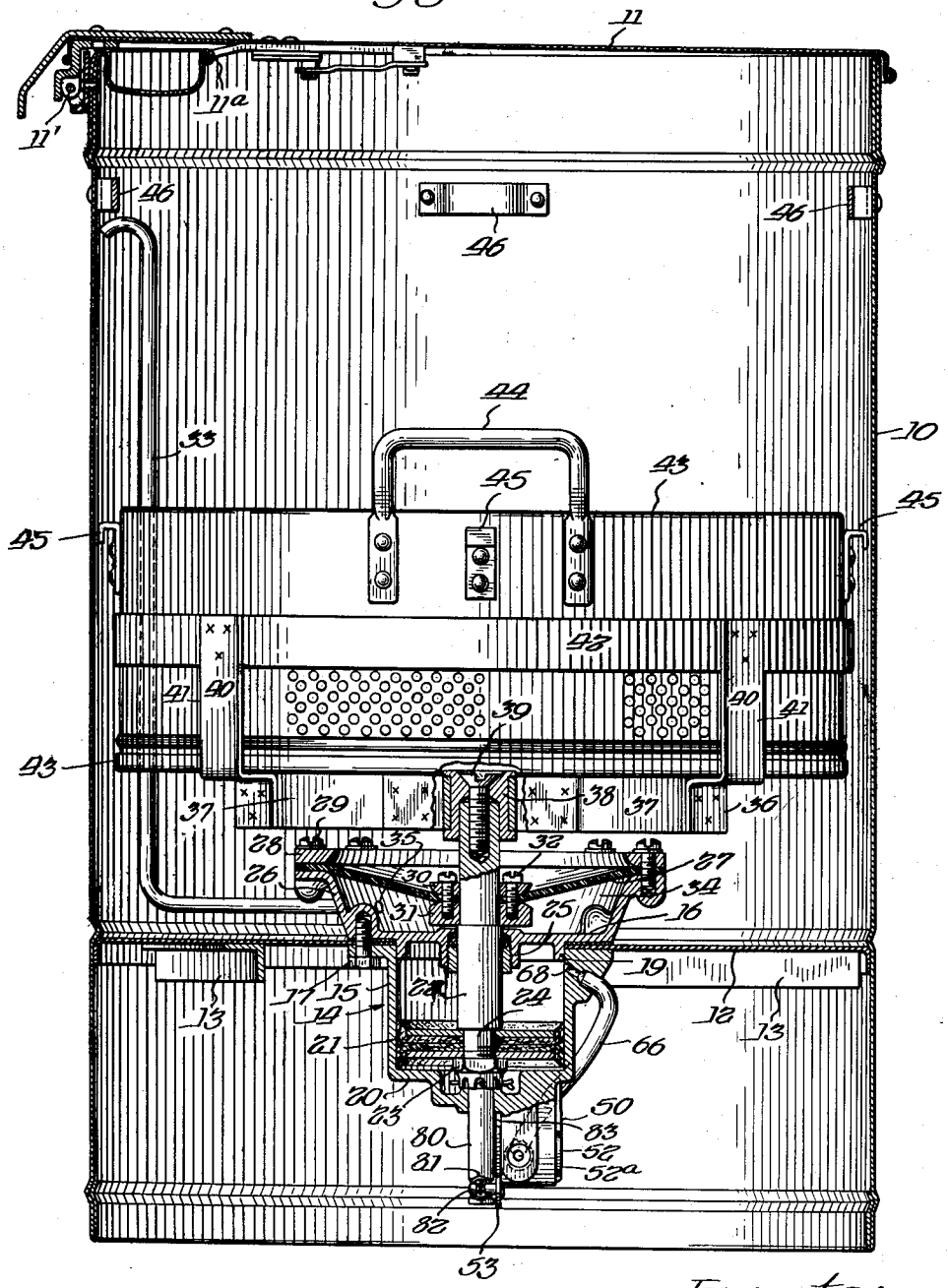
Feb. 9, 1954 W. A. LEBUS 2,668,549

AUTOMATIC PARTS WASHER

Filed April 28, 1949 4 Sheets-Sheet 1

Fig. 1.



