Nov. 11, 1941. R. I. KLIPSTEIN ET AL 2,262,288

FLUID LIFT AND STABILIZER FOR WASHERS AND THE LIKE

Filed April 15, 1940

Fig. 1.

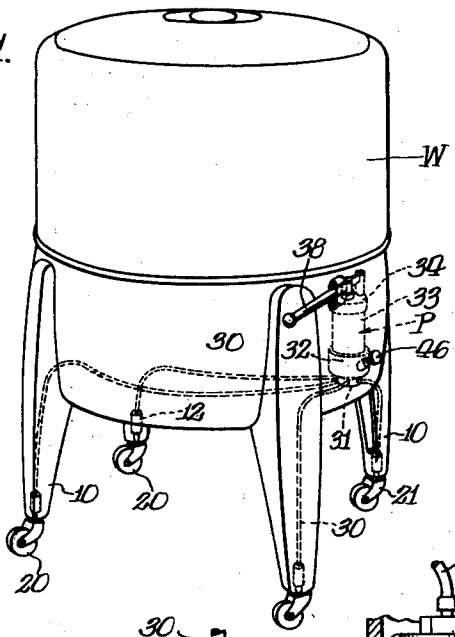


Fig. 2.

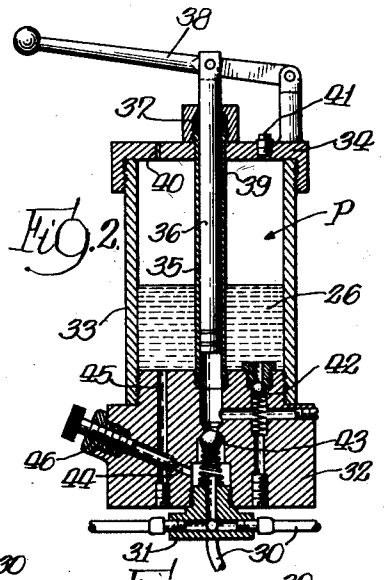


Fig. 3.

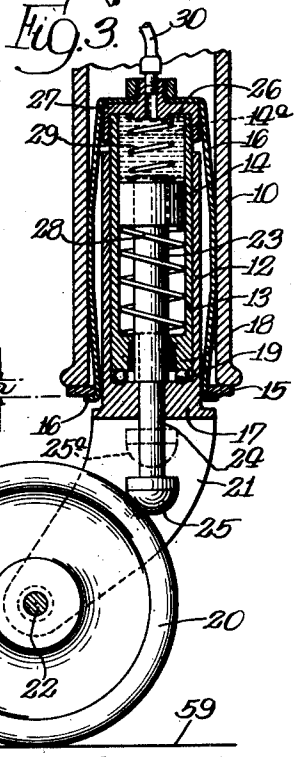


Fig. 4.

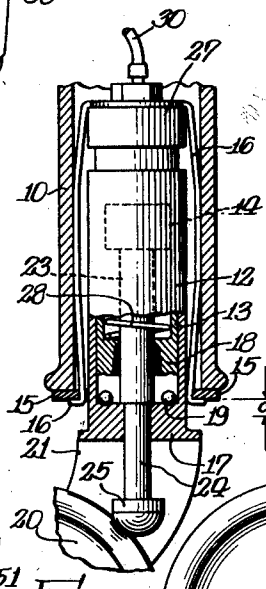
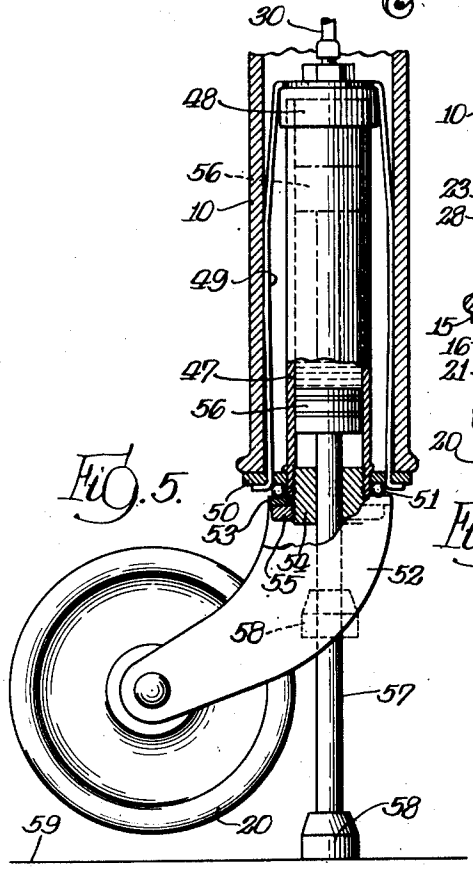


