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R. J. BEEDE ET AL

2,370,285

WASHER

Filed Aug. 31, 1939

3 Sheets-Sheet 1

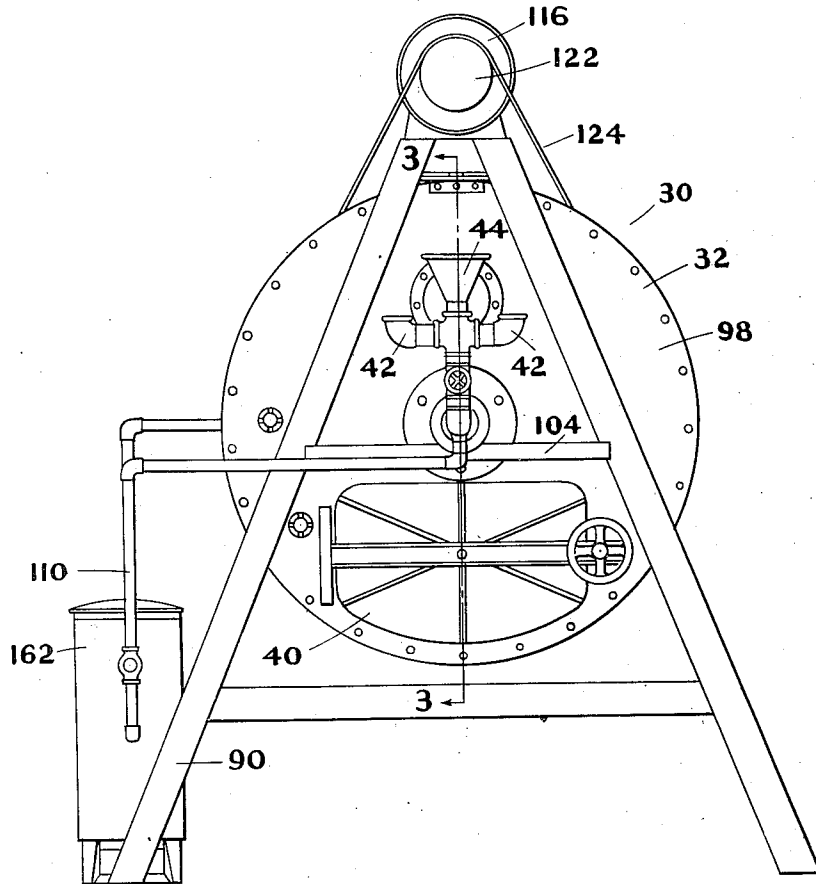


Fig. 1

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3 Sheets-Sheet 2

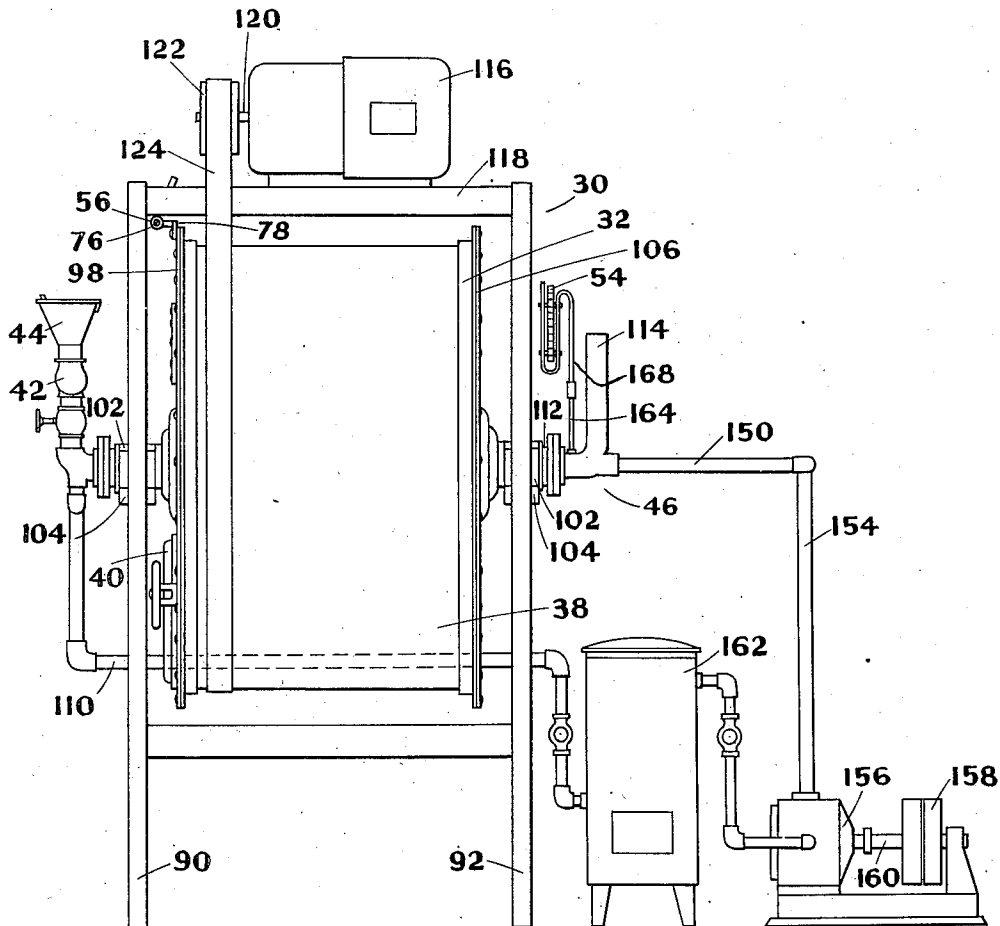


FIG. 2

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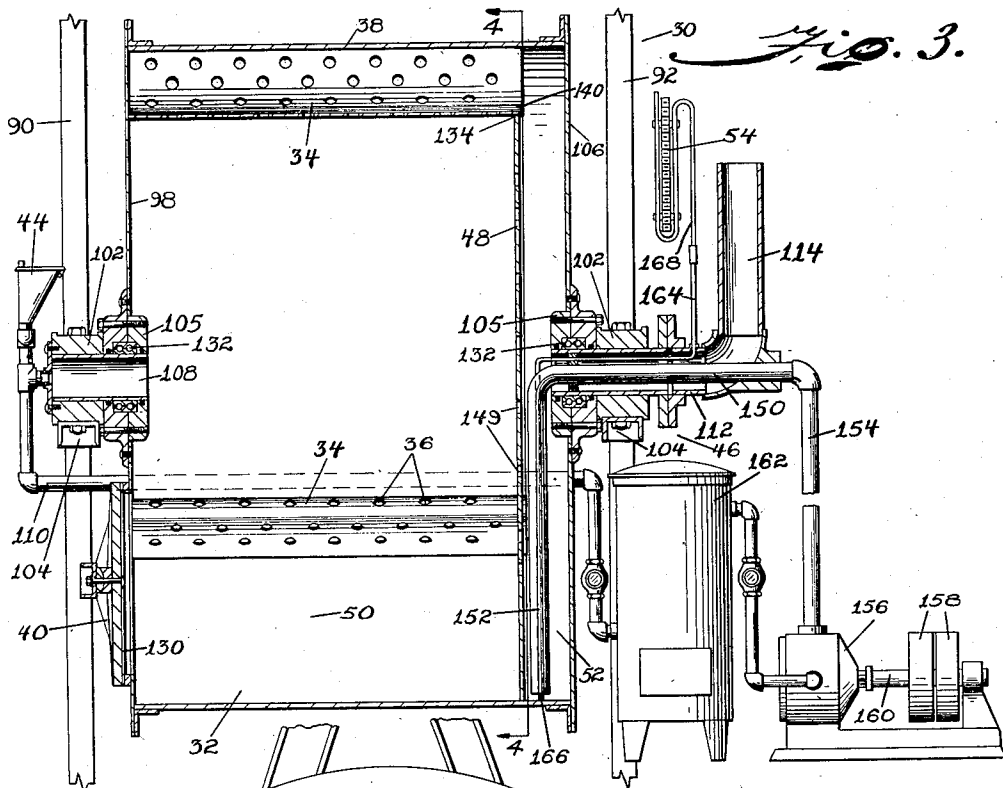
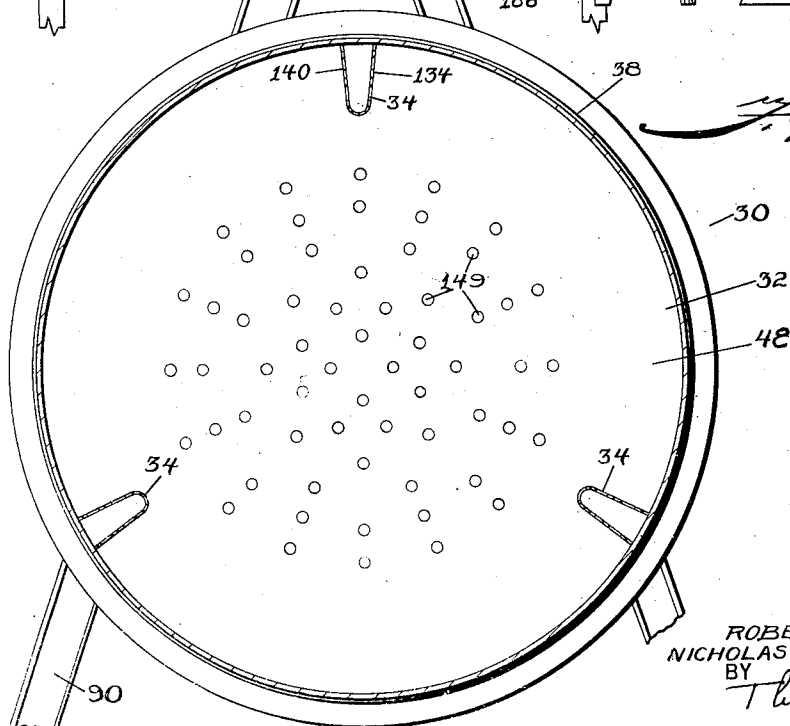
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3 Sheets-Sheet 3



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WASHER

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4 Claims. (Cl. 68—144)

Our invention relates to improvements in washers.

In the prior art, whether for laundry or other uses, washers of the rotary type have comprised a rotating work-holding member rotating in a body of liquid, which is static relative to the rotating member, whether said liquid circulates in said container or not.

An object of our invention is to employ the principle in washers of the rotary type, whether they be used for washing clothes, such as in laundries, dry cleaning, fulling piece goods, or cleaning or washing other materials, which comprises, inserting the work to be washed and the cleaning liquid in a single container and rotating both simultaneously. We have found that this results in a more efficient washing action for substantially the entire body of the liquid is constantly brought into washing contact with the work and to interrupt the rotative movement of the work and liquid, we preferably provide in the interior of the cylinder or container a plurality of means projecting inwardly therefrom to interrupt the travel of the work and throw it into intimate contact with the cleaning liquid. We preferably operate the cylinder or container so that the body of cleaning liquid will remain in the base of the container and the work will be continuously picked up by the lifting means just described and continuously dropped into the cleaning liquid. Due to the fact that there is a greater area of washing contact between the work and the cleaning liquid, it is apparent that washing units of equal capacity can be made of much less percentage volume than those formerly employed. It is also apparent that due to the intimate contact between the work and the cleaning liquid, we are able to provide a washer which operates much more quickly than former types.

A further object of our invention is to provide a washer which will operate with a large percentage of economy of cleaning liquid and laundry supplies, such as soap, detergent, bleach, sour, blueing, starch, tint, etc.