Inventor.
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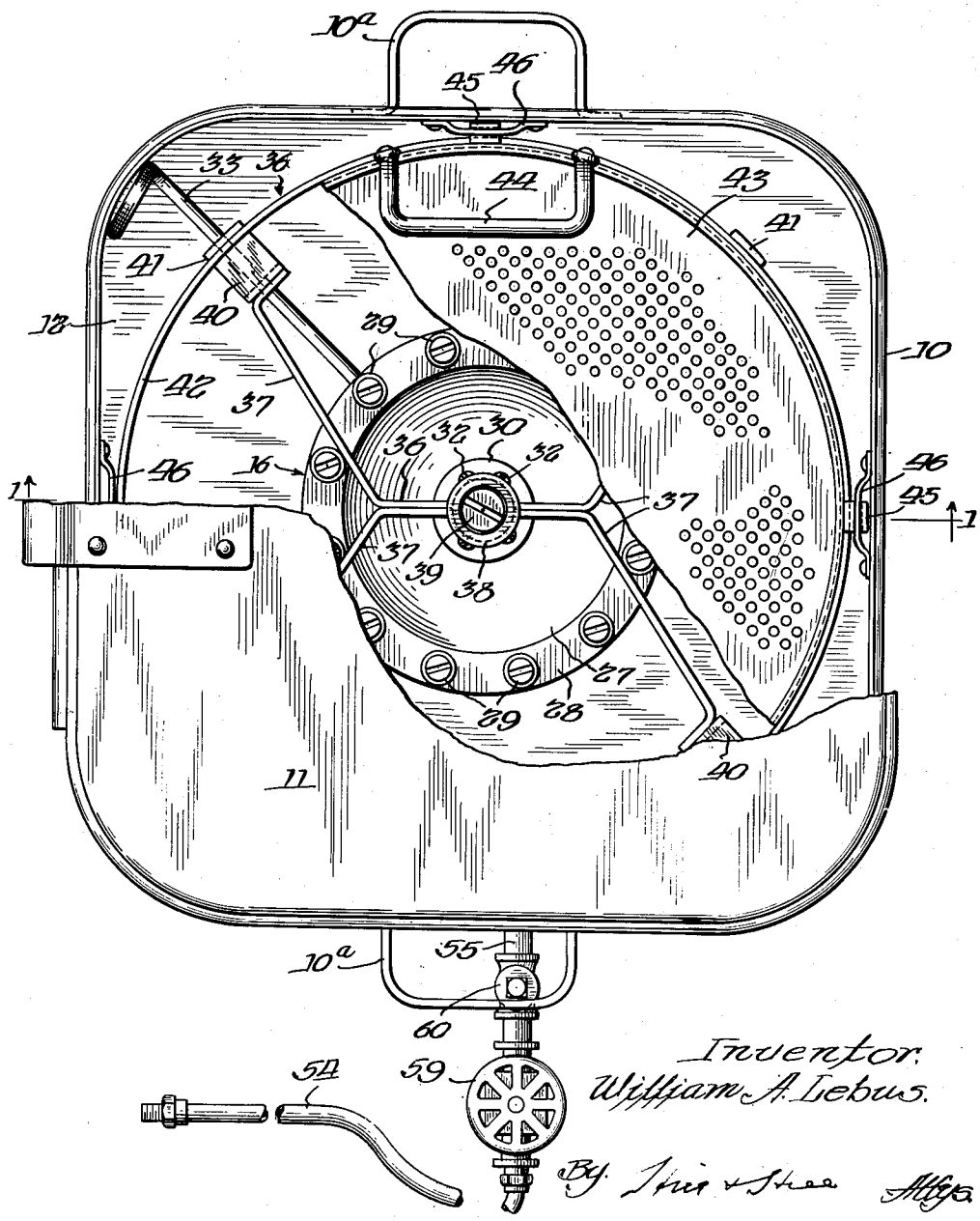
By Lee & Lee Attys.

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AUTOMATIC PARTS WASHER

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Fig. 2.



