June 5, 1951 R. L. ARCHBOLD 2,555,725

SELF-CLEANING LINT TRAP FOR WASHING MACHINES

Filed Nov. 13, 1947 2 Sheets-Sheet 1

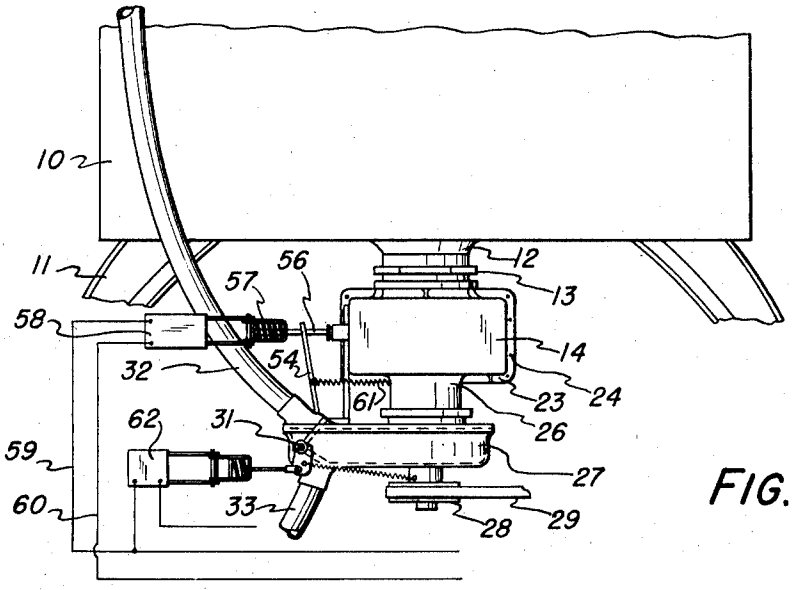


FIG. 1

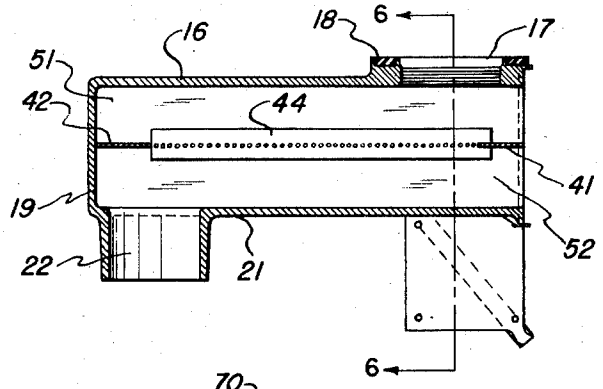


FIG. 2

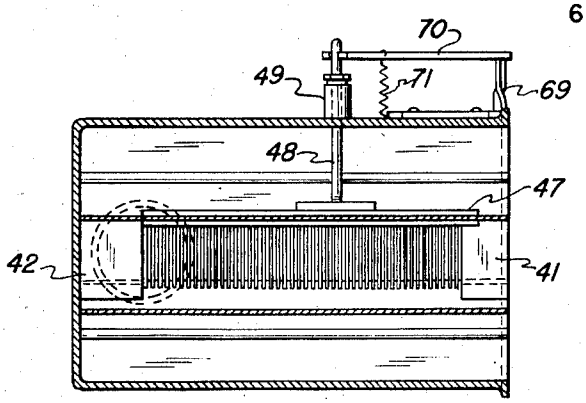


FIG. 3

INVENTOR.
RALPH L. ARCHBOLD
BY
W. G. Sullivan
ATTORNEY

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SELF-CLEANING LINT TRAP FOR WASHING MACHINES

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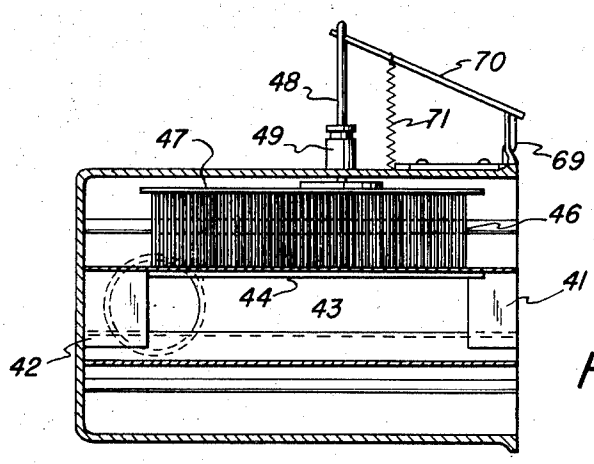