Fig. 5.



Inventors:-
Raleigh I. Klipstein,
Walter E. Klipstein,
BY Bair & Freeman
ATTORNEYS.

Patented Nov. 11, 1941 2,262,288

UNITED STATES PATENT OFFICE

2,262,288

FLUID LIFT AND STABILIZER FOR WASHERS AND THE LIKE

Raleigh I. Klipstein, Des Plaines, and Walter Ervin Klipstein, Chicago, Ill.

Application April 15, 1940, Serial No. 329,836

13 Claims. (Cl. 188—151)

Our invention relates to a lift and stabilizer device which can be used on washing machines, ironing machines, hospital beds and other portable castored devices.

One object of the invention is to provide a fluid operated lift structure associated with the castor of each leg of a washer or the like, that is, it may be operated by either liquid, such as oil; or gas, such as air, and when operated is effective to lock the castor against rotation and then to elevate the leg of the device relative to the castor.

Another object is to provide a single pump, with distributing pipes running to the lift devices of each leg whereby after the castors are locked the legs may be elevated and such elevation will stabilize the washer or other castored device so that there is equal pressure engagement of each castor with the floor surface, regardless of the contour of such surface.

Still another object is to provide a fluid lift structure for castored devices wherein the stabilizing action of our invention substantially eliminates vibration being transmitted from the machinery of the castored device to the floor surface through a cushioning action.

Still a further object is to provide a modified form of structure in which the fluid lift elevates the castor and leg of the castored device relative to the floor surface instead of locking the castor and then elevating the leg relative to it.

With these and other objects in view, our invention consists in the construction, arrangement and combination of the various parts of our device whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in our claims and illustrated in the accompanying drawing, wherein:

Figure 1 is a perspective view of a washing machine representative of a castored device to which our fluid lift and stabilizer mechanism has been applied;

Figure 2 is an enlarged vertical sectional view through a fluid pump which we find suitable for pumping fluid to the lifting device on each leg of the washing machine;

Figure 3 is an enlarged vertical sectional view on a still larger scale than Figure 2, showing one of the fluid lifts and castors in a leg of the washer, the parts being at an intermediate castor wheel locking position, with dotted lines illustrating initial position.

Figure 4 is a similar sectional view showing certain parts of Figure 3 in a different position, as assumed by operating the fluid lift device to a lifting and stabilizing position, and

Figure 5 is a vertical sectional view showing a modified form of fluid lift and castor.

On the accompanying drawing, we have used the reference character W to indicate generally a washer or any suitable castored device to which our fluid lift and stabilizer has been applied. The legs of the washer W are indicated at 10. Each leg 10, as shown in Figure 3, includes a lift device including an outer cylinder 12, an inner cylinder 13 and a piston 14. The cylinder 13 telescopes within the cylinder 12 and the piston 14 is slidable within the cylinder 13.

The cylinders 12 and 13 normally assume the position shown in Figure 3, with the weight of the leg 10 supported through a washer 15 and a strap 16 on a lower head 17 of the cylinder 12. The cylinder 13 also has a lower head indicated at 18 and ball-bearings 19 are interposed between the heads 17 and 18. The cylinder 12 in turn is supported on a castor wheel 20 by the usual yoke 21 and axle pin 22.