A further object of our invention is to provide a rotary washer of the above-mentioned type provided with a novel type of means to fill the washer and to drain the spent cleaning liquid therefrom.

A further object of our invention relates to the novel means we employ for withdrawing the cleaning liquid from the clothes, or other work being cleaned without clogging the outlet pipe, and while we may, in various modifications of our invention, draw the cleaning liquid from

the top, center, or bottom of its liquid level, we preferably provide a construction which will draw the liquid from the top, which normally contains the solids and detritus washed from the clothes as well as the detritus of the washing materials, or in greater selective volume from the top.

A further feature of our invention is to provide, in combination with the feature just described, if desired, means to continuously recirculate the cleaning liquid through the material being washed, in which case there is a greater tendency for the said detritus to rise to the top of the cleaning liquid, whether said recirculation comprises positive means exterior of the washer for recirculation, or whether it comprises continuous circulation between the washing compartment and a connected spent cleaning liquid compartment.

A further feature of our invention resides in the fact that we provide a breather port for admitting air to the materials being washed, so as to insure efficient operation, to vent excessive gases, as for example, when hot water is introduced.

Further features of our invention relate to the means we preferably employ for continuously recirculating cleaning liquid through the washer while the washer is rotating and the means shown for readily withdrawing the cleaning liquid therefrom either while in operation, or in a set position for loading or unloading.

A further object of our invention is to provide a washer which may be constructed of a lesser amount of material, thus effecting a saving in the cost of material.

These and such other objects of our invention as may hereinafter appear will be best understood from a description of various embodiments thereof, such as are shown in the accompanying drawings.

In the drawings, Fig. 1 is an end elevation of a washer constructed in accordance with one embodiment of our invention.

Fig. 2 is a side elevation thereof.

Fig. 3 is a vertical longitudinal sectional view taken along the line 3—3 of Fig. 1 showing in elevation in combination therewith means to continuously recirculate the cleaning material through the washer during use.

Fig. 4 is a vertical sectional view taken along the line 4—4 of Fig. 3.

In the drawings, wherein like characters of reference indicate like parts throughout, 36 gen-

erally indicates a washer constructed in accordance with our invention.

Our invention includes a single rotary washer member 32 preferably of closed cylindrical shape provided with a suitable axis of rotation, preferably substantially centrally thereof. We provide means to rotatably support said cylinder 32 on said axis. For a purpose to be described, circumferentially spaced hollow lifting ribs 34, preferably perforate as at 36 project radially inwardly from the inner surface of the cylinder side wall 38. As stated hitherto, the cylinder 32 is preferably rotated at such a speed that the lifting ribs 34 will lift the clothes and drop them into the body of cleaning liquid for optimum cleaning operation. We also provide a work loading door 40 for said cylinder to load and unload the material to be washed therefrom. We also provide inlet means 42 to supply cleaning material in liquid form to said cylinder, in our preferred embodiment having a supply hopper 44 connected thereto. We also provide outlet means 46 to discharge spent cleaning liquid from said cylinder 32. To prevent the work from clogging the outlet means and for other purposes, as will be apparent, we also provide a spent cleaning liquid compartment forming partition 48 adjacent said outlet means to shield the work therefrom, dividing said washer into a washing compartment 50 and a spent cleaning liquid compartment 52. We may, if desired, provide a liquid level indicating means 54 for indicating the level of the cleaning liquid within said cylinder. We may also, if desired, for loading and unloading purposes, provide means 56 to secure said cylinder to said supporting means against rotation at a predetermined point of its rotation.