FIG. 4

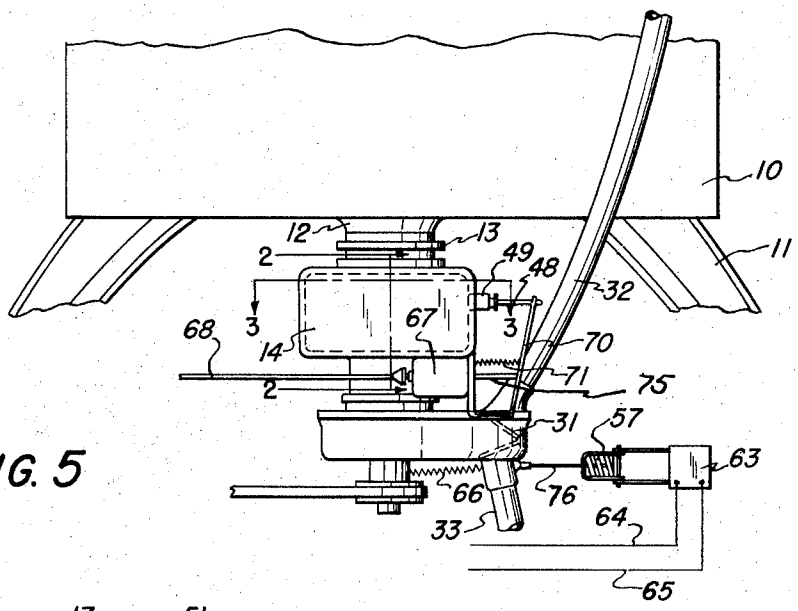


FIG. 5

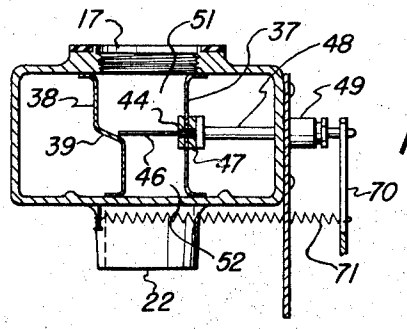


FIG. 6

INVENTOR.
RALPH L. ARCHBOLD
BY W. G. Sullivan
ATTORNEY

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2,555,725

UNITED STATES PATENT OFFICE

2,555,725

SELF-CLEANING LINT TRAP FOR WASHING MACHINES

Ralph L. Archbold, Euclid, Ohio, assignor to The Apex Electrical Manufacturing Company, Cleveland, Ohio, a corporation of Ohio

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6 Claims. (Cl. 68—12)

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This invention relates to lint traps for washing machines and the like, and more particularly to a lint trap adapted to be self-cleaning or automatically cleaned.

In certain type washing machines, and particularly automatically controlled washing machines, it is desirable to recirculate liquid passing from the clothes container during the washing operation. Lint discharged from the container with liquid during washing will be returned to the container by the recirculating liquid, unless a lint trap is inserted in the recirculating system and it has been common practice to provide a lint trap on automatically controlled washing machines. Prior lint traps of this type with which I am familiar, have not been adapted to be automatically cleaned but are removable for periodic manual cleaning. However, a lint trap of this type in many instances remains uncleaned for relatively long periods and the partial clogging of the trap results in less recirculating flow, and lowered washing efficiency. Additionally, after continued use of the washing machine which results in periodic accumulation and drying of the lint in the trap, the lint becomes matted and interlocked with the trap perforations so that it is difficult to remove manually.

