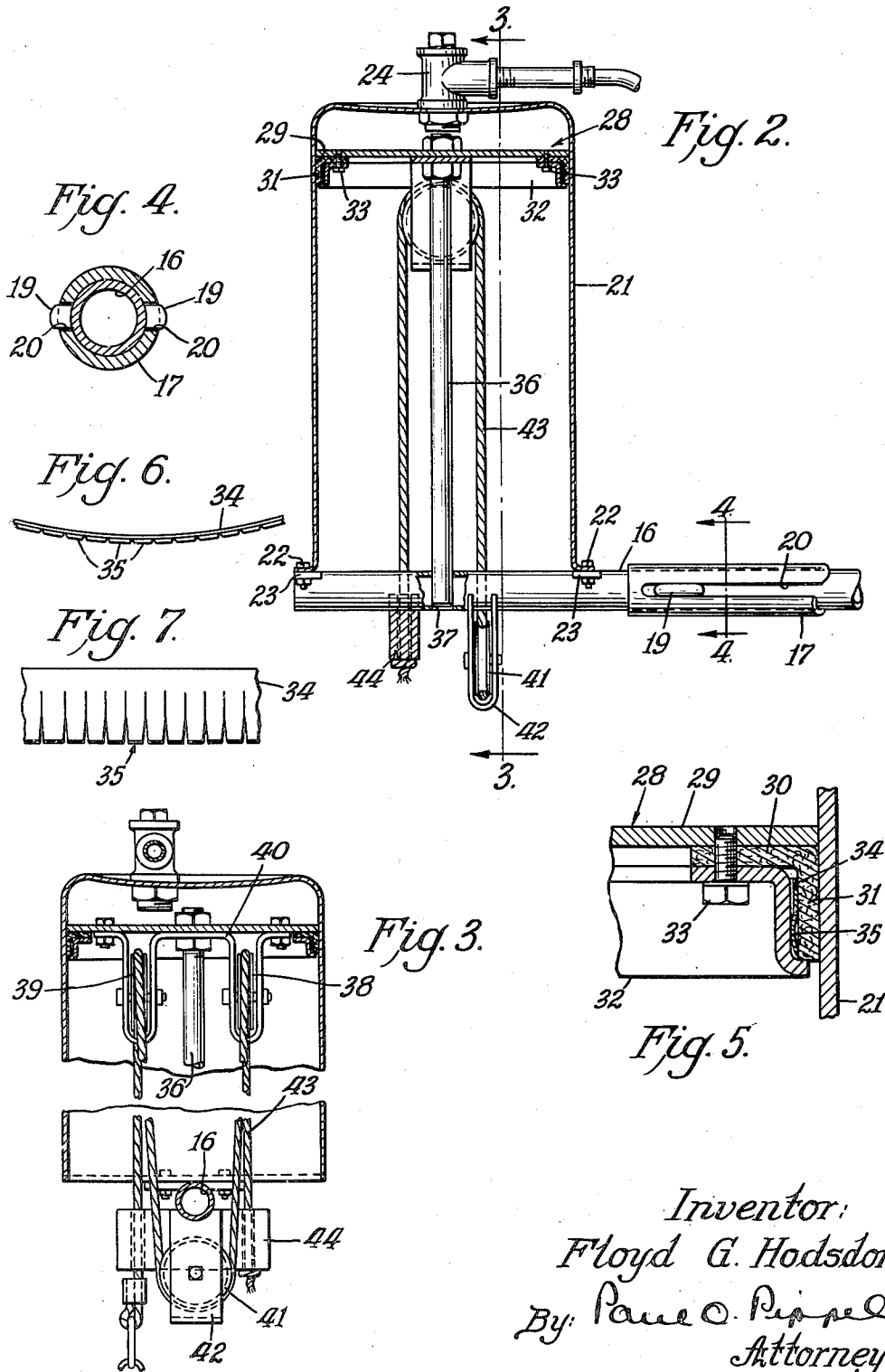
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UNITED STATES PATENT OFFICE

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LIFTING DEVICE

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5 Claims. (Cl. 212—31)

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This invention relates to a lifting mechanism and more particularly to a lifting device that is operable with a vacuum producing means. More specifically it relates to a lifting device adapted to be used in conjunction with a milker system having a vacuum producing means.

One of the difficult chores found in conjunction with the operation of a milker system is the lifting and moving of filled milk cans to and from the milk coolers. This tiring task often requires the efforts of several men and causes the expending of energy that can be more profitably used elsewhere. In order to eliminate this extra effort, it is extremely desirable to provide an inexpensive and efficient lifting device.