A piston rod 23 depends from the piston 14 and has a reduced lower end 24 terminating in a head 25. The head 25 is adapted to engage the caster wheel 20 for the purpose of locking it against rotation when our fluid lift is operated, as will hereinafter appear. Such operation is effected by introducing fluid, such as air or oil 26, into the cylinder 13 between a head 27 thereon and the piston 14. A return spring 28 is provided for the piston 14 and above the piston we provide a bumper spring 29.

For supplying fluid to the cylinder head 27, we provide a plurality of distributor pipes 30 connected with a cross fitting 31. The fitting 31 is screwed into a base 32 of a pump P having a reservoir cylinder 33 mounted thereon. The cylinder 33 is provided with a closure head 34.

Within the reservoir cylinder 33, we provide a pump cylinder 35 in which is slidably mounted a plunger 36. The upper end of the plunger extends through a packing nut 37 to an operating handle 38. The pump cylinder 35 is vented at 39 and the reservoir cylinder 33 is vented to atmosphere at 40. A filler plug for the reservoir is indicated at 41.

In the pump base 32 an inlet valve 42 and an outlet valve 43 are provided. As the plunger 36 is pulled upwardly by manipulating the handle 38, oil is drawn downwardly through the inlet valve 42 and into the pump cylinder 35. When the handle 38 is moved downwardly, oil is forced out of the cylinder 35 by the plunger 36 through the outlet valve 43 to the cross fitting 31, the distributor pipes 30, and into each of the lift cylinders 13.

The outlet valve 43 holds the oil against return. Passageways 44 and 45 connect the space between the outlet valve 43 and the fitting 31 with the interior of the reservoir cylinder 33. A return valve 46 is introduced between the passageways 44 and 45 to prevent such return when the valve is closed.

In Figure 5 we show a modified construction

wherein a single cylinder 47 is provided instead of the double cylinder 12—13 of Figure 3. The cylinder 47 has an upper head 48 connected with the distributor pipe 30 and connected by a strap 49 with a washer 50. The washer 50 surrounds the cylinder 47 and ball-bearings 51 are interposed between this washer and a yoke 52 of the castor wheel 20. The top or cross piece of the yoke 52 is indicated at 53. The balls 51 rest on the cross piece 43 and the cross piece in turn is secured to the cylinder 47 by a sleeve 54 and a lock nut 55.

A piston 56 is provided in the cylinder 47 and a piston rod 57 extends from the piston slidably through the sleeve 54. The lower end of the piston rod is provided with a foot 58 adapted to contact with a floor surface, indicated at 59 (the normal position of the piston 56 and the foot 58 being shown by dotted lines).

Practical operation

In the operation of the type of our fluid lift and stabilizer shown in Figures 1 to 4 inclusive, the head of the piston 14 normally assumes the position indicated by the dotted line 14*a* and the enlargement 25 normally assumes the dotted position indicated at 25*a*, under constraint of the spring 28. In these positions the weight of the legs 10 is imposed through the washer 15, the strap 16, the head 27, the inner cylinder 13, the ball-bearings 19 and the outer cylinder head 17 to the castor yoke 21 and the castor wheel 20. Accordingly, the washing machine may be readily transferred from one position to another as desired. When the washing machine is to be used, then the valve 46 may be closed and the pump handle 38 manipulated for pumping oil to each of the cylinders 13.

The first action that takes place is lowering of the piston 14 from the dotted position of Figure 2 to the full line position, with the shoulder formed by the transition from the lower end of the piston rod 23 to its reduced portion 24 engaging the cylinder head 17. In this position, the enlargement 25 on the piston rod 23—24 engages the periphery of the castor wheel 20 to firmly lock it against rotation.

Further operation of the pump P causes the inner cylinder 13 to be moved upwardly relative to the piston 14, for instance to the position shown in Figure 4, the distance of motion being indicated by the dimension *a*. The weight of the leg 10 is now interposed through the washer 15, the strap 16, the cylinder head 27, the oil 26 between it and the piston 14 and the shoulder of the piston rod 23 against the cylinder head 17 and the castor yoke and castor wheel 21 and 20. In this position each of the legs 10 is supported and cushioned on the oil distributed to the cylinders 13 by the pipes 30 and the cross fitting 31. Any castor which is over a low spot in the floor surface 59 will be projected further than the others from its leg 10, and there will be equal weight on each castor thereby compensating for any uneveness of the floor surface. Also, each of the legs 10 is cushioned on the oil within the cylinders 13 and the transmission of vibration from the machinery of the washer W to the floor surface is thereby minimized.