I have devised a lint trap particularly adapted to automatically controlled washing machines, which is automatically cleaned one or more times each time the machine is used, whereby the lint is flushed from the trap and directed to the drain with the lint being removed while it is still wet and relatively easy to flush from the trap.

According to the invention, the lint trap is inserted in the recirculating system between the drain for the tub or casing and the pump with the trap comprising a generally box-shaped member having a passage therein adapted to direct liquid containing lint longitudinally of the member when said liquid is passing from the casing to the pump. One wall of this passage has associated therewith a plurality of spaced parallel fingers secured to a common bar. These fingers project through the passage wall and are reciprocable laterally whereby during recirculation of washing liquid a considerable portion of the liquid is caused to travel over the fingers. The lint or a substantial portion thereof is caught by the fingers and is prevented from being recirculated with the liquid. During recirculation the liquid is directed from the casing through or along the screen unit which removes the major portion of the lint, the liquid then passes through the pump and is returned to the clothes container. Automatically controlled washing machines usually have a two-way valve at the discharge side of the pump whereby during the washing and extracting cycle liquid may be automatically and selectively directed to a sewer drain or returned to the clothes container with final communication to the drain. The above described screen unit may be cleaned each time communication is made with the sewer drain or only at the time of final draining. Cleaning is effected by retracting the fingers laterally of the passage which wipes the lint from the fingers and at the same time provides a clear opening in the passage directly communicating with the sewer drain through the pump and two-way valve whereby the removed lint will be flushed to the drain.

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It is a primary object of the invention to provide a lint trap in the recirculating system of washing machines or the like which is adapted to be automatically cleaned each time the machine is used.

Another object of the invention is to provide a self-cleaning lint trap which is particularly adaptable to automatically controlled washing machines.

Another object of the invention is to provide a self-cleaning lint trap of the above type wherein lint is removed from the screen unit by a wiping action.

Another object of the invention is to provide a self-cleaning lint trap of the above type which is of relatively simple construction, easy to install, and which will operate efficiently for long periods without attention.

Other objects of the invention and the invention itself will become increasingly apparent from a consideration of the following description and drawings wherein:

Figure 1 is a fragmentary elevational view of a washing machine embodying my invention,

Figure 2 is a longitudinal vertical sectional view of the lint trap per se taken along the line 2—2 of Fig. 5,

Figure 3 is a horizontal section taken along the line 3—3 of Fig. 5 showing the screen unit in closed position,

Figure 4 is a view similar to Fig. 3 showing the screen unit in open position,

Figure 5 is a view generally similar to Fig. 1 showing modified means for controlling the operation of the lint trap, and

Figure 6 is a vertical transverse section taken along the line 6—6 of Fig. 2.

Referring now to the drawings, and particu-

larly to Fig. 1, I have indicated at 10 the tub or casing of a conventional washing machine which is supported by legs 11. A clothes container or basket (not shown) disposed within the tub is adapted to have clothes placed therein agitated during washing while initially supplied liquid is being recirculated. Extraction of liquid from the clothes may be effected by providing perforations in the basket and rotating the basket at relatively high speed, whereby liquid will be forced through the perforations by centrifugal action to collect in the tub and be directed to the drain. However, the particular manner of washing the clothes and extracting liquid therefrom constitutes no essential part of my invention and any suitable means may be used. During the washing, rinsing and extracting periods the liquid is periodically supplied, recirculated and drained, and the supply valves, drain valve and the mechanism for shifting from washing to extracting may be automatically controlled, but the particular means for effecting control constitutes no particular part of the present invention.

The tub drains toward a sump portion in the base thereof from which depends a neck 12. Secured to neck 12 in any suitable manner as by a coupling 13 having opposite hand threads at each end and a hexagonal or the like wrench engaging portion in a generally box form housing generally indicated at 14. Housing 14 comprises a top wall 16 having a threaded inlet opening 17 preferably provided with a rubber sealing gasket 18 adapted to sealingly engage a shoulder provided on coupling 13, an end wall 19, and a bottom wall 21 provided with a depending outlet neck 22. The opposite end of the housing is closed by a plate 23 detachably secured to the housing by bolts as indicated at 24 with a sealing gasket disposed between the plate and housing. A short length of hose 26 has its upper end telescoped over and sealingly clamped to housing neck 22 and its lower end connected in a similar manner to the inlet of a pump 27.