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AUTOMATIC PARTS WASHER

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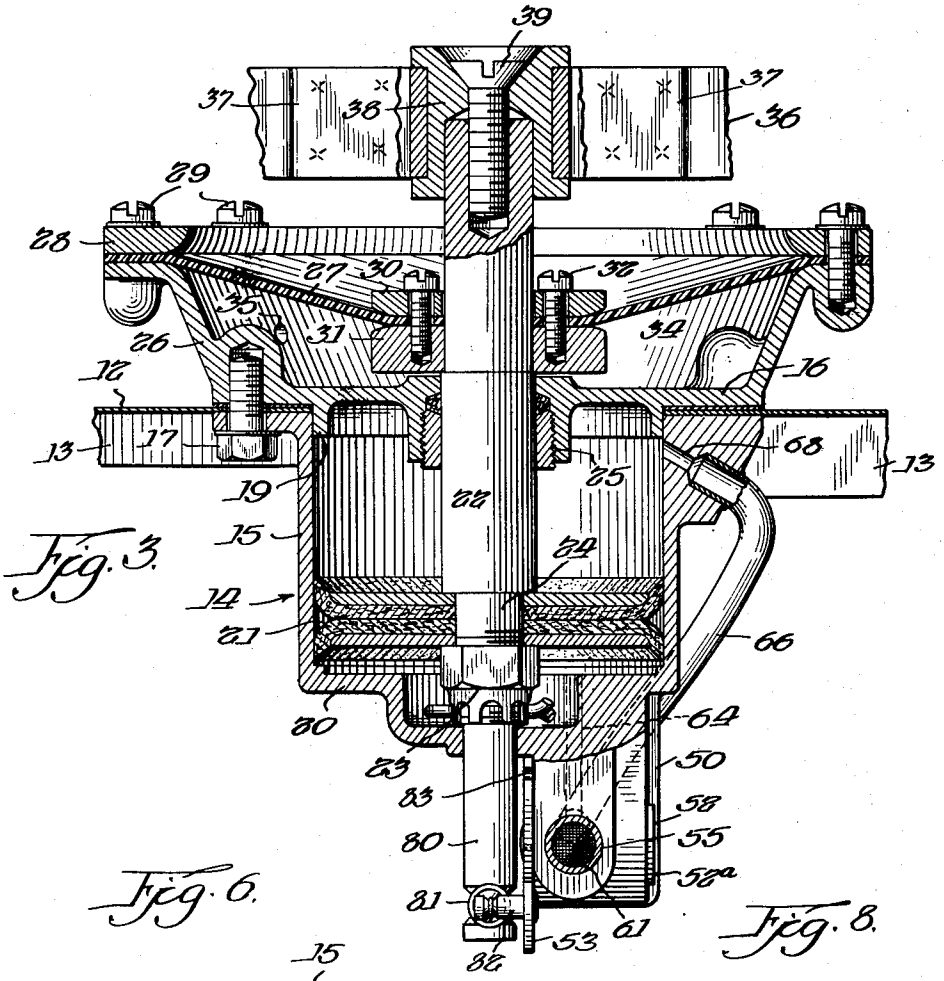


Fig. 3.

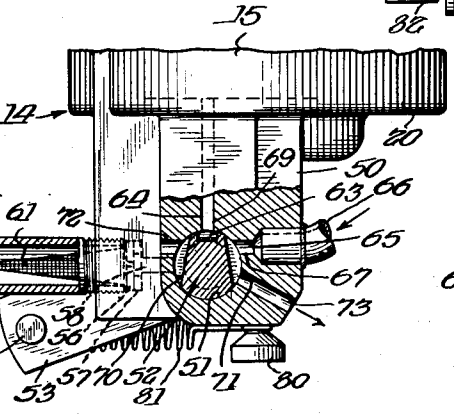


Fig. 6.

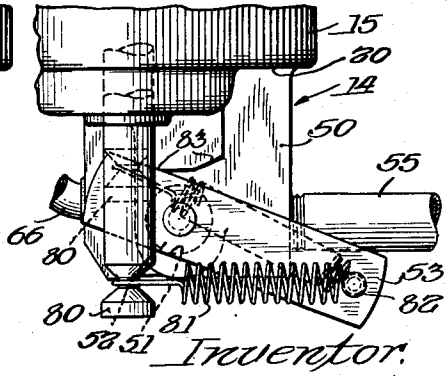


Fig. 8.

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AUTOMATIC PARTS WASHER

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Fig. 4.

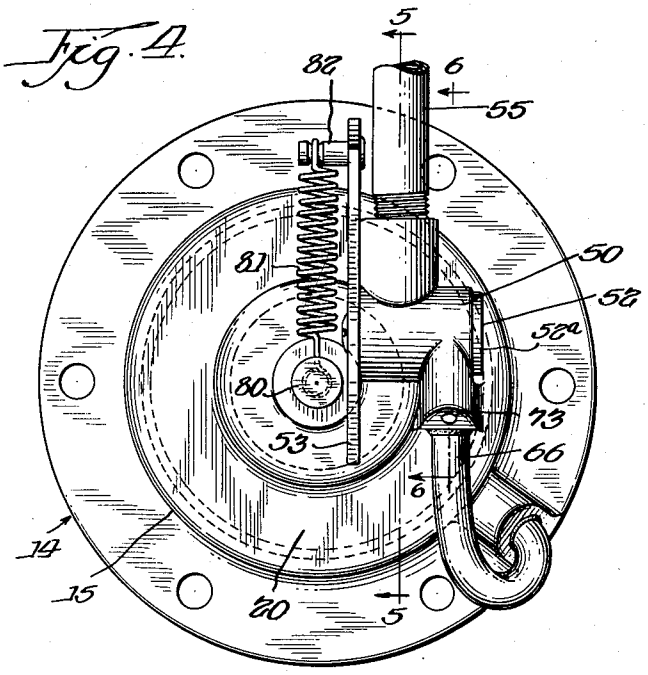


Fig. 9.

