

July 26, 1932.

M. F. BRENEMAN

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AIR JACK

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2 Sheets-Sheet 1

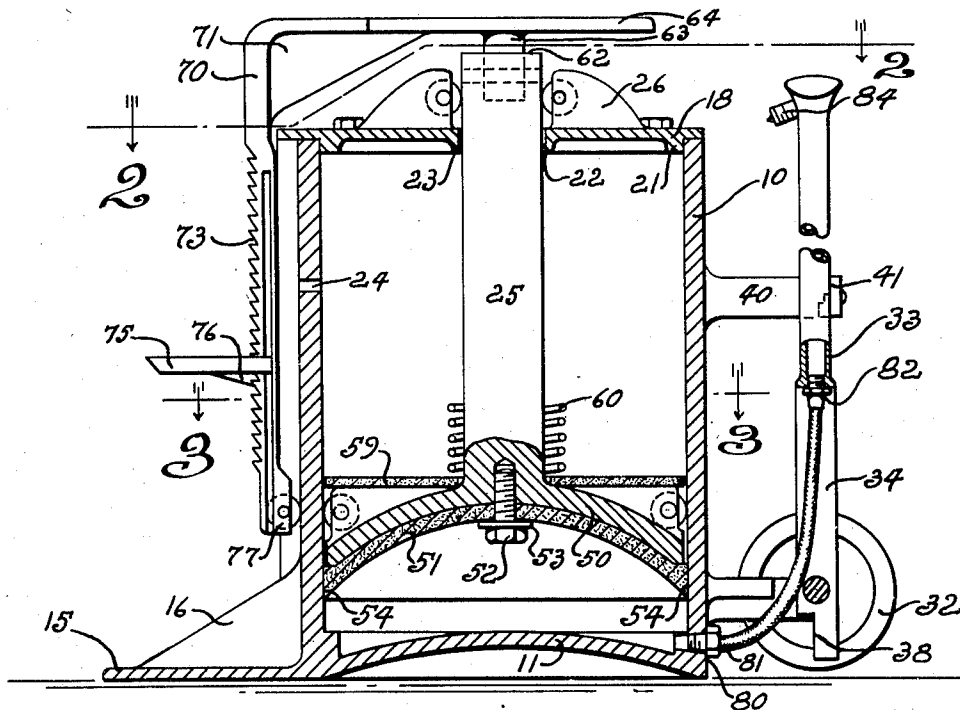


Fig. 1.

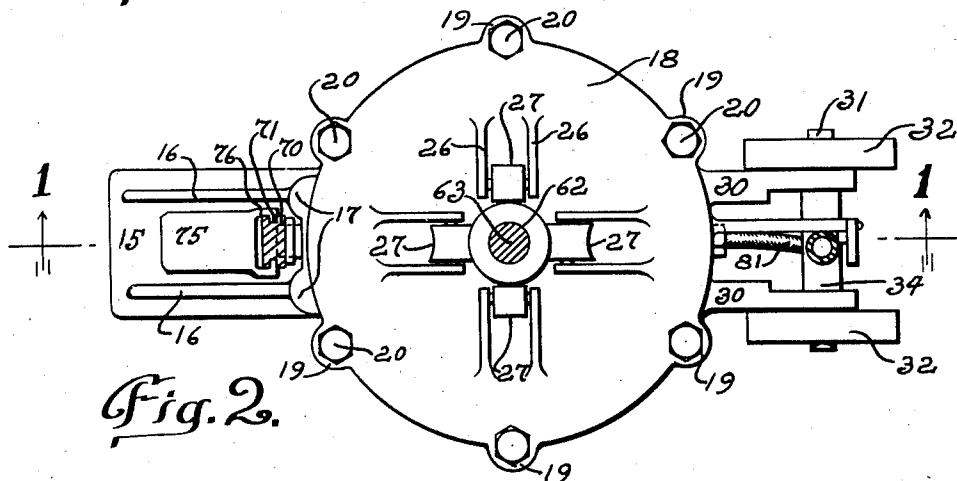


Fig. 2.