The pump may be of the impeller type and driven through a pulley 28 by a belt 29 driven from the motor. Disposed within the pump housing is a two-way flap valve 31 adapted in one position to direct liquid flow to a recirculating hose or conduit 32 and in another position to direct liquid flow to a drain conduit 33 connected to a sewer.

Referring now to Fig. 6, the housing 14 has a vertically disposed plate 37 therein extending from the top wall 16 to the bottom wall 21 and from the end wall 19 to plate 23. Plate 37 may be flanged at the top and bottom whereby it may be welded or bolted to the housing. A second generally vertical extending plate 38 is secured in a similar manner to the housing and this plate is bent to provide a shelf portion 39 preferably slightly inclined to the horizontal. Horizontally extending plates 41 and 42 disposed at each end of the housing interconnect vertical plate 37 and the shelf portion 39 of plate 38 thereby providing an open area as indicated at 43 between plates 41 and 42. The plates 41 and 42 may be connected in any suitable manner as by welding to shelf portion 39 and to plate 37. A strip 44 secured to plate 37 extends throughout the length of area 43, this strip being perforated at closely spaced points in horizontal alignment to receive fingers 46 of a comb type screen unit. The fingers 46 are fixed to a strip 47 having a rod 48 secured thereto. Rod 48 projects through a stuffing box 49 to prevent leakage of liquid from the housing.

The fingers 46 are preferably cylindrical rods about $\frac{1}{16}$ inch in diameter and the spacing between fingers is also about $\frac{1}{16}$ inch. When strip 47 abuts plate 37 it will be noted that fingers 46 ride over and substantially rest on shelf portion 39 of plate 38. Thus a top liquid passage-way 51 and a bottom liquid passage-way 52 are provided and when the screen unit is in closed position as illustrated in Fig. 6, the only passage of liquid from passage 51 to passage 52 is between the comb fingers 46. When the screen unit is retracted as illustrated in Fig. 4 the area 43 is unimpeded and liquid may pass without interference from housing inlet 17 to outlet 22.

The manner of operating the lint trap will now be described. During periods when it is desired to recirculate liquid or to return liquid passing from casing 10 and through the pump back to the clothes container through conduit 32, valve 31 will block drain conduit 33 and permit liquid passage to conduit 32 so that a continuous recirculation may be effected during such periods. During recirculation the screen unit is closed or in the position illustrated in Figs. 3 and 6 so that liquid entering inlet 17 flows over and through fingers 46 whereby a major portion of the lint is caught between the fingers before the liquid passes through outlet 22 for recirculation. It will be noted that inlet 17 is spaced substantially longitudinally from outlet 22 or that the inlet and outlet are at opposite ends of the housing 14, and I have found by experiment that it is desirable to have the inlet and outlet spaced in this manner, since, if they are in vertical alignment, the liquid passes in a vertical direction through the screen area directly between the inlet and outlet, which area becomes quickly clogged with lint and the remaining screen area is relatively ineffective.

When the valve 31 is shifted to block recirculation through conduit 32 and permit liquid passage through drain conduit 33, the screen unit may be retracted to the position illustrated in Fig. 4 and this movement wipes or strips the lint from the fingers 46. The removed lint passes with liquid through the open area 43 to the pump and then to drain conduit 33. Normally an automatically controlled washing machine will provide rinse water for the clothes several times subsequent to the initial washing period and in each instance communication with the drain conduit 33 may be effected. I prefer that the screen unit be retracted or cleaned each time the drain is opened but if desired the unit need only be cleaned at the completion of the cycle at final opening of the drain.