When it is desirable to lower the washer W back onto the castor wheels 20 and unlock them so that they may rotate freely, it is merely necessary to open the valve 46 slightly to permit return flow of the oil 26 from each of the cylinders 13 to the reservoir cylinder 33. The weight of the washer and the action of the springs 28 effect such return and elevate the enlargements 25 of the piston rods to the dotted position of Figure 3.

With the type of construction shown in Figure 5, the introduction of fluid pressure to the cylinder 47 moves the foot 58 into contact with the floor surface 59 and then elevates the entire assembly of leg 10, cylinder 47, strap 49, castor yoke 52 and castor 20 relative to the floor surface. The washer W is now supported by the piston rods 57 and the castors are free of the floor, so that the washer will not roll from its supported position. When the lift devices of Figure 5 are in the full line position illustrated, then stabilization is effected in the same manner as described in connection with Figures 1 to 4.

Our fluid lift, although it has been described as utilizing oil as the fluid under pressure, may instead use a gas such as air, thereby eliminating the necessity of keeping a supply of oil in the mechanism and providing a greater cushioning effect.

Although we have described and illustrated our device in connection with a washing machine, it is obvious that it may be used on any type of castored device. When used in connection with a hospital bed or a wheeled device for transporting articles which should not be jarred, its use is ideal, as the enlargement 25 on the lower end of the piston rod 24 may be omitted and the structure thus used merely as a lift and stabilizer. The cushioning and stabilizing effect permit movement of the bed or wheeled device across floor cracks and any floor surface which is uneven without any tilting or rocking of the device, as the castors or wheels conform to the surface. At all times there will be equal pressure on each castor wheel, thus resulting in the desired conformation to the floor surface, with the fluid passing freely from a cylinder 13 over a high spot to a cylinder 13 over a low spot. Thus the castors are automatically self leveling, whether our invention is used in connection with a portable wheeled or castored device omitting the locking feature of the head 25, or whether the locking feature is utilized for lifting and stabilizing a washer or the like in a predetermined position.

Some changes may be made in the construction and arrangement of the parts of our device without departing from the real spirit and purpose of our invention, and it is our intention to cover by our claims any modified forms of structure or use of mechanical equivalents which may be reasonably included within their scope without sacrificing any of the advantages thereof.

We claim as our invention:

1. In a fluid lift and stabilizer for washers and the like, a castor on each leg of the washer, fluid operated means on each leg for locking the castor wheel against rotation and thereafter elevating the leg relative to said castor wheel, a single pump, and distributing pipes connecting said pump with each of said fluid operated means to pump fluid thereto and thereby effect such elevation.

2. In a fluid lift and stabilizer for a device having a plurality of castors to support the device, fluid operated means adjacent each castor for locking the castor wheel against rotation and thereafter elevating the device relative to the castor wheels, a single pump, and distributing pipes connecting each of said fluid operated

means with said pump to pump fluid to all of the fluid operated means and thereby effect such locking of said castor wheels and elevation of said device.

3. In a fluid lift and stabilizer of the character disclosed, a device having legs, a castor on each of said legs, fluid operated means on each of said legs for locking the castor wheel of the castor thereon and for elevating the leg relative to said castor wheel, a reservoir, a pump connected with each of said fluid operated means to pump fluid from said reservoir to said means and thereby effect such locking and elevation, and means to permit return of said fluid to said reservoir.

4. In a fluid lift and stabilizer for a movable device, castors for normally supporting said device, fluid operated means associated with each castor to elevate said device relative to said castors, each of said fluid operated means including an element to engage the castor wheel of the castor to prevent rotation thereof when the fluid operated means is effective to cause such elevation, and a fluid pump to pump fluid to all of said fluid operated means.