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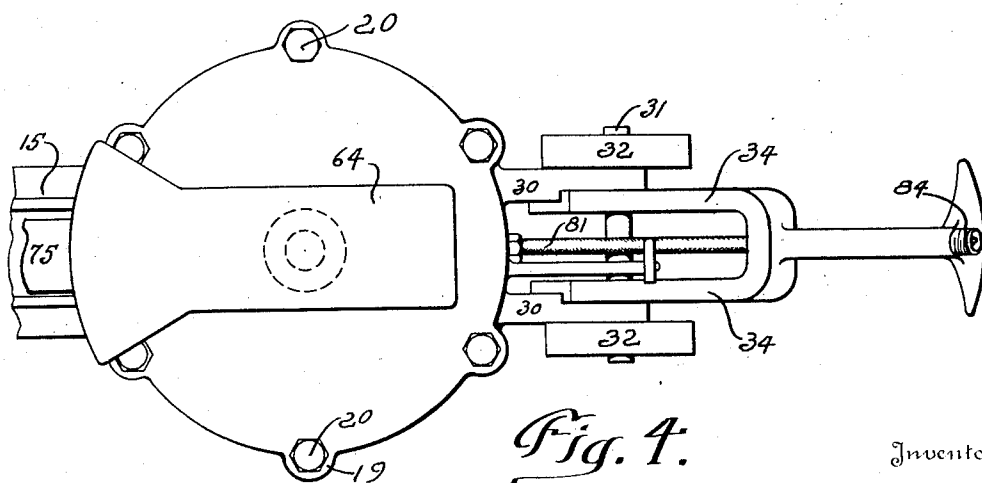
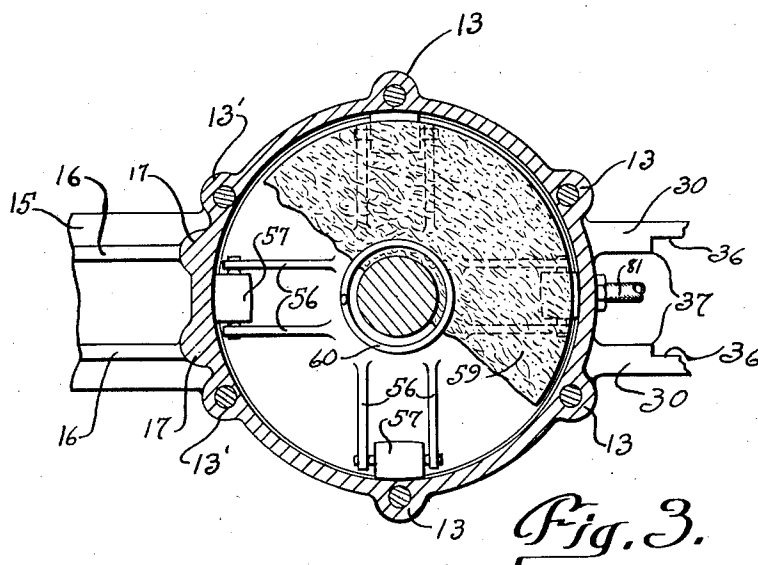
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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AIR JACK

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The principal object of my invention is to provide a cheaply constructed and efficient air jack and means for handling the same.

With the above and other objects in view, my invention consists in certain features of construction, and combinations of parts to be hereinafter described with reference to the accompanying drawings, and then claimed, having the above and other objects in view.

In the accompanying drawings which illustrate a suitable embodiment of the present invention, and in which like numerals refer to like parts throughout the several different views,—

Fig. 1 is a vertical sectional view of my device taken on the line 1—1 of Fig. 2.

Fig. 2 is a view taken on the line 2—2 of Fig. 1.

Fig. 3 is a fragmentary sectional view taken on the line 3—3 of Fig. 1.

Fig. 4 is a plan view of my device.

The numeral 10 indicates a cylinder having a convex bottom 11. The exterior of the cylinder is provided with vertical strengthening ribs 13, Fig. 3, which, with the exception of the two ribs 13', extend the full length of the cylinder. The ribs 13' extend only part way down from the top of the cylinder.

Formed on one side of the cylinder is a lateral extension or foot member 15, Fig. 1, which has two reinforced webs 16, Figs. 1 and 2, extending between its outer end and the lower portion of the cylinder 10. A pair of ribs 17 extend vertically from the ends of the webs 16 to the top of the cylinder 10, and the space between the ribs 17 forms a guide track or path, the purpose of which will be hereinafter explained.