The means for actuating the screen unit and the valve 31 will now be described but any suitable means other than the means disclosed may be used. Referring now to Fig. 1, a lever 54 has its lower end pivoted to the pump housing and its upper end which is forked engages a groove cut in a rod 56 (corresponding to rod 48 of Fig. 5) which is secured to strip 47. Rod 56 is headed at its outer end and abuts one end of a compression spring 57, the spring opposite end abutting a U shaped strap which is pivoted to arms extending from the plunger of a solenoid 58. Leads 59 and 60 extend from the solenoid to a suitable electric timer whereby the solenoid 58 may be periodically energized during operation of the washing machine and as determined by the contour of the cams operating the timer

contact fingers. When the solenoid 58 is energized the screen will be retracted against the tension of a spring 61. A second solenoid 62 operates flap valve 31 in a similar manner and it will be apparent that both solenoids 58 and 62 can be operated concurrently from the timer so that the screen unit will be cleaned each time the drain is opened. Optionally, the solenoid 62 can be controlled so that the screen unit will only be cleaned at final opening of the drain during a cycle of operations of the washing machine.

Referring now to the control means illustrated in Fig. 5, a hydraulic control is provided for actuating the screen unit. In this embodiment a lever 70 at its lower end engages an abutment 69 extending from housing 14 and at its upper end engages a groove formed in rod 48. A tension spring 71 fixed to housing 14 and lever 70 continuously urges the screen unit toward a closed position or to the position illustrated in Figs. 3 and 6. A fluid pressure operable power unit 67 which may be a chamber having one wall formed by a flexible diaphragm or a bellows has a rod 75 extending from the movable portion of the power unit to engage lever 70. A fluid supply line 68 is adapted to periodically supply fluid under pressure to unit 67 to rock lever 70 against the tension of spring 71 and move the screen unit to open position or to the position illustrated in Fig. 4. The source of fluid pressure is preferably the conventional water supply system for homes or the like. Timers adapted to open or close a fluid supply valve at a desired time are well-known and suitable drain means (not shown) are associated with unit 67 for exhausting fluid therefrom after the supply valve is closed. A solenoid 63 connected to the electric timer by leads 64 and 65 is adapted to actuate the flap valve 31 through a rod 76 connected to an arm extending from the valve and against the tension of a spring 66.

Although a solenoid is shown for operating valve 31 a power unit such as 67 may be used. Also, in the event it is desired to have the lint removed each time communication is effected with the drain conduit 33, the levers 54 and 70 could be linked to valve 31 so that a single solenoid or power unit could actuate both the screen unit and valve. For example, pivoted lever 54 could be extended downwardly and linked to the arm fixed to the shaft of valve 31 whereby as rod 56 is retracted to uncover area 43 valve 31 will be rocked counter-clockwise (Fig. 1) to uncover drain conduit 33 and cover recirculating conduit 31.

It will be noted by reference to Fig. 6 that strip 47 is shown as abutting plate 37 when the screen unit is in filtering position, but I contemplate that the strip may be slightly spaced from plate 37 to provide space for any lint which might work through the openings in plate 37 and still permit the screen unit to engage plate 38.

I wish it to be understood that I do not desire to be limited to the exact details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

What I claim is:

1. The combination with a recirculating liquid system, a drain outlet therefrom, valve means for selectively directing liquid through the recirculating system or the drain outlet, of a lint trap disposed in the recirculating system at a point ahead of the drain outlet to receive liquid prior to passage towards the outlet, the lint trap comprising a housing having a liquid passageway therethrough, a screen unit movable into the housing passageway to divide the passageway into upper and lower zones, the housing having a liquid entry port communicating with the upper zone and a liquid outlet port communicating with the lower zone at a point longitudinally spaced from the entry port whereby lint-containing liquid may flow over and through the screen unit to remove lint therefrom, automatic means associated with the screen unit and valve means for retracting the screen unit from the passageway in timed relation to valve means movement directing liquid to the drain outlet whereby lint flushed from the housing may be carried to the drain, said automatic means comprising a sequential timer, power means for actuating the screen unit, power means for actuating the valve means, and operative connections between the timer and power means whereby the power means will be energized at predetermined times and for predetermined intervals under control of the timer.