5. In a fluid lift and stabilizer for a movable device, wheels for normally supporting said device, fluid operated means associated with each wheel to elevate said device relative to the wheels, said fluid operated means each including an element to first engage the wheel to positively prevent rotation thereof when the fluid operated means is effective and to thereafter cause such elevation, and a fluid pump to pump fluid to all of said fluid operated means.

6. In a fluid lift and stabilizer for a movable device, wheels for normally supporting said device, fluid operated means assocated with each wheel to elevate said device relative to the wheels said means including an element for each wheel, each element being movable with relation to the device and operable to first engage the periphery of the wheel and then effect movement of the device relative to the element with the element supported on the wheel, and a fluid pump to pump fluid to all of said fluid operated means.

7. In a fluid lift and stabilizer for a movable device, wheels for normally supporting said device, fluid operated means associated with each wheel to elevate said device relative to said wheels, each of said fluid operated means including an element to engage the wheel to prevent rotation thereof when the fluid operated means is effective to cause such elevation, a fluid pump to pump fluid to all of said fluid operated means, said fluid pump comprising a reservoir having a base, inlet and outlet valves in said base, a pump cylinder extending from said base and up through said reservoir, a plunger in said cylinder, a handle for operating said plunger, a distributing pipe connected with said pump cylinder, a return connection from said distributor pipes to said reservoir, and a lock valve in said return connection.

8. In a fluid lift for a movable device, castors for normally supporting said device, fluid operated means associated with each castor to lock the castor wheel of the castor to prevent rotation thereof and to elevate said device relative to said castors, a fluid pump comprising a reservoir having a base, inlet and outlet valves in said base, a pump cylinder extending from said base, a plunger in said cylinder, a handle for operating said plunger, a distributing pipe connected with said pump cylinder, a return passageway in said base from said distributor pipes to said reservoir, and a valve controlling said passageway.

9. In a fluid lift and stabilizing device for castored articles, a cylinder associated with each castor thereof, a piston in each of said cylinders, a piston rod projecting from each of said cylinders and having a head thereon, and means for introducing fluid pressure to said cylinders to extend said piston rods and cause said heads to engage the castors and thereafter lift the device relative to the castors.

10. In a fluid lift device for castored articles, a cylinder associated with each castor thereof, a piston in each of said cylinders, a piston rod projecting from each of said cylinders, and means for introducing fluid pressure to said cylinders to extend said piston rods and engage them with the castors and thereafter lift the device relative to the castors.

11. In a fluid lift and stabilizing device for castored articles, a cylinder for each castor and opening upwardly, a second cylinder in said first cylinder, a piston in said second cylinder having a rod extending to a position to engage the castor wheel and lock it against rotation upon introduction of fluid pressure into said second cylinder, said second cylinder being connected with the leg of the device to elevate said leg relative to said castor wheel after said castor wheel has been locked against rotation and further fluid pressure is introduced into said second cylinder, and a pump and distributor pipe system connected with said second cylinders to effect such introduction of fluid pressure thereto.

12. In a fluid lift device for castored washers and the like, a cylinder for each castor and opening upwardly, a second cylinder in said first cylinder, a piston in said second cylinder having a piston rod extending downwardly to engage the castor wheel and lock it against rotation, said second cylinder being connected with the leg of the washer to elevate said second cylinder relative to said first cylinder and thereby elevate said leg relative to said castor wheel after said castor wheel has been locked against rotation and further fluid pressure is introduced into said second cylinder, and a pump and distributor pipe system connected with said second cylinders to supply fluid pressure thereto.

13. In a fluid lift and stabilizing device for castored articles, a cylinder connected with each castor wheel and opening upwardly, a second cylinder in said first cylinder, a piston in said second cylinder having a rod extended to a position to engage said castor wheel and lock it against rotation when fluid pressure is introduced to said second cylinder, said second cylinder being connected with the leg of the washer and said rod having a shoulder to engage said first cylinder in the castor wheel locking position of said piston and rod to elevate said leg relative to said castor wheel upon further introduction of fluid pressure into said second cylinder, and a pump and distributor pipe system connected with said second cylinders to supply fluid pressure thereto.

RALEIGH I. KLIPSTEIN.
WALTER ERVIN KLIPSTEIN.