A cover 18 is provided for the cylinder 10 and has ears 19, Fig. 2, formed thereon which align with the upper ends of the ribs 13 and 13'. The upper ends of the ribs 13 and 13' are tapped, Fig. 3, to receive the ends of the bolts 20 and the ears 19 of the cover 18 are perforated to permit the passage of the bolts 20 which are inserted through the said perforations and turned into the tapped ends of the ribs 13 and 13' to secure the cover 18 to the cylinder 10. The cover 18 is also pro-

vided with an annular ridge or flange 21 on its inner face which is spaced sufficiently from the edge of the cover to engage the inner surface of the cylinder 10. The cover 18 is also provided with a central opening 22 about which is formed a downwardly extending flange 23. The opening 22 is provided for the accommodation of the piston rod 25 and is of sufficient size to allow substantial clearance between its edge and the sides of the piston rod. Upon the outer surface of the cover 18 are formed ears 26, Fig. 2, in spaced pairs arranged opposite each other about the opening 22. Journaled in each pair of ears 26 is a roller 27, each of which is adapted to bear against the piston rod 25.

The cylinder 10 is also provided with a breather opening 24 in its upper portion. On the outside of the cylinder 10 and on that side which is opposite to the foot 15 are formed a pair of roller supporting members 30 in the ends of which is journaled an axle 31 upon which are mounted the rollers 32. The rollers 32 are mounted upon the ends of the axle 31 which project beyond the exterior surfaces of the members 30. Mounted on the axle 31 between the members 30 is a handle member 33 having its lower end formed into a pair of branches 34 which extend parallel to and are spaced from one another. The lower ends of these branches 34 are pivotally mounted on the axle 31 adjacent the inner surfaces of the members 30, as shown in Figs. 2 and 4. The members 30 are formed with oppositely disposed offsets 36 which provide shoulders 37, Figs. 2 and 3. The axle 31 passes through the offset portions 36. The handle branches 34 are mounted upon the axle 31 adjacent the offset surfaces 36. The ends of the branches 34 extending beyond the axle 31 have notches cut therein as indicated at 38, Fig. 1, which notched portions are adapted to engage the shoulders 37 of the members 30 when the handle 33 is pivoted outwardly on the axle 31.

The rollers 32 are of such a size and are so mounted that their perimeters extend only to a point which is somewhat above the plane of the bottom of the foot 15 and the lower extremity of the cylinder 10. The notched por-

tions 38 of the branches 34 of the handle 33 are so arranged as to engage the lower edges of the shoulders 37 of the members 30 before the handle 33 reaches a point at right-angles to the cylinder 10, thus enabling the operator to raise the cylinder 10 by means of the handle 33 with the axle 31 serving as a fulcrum point and thus to bring the wheels or rollers 32 to bear upon the floor or other supporting surface so that the jack may be moved by means of the rollers 32 to any desired position.

Extending at right-angles to the cylinder 10 at a point above the members 30 is an arm 40 to the end of which is pivotally secured a latch member 41. The arm 40 and latch member 41 are so positioned that the handle 33 may be latched in an upright position as shown in Fig. 1. In order to do this the latch member 41 is turned on its pivot so that the handle 33 may be moved to a point alongside the arm 40 and the latch member 41 is then turned down to bear against the outer portion of the handle 33, thus securing the handle in upright position.

Secured to the inner end of the piston rod 25 is an inverted cup-shaped piston 50 of a diameter which provides a substantial clearance between its edge and the wall of the cylinder as shown in Fig. 1. On the underside of this piston 50 is secured an inverted cup-shaped member 51 which is preferably of rubber, although it may be made of any other suitable material. The member 51 is secured to the piston 50 by means of a bolt 52 and washer 53 shown in Fig. 1 and its edge extends beyond the edge of the piston 50 and bears against the wall of the cylinder. The bolt 52 is turned into a tapped opening in the lower end of the piston rod 25. The member 51 is thickened around its perimeter, and its upper surface adjacent the perimeter is practically horizontal, as shown in Fig. 1. The edges of the piston 50 bear upon this horizontal surface. The lower edge of the member 51 is tapered as shown in Fig. 1 so that the member 51 presents a broad vertical bearing surface 54 to the sides of the cylinder 10. This member 51 constitutes the sealing member of the piston 50.