Since the height of many milking establishments is definitely limited, it is also desirable to provide a lifting device that will fit into low ceiling areas and yet provide a maximum height of lift.

An important object of this invention is the provision of an efficient and inexpensive lifting device.

Another object is to provide a lifting device that is actuated by the vacuum producing means of a milker system.

Another object is to provide a vacuum actuated lifting device that will lift an object a substantially greater distance than the movement of the actuating piston.

A still further object is to provide a piston that will adequately seal a cylinder despite occasional distortions of said cylinder.

The foregoing and other important objects of the invention will become apparent from an examination of the following detailed description and accompanying drawings, in which:

Figure 1 is a view in side elevation of the invention, showing the lifting device in the operation of removing a milk can from a milk cooler;

Figure 2 is a side sectional view of the lifting cylinder and associated parts;

Figure 3 is a sectional view taken along the section line 3—3 of Figure 2;

Figure 4 is a sectional view taken along the line 4—4 of Figure 2;

Figure 5 is an enlarged sectional view of a portion of the piston and wiper means;

Figure 6 is a detail plan view of a resilient compression ring; and

Figure 7 is a side elevational view of the same.

The lifting device best illustrated in Figure 1 comprises a vertical standard 10 turnable about a vertical axis in a bearing member 11 connected to the floor 12. The upper end of the vertical

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standard 10 is connected to a ceiling supporting structure 13 by a bearing bracket.

A horizontal arm 15 consists of telescoping members 16 and 17 and is connected to the vertical standard 10 by a connecting coupling 18. The telescoping member 16 includes a pair of lugs 19 which ride in slots 20 in the telescoping member 17. The telescoping members 16 and 17 thus can be extended with respect to one another without any appreciable torsional movement.

A pressure cylinder 21, having an open and a closed end, is connected at its open end to the horizontal arm 15 by means of connecting bolts 22 and lugs 23. A pressure connection 24 communicates with the closed end of the cylinder 21 and is connected by a flexible conduit 25 to a vertically extending pipe 26 supported on the vertical standard 10. A flexible conduit 27 communicates with the pipe 26 and is connected to a vacuum chamber, not shown.

As best shown in Figures 2 and 5, a piston 28 comprises an annular plate 29, to which is fastened a wiper ring 30 having a downwardly extending portion 31 circumferentially in abutment with the wall of the cylinder 21. A retaining ring 32 is connected to the annular plate 29 by circumferentially spaced bolts 33. The retaining ring 32 serves to compress and retain a resilient ring 34 against the downwardly extending portion 31 of the wiper ring 30. The resilient ring 34 is also vertically slotted to provide a plurality of teeth 35 which serve to further compress the wiper ring 30 against the cylinder 21.

A stabilizing rod 36 is centrally connected to the piston 28 and slidably engages a guide slot 37 formed in the telescoping member 16.

A greater distance of lift, as compared to the distance of travel of the piston, is obtained by a pulley arrangement which consists of a pair of pulleys 38 and 39 connected to the annular plate 29 by a pulley bracket 40. A pulley 41 is connected to the telescoping member 16 by a pulley bracket 42. The pulleys 38, 39, and 41 are of a conventional type. They may, however, be bearing arrangements or members in the form of sleeves or similar members which may be engaged by the flexible element with a minimum of friction.

A flexible element in the form of a rope 43 is connected at one end to a guide bracket 44 which in turn is connected to the telescoping member 16. The rope 43 extends upwardly and around the pulley 38; then downwardly and around the pulley 41; then upwardly and around the pulley 39; then downwardly through the guide bracket 44. The end of the rope 43 is connected to a

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connecting or attaching tong 45 which is adapted to be connected to the handles of a milk can 46 for lifting said can out of a milk cooler 47.

The amount and vertical direction of travel of the piston 28 within the limits of the cylinder 21 is determined by a valve 48 in communication with the pipe 26.

The operation of the invention should be readily apparent from the drawings and the foregoing description. It should also be noted that in this invention the cylinder can be of comparatively light construction and need not be precision made as in the case of most cylinders. The novel construction of the piston, as disclosed, insures adequate sealing during occasional distortions of the cylinder walls.

It will be appreciated that the foregoing description has referred to only preferred embodiments of the invention and that modifications of these preferred forms may be made without departing from the spirit and scope of the invention as defined in the appended claims.