2. The combination with a recirculating liquid system, a drain outlet therefrom, valve means for selectively directing liquid through the recirculating system or the drain outlet, of a lint trap disposed in the recirculating system at a point ahead of the drain outlet to receive liquid prior to passage towards the outlet, the lint trap comprising a housing having a liquid passageway therethrough, a screen unit movable into the housing passageway to divide the passageway into upper and lower zones, the housing having a liquid entry port communicating with the upper zone and a liquid outlet port communicating with the lower zone at a point longitudinally spaced from the entry port whereby lint-containing liquid may flow over and through the screen unit to remove lint therefrom, automatic means associated with the screen unit and valve means for retracting the screen unit from the passageway in timed relation to valve means movement directing liquid to the drain outlet whereby lint flushed from the housing may be carried to the drain, said automatic means comprising a sequential timer, power means for actuating the screen unit, power means for actuating the valve means, and operative connections between the timer and power means whereby the power means will be energized at predetermined times and for predetermined intervals under control of the timer, and means associated with the screen unit for scraping lint therefrom on retracting movement and causing the lint to be deposited in the passageway.

3. The combination with a recirculating liquid system, a drain outlet therefrom, valve means for selectively directing liquid through the recirculating system or the drain outlet, of a lint trap disposed in the recirculating system at a point ahead of the drain outlet to receive liquid prior to passage towards the outlet, the lint trap comprising a generally horizontally extending housing having a liquid passageway therethrough, the housing having a liquid entry port communicating with the upper zone of the passageway and a liquid outlet port communicating with the lower zone of the passageway at a point spaced along the passageway from the entry port, a generally horizontal screen unit movable into and out of the passageway whereby all liquid flowing through the passageway may be caused to flow over and through the screen unit to remove lint therefrom, automatic means associated with the screen unit

and valve means whereby the screen unit will be moved into the passageway in timed relation to valve means movement directing liquid through the recirculating system, said automatic means comprising a sequential timer, power means for actuating the screen unit, power means for actuating the valve means, and operative connections between the timer and power means whereby the power means will be energized at predetermined times and for predetermined intervals under control of the timer.

4. The combination that is described in claim 1 and wherein one wall of the passageway has a plurality of horizontally aligned holes therein, the screen unit comprises a plurality of interconnected fingers slidingly projected through said holes, and the automatic means being connected to the screen unit whereby upon retracting movement lint will be scraped from the fingers.

5. The combination with a washing machine of the type having a tub with a recirculating liquid conduit extending from the tub base to the upper portion of the tub, a pump in the recirculating conduit, a drain outlet from the recirculating conduit, and an automatically controlled valve for selectively directing liquid flow through the conduit and drain outlet, of a self-cleaning lint trap disposed between the tub base and pump, said lint trap comprising a housing providing a liquid passageway communicating with the tub base adjacent one end and communicating with the pump adjacent its opposite end, a screen unit movable into the passageway whereby substantially all liquid flowing through the passageway will pass over and through the screen unit, automatic means for moving the screen unit in timed relation to valve movement, said automatic means comprising a sequential timer, power means for actuating the screen unit, power means for actuating the valve, and operative connections between the timer and power means whereby the power means will be energized at predetermined times and for predetermined intervals under control of the timer.

6. The combination with a recirculating liquid system, a drain outlet therefrom, valve means for selectively directing liquid through the recirculating system or the drain outlet, of a lint trap disposed in the recirculating system at a point ahead of the drain outlet to receive liquid prior to passage towards the outlet, the lint trap comprising a generally horizontally extending housing having a liquid passageway therethrough, the housing having a liquid entry port communicating with the upper zone of the passageway and a liquid outlet port communicating with the lower zone of the passageway at a point spaced along the passageway from the entry port, a generally horizontal screen unit movable into and out of the passageway whereby all liquid flowing through the passageway may be caused to flow over and through the screen unit to remove lint therefrom, automatic means associated with the screen unit and valve means whereby the screen unit will be moved into the passageway in timed relation to valve means movement directing liquid through the recirculating system, said automatic means comprising a power device, a timer for controlling actuation of the power device, and linkage extending from the power device to the valve means and screen unit whereby the valve means and screen unit may be actuated concurrently.

RALPH L. ARCHBOLD.

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