On the upper surface of the piston 50, as shown in Figs. 1 and 3, are formed pairs of spaced ears 56 and each of said pairs are arranged on opposite sides of the piston rod 25. The ears 56 extend outwardly toward the walls of the cylinder 10 and journaled in the outer extremities of each pair of ears is a roller 57 which is positioned to bear against the surface of the cylinder 10. The surface of each roller is convex as shown in Fig. 3 to conform to the curvature of the surface of the cylinder 10. On top of the ears 56 and rollers 57 is positioned a pad 59 of felt or other absorbent material which is saturated with lubricant and the edge of which rubs against the walls of the cylinder 10

and lubricates them for the passage of the rollers 57 and the bearing surfaces 54 of the sealing member 51.

Positioned around the piston rod 25 and resting upon the lubricant pad 59 is a coil spring 60 which serves to prevent the piston 50 from striking the cover 18 and which also cushions the blow which the piston 50 may deliver against the cover 18. The outer end of the piston rod 25 is provided with a socket 62 and in this socket rests a pin 63 which supports a bearing plate 64. The pin 63 and socket 62 are preferably formed so that the pin 63 may have a slight universal movement in the socket which enables the bearing plate 64 to accommodate itself to the surface of the object which is to be lifted. The bearing plate 64 is preferably formed with an extension which reaches to the edge of the cylinder 10 and then extends downwardly along the side of the cylinder to a point adjacent the ends of the webs 16 which reinforce the foot 15. The extension of the plate 64 is gradually widened as it approaches the edge of the cylinder 10, as shown in Fig. 4, and attains its maximum width where it turns downwardly over the edge of the cylinder 10, and is narrowed again as it passes below the top of the cylinder. This widening adds materially to the strength of the plate and of the extension which reaches down alongside the cylinder. Webs 71 are preferably formed between the downwardly extending portion 70 and the horizontally extending portion of the plate 64 for strengthening purposes. A series of notches 73 are formed upon the outer surface of the extension 70 and grooves are formed in the side edges of the member 70 as shown in Fig. 2. A second bearing plate 75 is provided and has arms 76 extended from one end thereof which have inwardly extending flanges 77 on their ends adapted to fit in the grooves in the sides of the member 70 as shown in Fig. 2. On the under surface of the bearing plate 75 is formed a lug 76' which is adapted to engage the notches 73 and to hold the bearing plate 75 in any desired position throughout the range of notches 73.

Journaled in the lower end of the extension 70 is a roller 77' which is adapted to bear against the exterior of the cylinder 10 between the ribs 17 and to follow the track guide formed by the space between such ribs.

An opening 80 is provided in the lower part of the cylinder 10 as shown in Fig. 1 and in this opening is fitted the end of an air hose 81 as shown in Figs. 1 and 4. The upper portion of the handle 33 is hollow and forms an air conduit, and one end of the air hose 81 is fitted into this passage as at 82, Fig. 1. In the upper end of the air conduit through the handle 33 is fitted a conventional air valve 84 which is for connection with a source of compressed air.

In operation, the jack is positioned beneath

the object to be raised. If the object is of sufficient height from the ground the jack will be positioned beneath the same so that the bearing plate 64 will contact with the object.

5 If the object is not of sufficient height above the ground to enable the jack to be positioned thereunder the bearing plate 75 on the extension 70 may be adjusted to extend under the object. Air pressure is then supplied to the
10 lower part of the cylinder beneath the piston and its sealing member through the valve 84, the handle 33, the air hose 81 and the opening 80. The rollers 57 on the piston 50 effectually prevent the edges of the piston from contact-
15 ing against the inner surface of the cylinder 10 and scoring the same or binding thereagainst. The rollers 57 are aided in preventing binding by the rollers 27 on the cover 18 which contact against the piston rod 25 on all
20 sides and prevent binding of the piston rod 25 against the flange 23 when the load which is being lifted is off center relative to the piston rod, and when the load is being lifted on the bearing plate 75. The roller 77 in the end of
25 the extension 70 maintains the extension 70 at a predetermined distance from the side of the cylinder 10, eliminates all friction therebetween and prevents any binding between the extension 70 and the cylinder 10. The foot
30 15 and its reinforcing web 16 furnish the foundation or footage necessary to prevent the jack from overbalancing or tipping when the load is being raised upon the bearing plate 75.