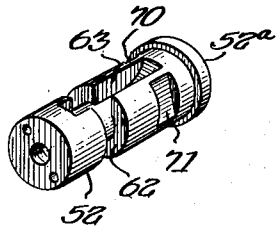


Fig. 7.

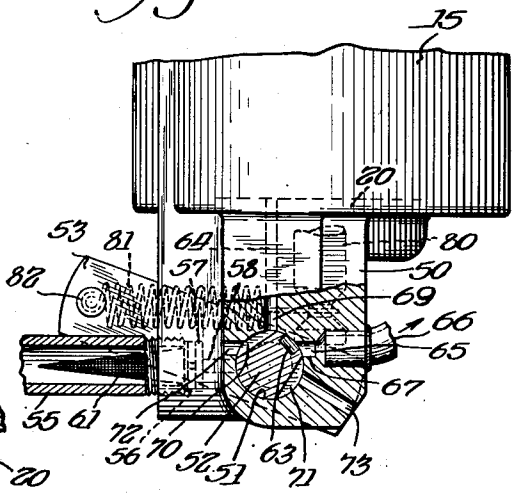
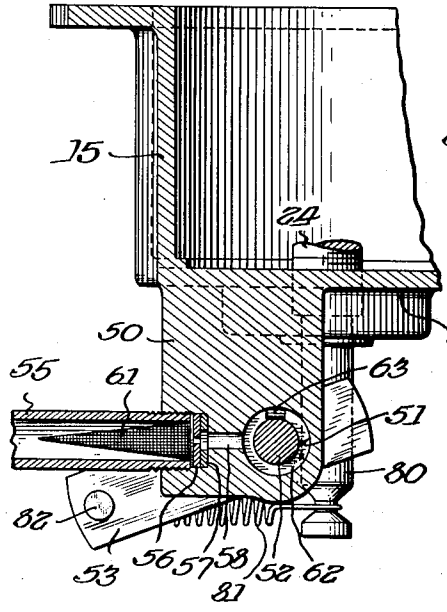


Fig. 5.



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Patented Feb. 9, 1954

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UNITED STATES PATENT OFFICE

2,668,549

AUTOMATIC PARTS WASHER

William A. Lebus, Chicago, Ill., assignor to The Protectoseal Company, Chicago, Ill., a corporation of Illinois

Application April 28, 1949, Serial No. 90,080

11 Claims. (Cl. 134—56)

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This invention relates to an automatic parts washer and its principal object is to provide a washer in which greasy, oily and dirty parts or articles may be automatically washed or cleaned.

It has especially among its objects the production of a device of the kind described which is efficient, compact and satisfactory, and a device in which inflammable and explosive cleaning materials may be safely used.

Another object is to provide a container for holding a quantity of naptha, gasoline or grease solvent or other cleaning fluid through which the parts to be cleaned are moved through the cleaning bath by a compressed air motor or other actuating means.

Another object is to provide an air motor having a reciprocating piston in its cylinder with a piston rod on which is supported a parts holding basket together with valve means to alternately direct compressed air above and below the top and bottom faces of the piston whereby to reciprocate the piston and therewith the basket carried thereby, whereby the parts contained therein are raised and lowered through the cleaning fluid.

Another object is to provide a container having a horizontal bottom partition or wall separating the upper part of the container which holds the cleaning fluid from the lower part thereby providing a chamber below the partition or bottom wall for containing the motor.

Another object is to provide means to prevent the cleaning fluid from leaking into the compressed air cylinder.

Many other objects and advantages of the construction herein shown and described will be obvious to those skilled in the art from the disclosure herein given.

To this end my invention consists in the novel construction, arrangement, and combination of parts herein shown and described, and more particularly pointed out in the claims.

In the drawings, wherein like reference characters indicate like or corresponding parts:

Fig. 1 is a vertical sectional view taken substantially on the center line 1—1 of Fig. 2;

Fig. 2 is a plan view with parts broken away;

Fig. 3 is an enlarged vertical sectional view of the motor similar to Fig. 1;

Fig. 4 is a bottom plan view of the air motor;

Fig. 5 is a fragmentary vertical section taken substantially on line 5—5 of Fig. 4;

Fig. 6 is a fragmentary detail view, partly in section, taken substantially on line 6—6 of Fig. 4;

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Fig. 7 is a view substantially the same as Fig. 6 showing the parts in changed positions;

Fig. 8 is a view in elevation, similar to Fig. 5, viewed from the opposite side; and

Fig. 9 is a perspective view of the valve plug member.