What is claimed is:

1. A lifting device adapted for use with a vacuum operated milker system, said lifting device comprising a vertical support, a supporting means extending radially from said vertical support, a cylinder having an opening, means connecting said cylinder to said supporting means, a piston mounted for reciprocation in response to vacuum pressure within said cylinder, a pressure conduit connected to and communicating with said cylinder, a stabilizing member connected to said piston and adapted to slidably extend through an opening in said supporting means, first and second pulleys mounted on said piston, a pulley mounted on said supporting means, a flexible element having a first end connected to said supporting means, said element extending upwardly and around the first pulley mounted on the piston, then downwardly and around said pulley mounted on said supporting means, then upwardly and around the second pulley mounted on said piston, then downwardly through the opening of said cylinder, and connecting means for attaching the second end of said flexible element to an object to be lifted, said pulleys providing means whereby the second end of said flexible element is moved a distance substantially greater than the movement of said piston.

2. A lifting device adapted for use with a vacuum operated milker system, said lifting device comprising a supporting means having a cylinder connected thereto, said cylinder having an opening in its lower end, a piston mounted for reciprocation in response to vacuum pressure within said cylinder, a pressure producing conduit connected to and communicating with said cylinder, a stabilizing member connected to said piston and arranged to slidably extend through an opening in said supporting means, first and second pulleys mounted on said piston, a pulley mounted on said supporting means, a flexible element having a first end connected to said supporting means, said element extending upwardly and around the first pulley mounted on said piston, then downwardly and around said pulley mounted on said supporting means, then upwardly and around said second pulley mounted on said piston, then downwardly below said supporting means, and connecting means for attaching the second end of said flexible element to an object to be lifted, said pulleys providing means whereby the second end of said flexible element is moved

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a distance substantially greater than the movement of said piston.

3. The combination with a vacuum operated milker system, of a lifting device comprising a supporting means having a cylinder connected thereto, a piston reciprocally mounted in response to vacuum pressure within said cylinder, a vacuum conduit connected to and communicating with said cylinder, a guide member connected to said piston, said guide member being slidably arranged to engage said supporting means for stabilizing the reciprocation of said piston with respect to said cylinder, first and second pulleys mounted on said piston, a pulley mounted on said supporting means, a flexible element having a first end fixedly connected to said supporting means below said piston, said element extending upwardly and around the first pulley mounted on said piston, then downwardly and around said pulley mounted on said supporting means, then upwardly and around said second pulley mounted on said piston, then downwardly, and connecting means for attaching the second end of said flexible element to an object to be lifted, said pulleys providing means whereby the second end of said flexible element is moved a distance substantially greater than the movement of said piston.

4. The combination with a vacuum operated milker system, of a lifting device comprising a supporting means having a cylinder connected thereto, a piston reciprocally mounted in response to vacuum pressure within said cylinder, a vacuum conduit connected to and communicating with said cylinder, first and second pulleys mounted on said piston, a pulley mounted on said supporting means, a flexible element having a first end fixedly connected to said supporting means, said element extending upwardly and around the first pulley mounted on said piston, then downwardly and around said pulley mounted on said supporting means, then upwardly and around said second pulley mounted on said piston, then downwardly, and connecting means for attaching the second end of said flexible element to an object to be lifted, said pulleys providing means whereby the second end of said flexible element is moved a distance substantially greater than the movement of said piston.

5. A lifting device comprising a cylinder having a piston reciprocally mounted therein for movement in response to pressure, means connected to said cylinder for supporting said cylinder above an object to be lifted, a pressure conduit connected to said cylinder, a first rope supporting and guiding means connected to said piston for reciprocation therewith, a second rope supporting and guiding means, means fixedly connecting said second rope supporting and guiding means to said cylinder supporting means below said piston, a rope having one end fixedly connected to the cylinder supporting means below said piston, said rope extending around said first rope supportig and guiding means, then around said second rope supporting and guiding means, then around said first rope supporting and guiding means and away therefrom, and means for connecting the other end of said rope to an object to be lifted, whereby said rope supporting and guiding means and said rope provide means for moving an object a substantially greater distance than the movement of said piston.

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(References on following page)

2,480,244

5

REFERENCES CITED

The following references are of record in the
file of this patent:

UNITED STATES PATENTS

Number	Name	Date
489,635	Hemphill et al.	Jan. 10, 1893

Number
655,321
1,079,404
1,551,426
2,250,011
2,389,872

5

6

Name	Date
Anderson	Aug. 7, 1900
De Wein	Nov. 25, 1913
Pavella	Aug. 25, 1925
Dayton	July 22, 1941
Ruger et al.	Nov. 27, 1945