In the embodiment of our invention shown, said means 56 to detachably secure said cylinder to its supporting means in a rest position with the work loading door 40 in its lowermost position comprises a latch pin 76 pivotally mounted on the supporting means for said cylinder detachably engageable within a suitable notch 78 in the cylinder. We have employed axially spaced standards 90 and 92, which preferably comprise the respective A-frames 90 and 92, said standards being provided with the horizontally aligned stub-axle supports 102 therein, where A-frames are employed substantially centrally of the A-cross-bars 104 thereof. The cylinder 32 is provided with a closed end wall 106 and an opposite end wall 98. The closed end wall 106, as shown, or if desired the opposite wall 98 is provided with a hub bearing 105 for a hollow stub-axle 108 projecting outwardly therefrom adapted to be mounted on the stub-axle support 102 of the standard 90, having a cleaning liquid supply pipe 110 connected thereto and a cleaning material supply hopper 44 connected thereto for the insertion of washing supplies, such as soap, detergent, bleach, sour, blueing, starch, tint, etc. The opposite end wall 106 has the hollow outlet stub-axle 112 projecting axially outwardly from a suitable hub bearing 105 which is mounted on the other of said stub-axle supports 102 on the standard 92. In order to provide for fluid expansion in the cylinder on the insertion of hot water therein, or for other reasons, is preferably provided with the breather port 114 connected thereto. It is obvious, however, that any well-known type of means for rotatably mounting a cylinder on its supporting means may be employed.

Any suitable means may be provided to

continuously or intermittently rotate the cylinder 32, in our preferred embodiment, comprising a reversing motor 116 suitably mounted on a cross bar 118 connecting the upper ends of the respective A-frames 90 and 92. Said motor is provided with the usual drive shaft 120 having a pulley 122 mounted thereon and a belt 124 passes around said pulley 122 and around the cylinder 32 to rotate it. While in accordance with the teachings of the art, we preferably provide a reversing motor 116, we have found in practice that in operation our improved washer is so efficient that a unidirectional motor may be employed if desired. In the embodiment of our invention shown, the end walls preferably project radially a distance beyond the periphery of the sidewall 38 of said cylinder so as to provide a stronger and more easily fabricated construction. The door 40 is preferably provided with a sealing gasket 130 so that it may be locked in a liquid-tight condition. Suitable stuffing boxes 132 may be provided where the stub-axes 108 and 112 are mounted in the hub bearings 105 in the respective end walls 98 and 106 of said cylinder.

Means are provided to guide spent cleaning liquid from the cleaning compartment 50 to the spent cleaning liquid compartment 52 during continuous rotation of said cylinder entirely independently of any means to draw cleaning liquid from said compartment 52.

We have shown a type of means that may be employed to withdraw the cleaning liquid from the spent liquid compartment 52, which means may be operative during rotation of said cylinder. The partition 48 extends completely around said compartment at a spaced distance from the end wall 106 and is provided with the notches 134 opposite the ends 140 of the perforate ribs 34 for substantially complete evacuation of cleaning liquid therefrom on revolution of said washer member, the ribs 34 terminating in the interior of said partition. In this embodiment, the partition is provided with a plurality of perforations 149 spaced from the outer edge thereof to selectively discharge a greater proportion of spent liquid from the top of the cleaning liquid in the cleaning compartment 50 into said spent cleaning liquid compartment 52 than is discharged through said rib ends 140 and notches 134. It is thus obvious that the lighter waste materials cleaned from the work and the detritus of supply material may be floated off from the top of the cleaning liquid. In this embodiment to discharge spent cleaning liquid from the cleaning compartment we provide a discharge pipe 150 extending axially through said hollow stub-axle 112 preferably at a spaced radial clearance therefrom and having an inner end 152 projecting radially downwardly substantially to the bottom of said spent cleaning liquid compartment 52 and having an outer end 154 connectable to means 156 to exhaust spent liquid therethrough, which may comprise a suction pump 156 if desired. The suction pump 156 may be actuated in any suitable manner, as indicated by the pulleys 158 mounted on the drive shaft 160 therefor, and if desired, instead of being exhausted to atmosphere, the spent cleaning liquid may be passed through a filter 162 and returned to the inlet supply pipe 110, so as to provide a complete continuous recirculation of revived cleaning liquid through the washer.