Referring to said drawings which are merely illustrative of one embodiment of the invention, the reference character 10 designates a container provided with handles 10*a* and having a lid or cover 11 hinged to its upper end and provided with fusible link means 11*a* to permit the lid to close by gravity in case the cleaning compound becomes ignited while the lid is in open position.

Adjacent the lower end of the container is a horizontal partition or bottom wall 12 which is secured to the side wall of the container and is reinforced by angle iron bars 13. Supported by the partition or wall 12 is a fluid motor 14, the cylinder 15 of which is disposed below the partition or wall 12 with its upper head portion 16 disposed above the partition or wall providing a head to the cylinder. The head 16 is bolted to a flange at the upper end of the cylinder by cap screws 17 or the like with the wall 12 or the partition and a gasket interposed between the cylinder and head. The head 16 may be formed with the circular flange 19 fitting the inner face of the cylinder wall. The lower end of the cylinder is closed by a head 20 which may be formed integral with the cylinder wall.

Reciprocating in the cylinder is a piston 21 which is mounted on a piston rod 22 and is secured thereto by a nut 23 or its equivalent on a reduced portion 24 of the piston rod. The upper head 16 is provided with a stuffing box 25 around the piston rod to prevent or minimize the compressed air from leaking out around the piston rod. From the periphery of the upper head 16 extends an annular flaring wall 26, and to a peripheral flange on the upper end of said wall is secured a flexible diaphragm 27 or its equivalent by a ring 28 and cap screws 29, the middle portion of the diaphragm being formed with a hole through which the piston rod extends and which is secured to the diaphragm by clamp rings 30, 31 and cap screws 32. Obviously, a bellows or "Sylphon" bellows may be substituted for the diaphragm. The ring 31 may be press fit upon the piston rod or otherwise secured thereto. The diaphragm is provided for the purpose of preventing any of the naphtha or other cleaning fluid from reaching the part of the piston rod which reciprocates through the stuffing box and from

entering or leaking into the cylinder. A vent pipe 33 which extends from the upper end of the container adjacent its side wall opens to the chamber 34 above the upper cylinder head through a port 35 and prevents any air in said chamber from being compressed in chamber 34 with injury to the diaphragm, as well as the escape of any air that passed the stuffing gland.

Mounted upon the upper end of the piston rod is a basket supporting ring 36 formed with spider arms 37 that extend outward from a hub 38 which is fastened to the piston rod as by a screw 39. Secured to the outer ends of the arms 37 are brackets 40 having upright portions 41 to which is secured a basket retaining ring 42. The spider arms form a support or carrier for a parts basket 43 composed of foraminated side walls and a bottom wall whereby the naptha or the cleaning fluid may freely flow through the basket and past the parts contained therein. Two handles 44 are riveted or otherwise secured to the side walls of the basket to facilitate handling the same, and on the side walls of the basket are hooks 45 otherwise secured thereto and riveted or otherwise secured to the wall of the container. Adjacent the upper end of the container are loops 46 upon which the basket may be suspended above the cleaning fluid.

When the parts have been cleaned, the basket is lifted by the handles and hung upon the hooks to permit the cleaning fluid to drop or drain therefrom and to evaporate off the parts.

Control mechanism is provided for alternately directing the compressed air to the bottom of the piston and to the top thereof and providing valve controlled exhaust ports whereby the piston may discharge the air from that side of the piston opposite to the one against which the compressed air is working. The control mechanism will now be described.

Projecting down from the lower cylinder head 20 is a valve casing 50 formed with a bore 51 in which is seated a rotary oscillating valve 52 which controls the admission of compressed air to both sides of the piston, and the evacuation of air therefrom. On one end of the valve is a flange 52a (see Fig. 9) which bears against an end wall of the valve casing. To the other end of the valve is secured a spring actuated arm 53 (see Figs. 1, 3, 5, 6 and 8) which oscillates the valve at the ends of the strokes of the piston for the purpose of directing or controlling the movement of the air. A compressed air pipe 54 (see Fig. 2) leading from a suitable source of air under pressure (not shown) leads to an air inlet pipe 55 (see Figs. 4, 5, 6, 7 and 8) which is threadedly secured in the valve casing 50 and opens through the orifice of an orifice plate 56 and a washer 57 to a port 58 in the valve casing which leads to the valve (see Fig. 5). A regulating valve 59 and a shut off valve 60 may be interposed in the compressed air pipe 55 and a screen 61 may be provided in the air inlet pipe 55 to screen out any foreign matter.

The valve 52 is formed with an annular groove 62 (see Fig. 9) in its cylindrical wall, which groove registers with the air inlet port 58 so that regardless of the position of the valve, the groove will always be in communication with the port with compressed air being constantly admitted to said groove.