35 The broad bearing edges 54 of the sealing member 51 effectually prevent the leakage of air past the piston 50. The effectiveness of the sealing member 51 is aided materially by its shape and the shape of the piston 50.
40 The inverted cup-shape shown, tends to utilize the air pressure introduced through the opening 80 to force the bearing surfaces 54 more tightly against the surface of the cylinder 10 as the air pressure is increased.
45 All pressure beneath the sealing member 51 tends to tighten the bearing surface 54 against the surface of the cylinder 10. The breather opening 24 permits the intake and exhaust of atmospheric air above the piston
50 50 and relieves any compression or vacuum condition which might otherwise be produced by movement of the piston. If the pressure beneath the piston 50 becomes great enough to force the piston tightly against the cover
55 18, the bearing surface 54 of the sealing member 51 will pass above the opening 24 and permit the escape of the excessive pressure.

It will be obvious that various changes may be made in the arrangement, combina-
60 tion and construction of the various parts of my improved device without departing from the spirit of my invention, and it is my intention to cover by my claims such changes as may be reasonably included within the scope thereof.

What I claim is:

1. A device of the class described comprising a cylinder having a lateral flange formed on its base, a pair of spaced ribs formed on said cylinder and extending vertically above said flange, a piston operable in said cylinder, a piston rod attached to said piston and extending above the top of said cylinder, a cover for said cylinder having an opening therein through which said piston rod extends, roller bearings attached to said piston and adapted to guide the same relative to the wall of said cylinder, roller bearings on said cover adapted to guide said piston rod relative to the said opening therein, a bearing plate on said piston rod having an extension thereon extending down the outside of said cylinder above said lateral flange and adjacent said pair of spaced ribs, a second bearing plate adjustably secured to said extension, and a roller bearing secured to said extension and adapted to bear against said cylinder between said spaced ribs and be guided thereby.

2. A device of the class described comprising an upright cylinder, a piston operable in said cylinder, a piston rod attached to said piston and extending beyond the top of said cylinder, a cover for said cylinder having an opening therein through which said piston rod extends, a bearing member positioned upon the end of said piston rod, rollers attached to said cylinder adjacent the base thereof and positioned with their perimeters slightly above the plane of said base, a handle pivotally attached to said cylinder adjacent said rollers and having lugs thereon adapted to engage said cylinder and raise the same about the axis of said rollers upon movement of said handle away from said cylinder.

3. A device of the class described comprising an upright cylinder, a piston operable in said cylinder, a piston rod attached to said piston and extending beyond the top of said cylinder, a cover for said cylinder having an opening therein through which said piston rod extends, a bearing member positioned upon the end of said piston rod, rollers attached to said cylinder adjacent the base thereof and positioned with their perimeters slightly above the plane of said base, a handle pivotally attached to said cylinder adjacent said rollers and having lugs thereon adapted to engage said cylinder and raise the same about the axis of said rollers upon movement of said handle away from said cylinder, and latching means attached to said cylinder and adapted to engage and retain said handle in upright and in operative position.

4. A device of the class described comprising an upright cylinder having an air passage in the lower portion thereof, a piston operable in said cylinder above said air passage, a piston rod attached to said piston and extending above the top of said cylinder, a cover for said cylinder having an opening

therein through which said piston rod extends, rollers attached to said cylinder adjacent the base thereof and positioned with their perimeters slightly above the plane of the base of said cylinder, a hollow handle pivotally attached to said cylinder adjacent said rollers and having extensions thereon adapted to engage said cylinder and raise the same about the axis of said rollers upon movement of said handle away from said cylinder, an air conduit fitted at one end in the air passage in the base of said cylinder and fitted at the other end in the lower end of said hollow handle, and a valve fitted in the other end of said hollow handle adapted to control the passage of air to and from said cylinder.

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