The means 54 for continuously indicating the level of cleaning liquid within the cylinder comprises a tube 164 also extending axially through

said hollow axle 112 having an inner end 166 projecting radially downwardly substantially to the bottom of said spent cleaning liquid compartment 52 and an outer end 168 projecting upwardly exterior of said hollow stub-axle 112 having a liquid level indicating U-tube manometer 54 connected thereto.

The door 40 is located in the end wall 98 of the cylinder adjacent the inlet and preferably in a position near the lower end of the cylinder for convenient loading and unloading when the cylinder is latched in a predetermined position by the latch 76, said door being located substantially in the same position regardless of where the partition be located.

It is thus obvious that we have provided a novel type of washer with the advantages portrayed above.

It is understood that our invention is not limited to the specific embodiment shown and that various deviations may be made therefrom without departing from the spirit and scope of the appended claims.

What we claim is:

1. A washer, comprising a closed cylinder having an axis and an outlet end, means including a hollow outlet axle to rotatably support said cylinder on said axis, a circular partition mounted in said cylinder at a spaced axial distance from said outlet end dividing said cylinder into a cleaning compartment and a spent cleaning liquid compartment adjacent said outlet end, circumferentially spaced hollow perforate lifting ribs projecting inwardly from the inner surface of the cylinder side wall extending axially of said cleaning compartment, said partition having a notch therein opposite each rib end and a plurality of outlet perforations centrally thereof to selectively discharge a greater proportion of spent cleaning liquid from the top of the cleaning liquid in the cleaning compartment than is discharged from said rib ends into said spent cleaning liquid compartment, a discharge pipe extending axially through said hollow outlet axle and having an inner inlet end projecting radially downwardly substantially to the bottom of said spent cleaning liquid compartment and an outlet end and a tube also extending axially through said hollow outlet axle having an inner end projecting radially downwardly substantially to the bottom of said spent cleaning liquid compartment and an outer end projecting exterior of said hollow outlet axle having liquid level indicating means secured thereto.

2. A washer, comprising a closed cylinder having an axis and an outlet end, means including

a hollow outlet axle to rotatably support said cylinder on said axis, a circular partition mounted in said cylinder at a spaced axial distance from said outlet end dividing said cylinder into a cleaning compartment and a spent cleaning liquid compartment adjacent said outlet end, a discharge pipe extending axially through said hollow outlet axle and having an inner inlet end projecting radially downwardly substantially to the bottom of said spent cleaning liquid compartment and an outlet end and a tube also extending axially through said hollow outlet axle having an inner end projecting radially downwardly substantially to the bottom of said spent cleaning liquid compartment and an outer end projecting exterior of said hollow outlet axle having liquid level indicating means secured thereto.

3. A washer comprising a closed cylinder having an axis and an outlet end, means to rotatably support said cylinder on said axis, a circular partition mounted in said cylinder at a spaced axial distance from said outlet end dividing said cylinder into a cleaning compartment and a spent cleaning liquid compartment adjacent said outlet end, circumferentially spaced hollow perforate lifting ribs projecting inwardly from the inner surface of the cylinder side wall extending axially of said cleaning compartment, said partition having a notch therein opposite each rib end and a central area of outlet perforations to continuously discharge a greater proportion of spent cleaning liquid from the top of the cleaning liquid in the cleaning compartment than is discharged from said rib ends into said spent cleaning liquid compartment, the portion of the partition about said central perforated area forming an imperforate annulus, to continuously evenly float the surface scum from said cleaning compartment to said spent liquid compartment.

4. A washer comprising a closed cylinder having an axis and an outlet end, means to rotatably support said cylinder on said axis, a circular partition mounted in said cylinder at a spaced axial distance from said outlet end dividing said cylinder into a cleaning compartment and a spent cleaning liquid compartment adjacent said outlet end, said partition having a central area of outlet perforations, the portion of the partition about said central perforated area forming an imperforate annulus, to continuously evenly float the surface scum from said cleaning compartment to said spent liquid compartment.

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