Extending lengthwise along the cylindrical face of the valve is a straight groove 63 and one end of said straight groove 63 is arranged to alternately communicate with either of two air passages 64, 65 depending upon the position of the valve (see Figs. 6 and 7). The air passage 64 leads through the valve casing to the lower end of the cylinder 15 and the air passage 65 leads through a pipe 66 to the upper end of the cylinder with its ends secured in the valve casing and the cylindrical wall. Ports 67 extend from the lower end of the pipe 66 to the valve 50, and a port 68 connects the upper end of the pipe with the interior of the cylinder. When the groove 63 is in register with the port 69 of the air passage 64, compressed air is admitted to the lower end of the cylinder and moves the piston upward, and when said groove is in register with the port 67, compressed air is admitted to the upper end of the cylinder and moves the piston downward.

The valve 52 is also formed with exhaust grooves 70, 71 in its cylindrical face which are alternately brought into register with the ports 69, 67 to alternately exhaust the air from the lower end of the cylinder and the upper end thereof. An exhaust port 72 leads from the exhaust groove 70 through the valve casing to the outer face thereof, and an exhaust port 73 leads from the exhaust groove 71 through the valve casing to the outer face thereof. Each exhaust groove 70, 71 is of a length to connect the ports 64—72 (see Fig. 7), and the ports 67—73 (see Fig. 6), whereby when either exhaust groove 70 or 71 connects the ports associated with it, it permits the air at one side or the other of the piston to exhaust from the cylinder.

To oscillate the valve at the ends of the strokes of the piston, one end of the arm 53 is connected to an extension 80 of the piston rod 22 by a coiled tension spring 81, one end of which is connected to a pin 82 secured to and projecting laterally from the arm 53, the other end being connected to the extension 80. The arm 53 is movable from the position seen in Fig. 6 to that seen in Fig. 7 and stop shoulders 83 are formed on the valve casing to limit the angular movement of the arm to that required for partially rotating the valve from the position shown in Fig. 6 to that shown in Fig. 7.

When the piston rod extension moves upward from the solid line position shown in Fig. 8 to the dotted line position shown in said figure, it brings the longitudinal axis of the spring past the axis of the valve and thereupon the spring swings the arm upward from the position seen in Fig. 6 to that seen in Fig. 7, thereby partially rotating the valve from the position seen in Fig. 6 to that seen in Fig. 7.

In operation the part of the container above the partition or wall 12 is partly filled with naphtha, gasoline or other grease solvent or cleaning fluid. The parts to be washed are then placed in the basket 43 which at that time may be suspended from the loops 46. Thereafter, the basket is lowered to the spider arms 37 of the support, the lid is closed and the compressed air turned on to the motor. As a result the piston and piston rod are reciprocated, thereby reciprocating or lowering and lifting the basket support and therewith carrying said basket through the naphtha or other cleaning fluid. When the parts are thoroughly washed or cleaned, the compressed air is shut off, the lid raised and the basket lifted out of the cleaning fluid and suspended from the loops 46. The cleaning fluid drains or drips from the parts into the fluid below and it evaporates from the parts leaving them clean and dry.

Referring to Fig. 1, 11a represents a spring member and fusible link arranged on the cover 11. This need not be described in detail since no claims are directed specifically thereto, but it may be mentioned that when the cover 11 is raised, it pivots about the hinge 11' and is maintained open by the spring. In case the cleaning fluid within the container becomes ignited, the flame or fire from the same will melt the fusible link, and the cover 11 will be released from the spring holding member and drop from gravity.

The washer is particularly useful in automobile garages, repair shops and the like when greasy or other parts require handling and are required to be cleaned before being replaced in the object from which they were removed.

Having thus described my invention, it is obvious that various immaterial modifications may be made in the same without departing from the spirit of my invention; hence, I do not wish to be understood as limiting myself to the exact form, construction, arrangement and combination of parts herein shown and described or uses mentioned.

What I claim as new and desire to secure by Letters Patent is:

1. In a parts cleaning device of the kind described and in combination, a container for volatile cleaning fluids, a cover therefor, a receptacle carrier, a receptacle removably mounted on said carrier, reciprocating means adapted for periodically raising and lowering the carrier in the receptacle including a vertically reciprocating shaft extending into the container through the bottom thereof, an air motor comprising a cylinder operatively mounted on the bottom of the container and provided with ports, a piston therein secured to said shaft, and means for automatically controlling the operation of said air motor, comprising a valve operatively mounted on the cylinder and a shaft extension extending through the bottom of the cylinder and operatively connected to the valve for alternately controlling the admission and discharge of air through said ports operatively located above and below the piston, a detachable cylinder head for the cylinder positioned within the container and adapted for journalling the shaft, flexible diaphragm means operatively mounted on the cylinder head adjacent the bottom of the container and secured to said shaft, and means secured to the peripheral edge of the flexible diaphragm means and anchoring the same to the cylinder head for sealably enclosing the area of said container immediately surrounding said shaft at its point of entrance into said container.

2. In a device of the kind described and in combination, a volatile cleaning fluid container, a cover therefor, a receptacle carrier, a receptacle removably mounted on said carrier, reciprocating means for periodically raising and lowering the carrier in the container including a vertically reciprocating shaft extending into the container through the bottom thereof, a fluid motor comprising a cylinder operatively mounted on the bottom of the container, a piston therein secured to said shaft for reciprocating the same, and means for automatically controlling the operation of said motor, a cylinder head for the cylinder positioned within the container and adapted for journalling the reciprocating shaft, said head comprising an annular flaring wall, flexible diaphragm means adjacent the bottom of the container operatively mounted on said annular flaring wall and secured to said shaft,

means adapted for securing the peripheral edge of said flexible means to the annular flaring wall for anchoring the same to the bottom of said container, and a vent pipe communicating with the sealed space between the container bottom and the diaphragm means and extended to adjacent the upper part of the container.

3. In a device of the kind described and in combination, a volatile cleaning fluid container provided with a cover, a receptacle carrier arranged within the container, a shaft upon which said carrier is mounted depending from the carrier through the bottom of the container, a fluid motor comprising a cylinder operatively mounted on and arranged below the container bottom for reciprocating said shaft, means for automatically controlling the operation of said fluid motor comprising valve means operatively mounted on said cylinder and operatively connected to an extension of said shaft contiguous to said valve means, a cylinder head for the aforesaid cylinder comprising a cup-shaped member secured to the container bottom at the interior thereof and surrounding said shaft and providing a seal therefor, a flexible diaphragm secured to said shaft with its outer peripheral edge secured to said cup-shaped member at the upper edge thereof, and a vent pipe communicating with the space provided by the cup-shaped member below said diaphragm and extending to adjacent the top of the container, said cup-shaped member and said flexible diaphragm serving to sealably enclose the area immediately surrounding said shaft at its point of entrance into said container.

4. In a cleaning device of the kind described and in combination, a cleaning fluid container provided with a cover, a receptacle carrier arranged within the container, a shaft upon which said carrier is removably mounted, extending from the carrier through the bottom of the container, a fluid motor comprising a cylinder operatively mounted on and arranged below the container bottom for reciprocating said shaft, means for automatically controlling the operation of said fluid motor comprising valve means operatively mounted on the cylinder and an extension shaft operatively connected to the first-mentioned shaft and to said valve means, a cylinder head operatively mounting said shaft and comprising a cup-shaped member secured to the container bottom at the interior thereof and surrounding said shaft, a flexible diaphragm secured to said shaft with its peripheral edge secured to said cup-shaped member at the upper edge thereof for sealably enclosing the area of said container immediately surrounding said shaft at the point of entrance thereof into said container.

5. In a device of the kind described and in combination, a volatile cleaning fluid container including a safety cover therefor, a receptacle carrier arranged within the container, a removable receptacle disposed in said carrier, a shaft upon which said carrier is removably mounted extending from the carrier through the bottom of the container, an air motor comprising a cylinder operatively mounted on and arranged below the container bottom for reciprocating said shaft, means for automatically controlling the operation of said air motor, a cup-shaped member secured to the container bottom at the interior thereof and surrounding said shaft and adapted to provide a seal therefor, means for preventing leakage of fluid from the container down the

shaft consisting of a flexible diaphragm secured to said shaft with its peripheral edge secured to said cup-shaped member at the upper edge thereof, and a vent pipe communicating with the sealed space provided by said diaphragm and the cup-shaped member and extending to adjacent the top of the container.

6. A parts cleaning device including in combination a container for volatile cleaning fluids, a parts receiving basket removably arranged within said container, automatically controlled air motor means for reciprocatingly moving said parts receiving basket within said container, said air motor means comprising a cylinder mounted on and arranged below said container, a cylinder head for said cylinder affixed to the bottom of said container, said air motor means including a vertically disposed shaft passing through the bottom of said container and reciprocatingly movable with respect thereto and journaled and sealed by said cylinder head, an annular flaring wall affixed to said container, and flexible means secured to said shaft and to said annular flaring wall for sealably enclosing with said cylinder head the area of said container immediately surrounding said shaft at the point of entrance thereof into said container.

7. A parts cleaning device including in combination a container for volatile cleaning fluids comprising a fused safety cover for said container, a parts receiving basket removably arranged within said container automatically controlled air motor means for reciprocatingly moving said parts receiving basket within said container, said air motor means comprising a cylinder mounted on and arranged below said container, a cylinder head for said cylinder detachably affixed to the bottom of said container, said air motor means also including a vertically disposed shaft passing through the bottom of said container and reciprocatingly movable with respect thereto and journaled and sealed by said cylinder head, said cylinder head comprising an integrally formed annular flaring wall, flexible means secured to said shaft and to said annular flaring wall for sealably enclosing with said cylinder head the area of said container immediately surrounding said shaft at the point of entrance thereof into said container.

8. The combination in a cleaning device comprising a container for a cleaning fluid, a receptacle adapted to receive the material to be cleaned and to be reciprocated within the container, and fluid motor means including a cylinder operatively mounted on the container and a reciprocating shaft extending through the container and operatively connected to the receptacle for reciprocating the receptacle, of sealing means contiguously mounted to the shaft at its common entrance to the container and the cylinder, said sealing means including flexible means operatively affixed and sealed to the shaft and to the bottom of the container forming a sealed space, whereby the cleaning fluid within the container and the actuating fluid within the cylinder of the fluid motor means are sealed from each other, and means for venting the sealed space around the shaft whereby fluid leakage from the cylinder of the fluid motor means into the sealed space is vented but cleaning fluid within the container is prevented from entry within the fluid motor means.

9. The combination in a cleaning device comprising a container for a cleaning fluid, a receptacle adapted to receive the material to be cleaned and to be reciprocated within the container, and air motor means including a cylinder operatively mounted on the container and a reciprocating shaft extending through the container and operatively connected to the receptacle for reciprocating the receptacle, of sealing means contiguously mounted to the shaft at its common entrance to the container and the cylinder providing a sealed space around the shaft at its point of entry in the cylinder at the juncture of the cylinder with the bottom of the container, a liquid seal for the shaft adapted for journalling the shaft, and means for venting the sealed space around the shaft, whereby air leakage from the cylinder of the air motor means into the sealed space is vented but liquid within the container is prevented from entry within the air motor means.

10. The combination in a cleaning device comprising a container for a cleaning fluid, a receptacle adapted to be reciprocated within the container, and fluid motor means including a cylinder operatively mounted on the container, a movable piston within the cylinder, ports within the cylinder adapted for admitting fluid on opposite sides of the piston for actuating the piston, a reciprocating shaft extending through the container and operatively connected to the receptacle for reciprocating the receptacle, of valve means operatively mounted in a plane transverse to the reciprocating shaft on the bottom of the cylinder, contiguous to the axis of the reciprocating shaft and adapted to be connected to a source of fluid under pressure, said valve means operatively connected to the ports of the cylinder, said valve means comprising a housing, a ported rotatable valve member therein, an extension shaft operatively connected to the reciprocating shaft, contiguous to the valve means, a lever arm operatively connected to the rotatable valve member, spring means operatively connecting the lever arm and the extension shaft for biasing the lever arm in either direction upon reciprocation of the reciprocating shaft, whereby as fluid under pressure is admitted to the valve means, reciprocation of the piston in opposite directions is controlled by the actuation of the valve means as the to and fro movement of the extension shaft actuates the spring biased lever arm to control the rotatable valve member for the alternate admission of fluid to either side of the piston.

11. The combination with a fluid motor including a cylinder, a piston adapted to be reciprocated within the cylinder, a reciprocating shaft operatively connected to the piston and adapted to impart reciprocatory movement to a device operatively connected thereto, of an extension shaft operatively extending from the opposite end of the cylinder and connected to the piston, said cylinder provided with ports for the admission of fluid to opposite sides of the piston for actuating the piston, valve means operatively mounted in a plane transverse to the axis of the extension shaft on the cylinder contiguous to the axis of the extension shaft and adapted to be connected to a source of fluid under pressure, said valve means operatively connected to the ports of the cylinder, said valve means also comprising a housing, a ported rotatable member therein, a lever arm operatively connected to the rotatable valve member in a plane parallel to the axis of the extension shaft and transverse to the axis of the rotatable member, spring means operatively connecting the lever arm and the free end of the extension shaft for biasing the lever arm in either direction upon

reciprocation of the extension shaft, whereby as fluid under pressure is admitted to the valve means to cause movement of the free end of the extension shaft above or below the axis of the rotatable valve member, the rotatable valve member is biased by the spring means for alternate admission of fluid to either side of the piston to reciprocate the reciprocatory shaft.

WILLIAM A. LEBUS.

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