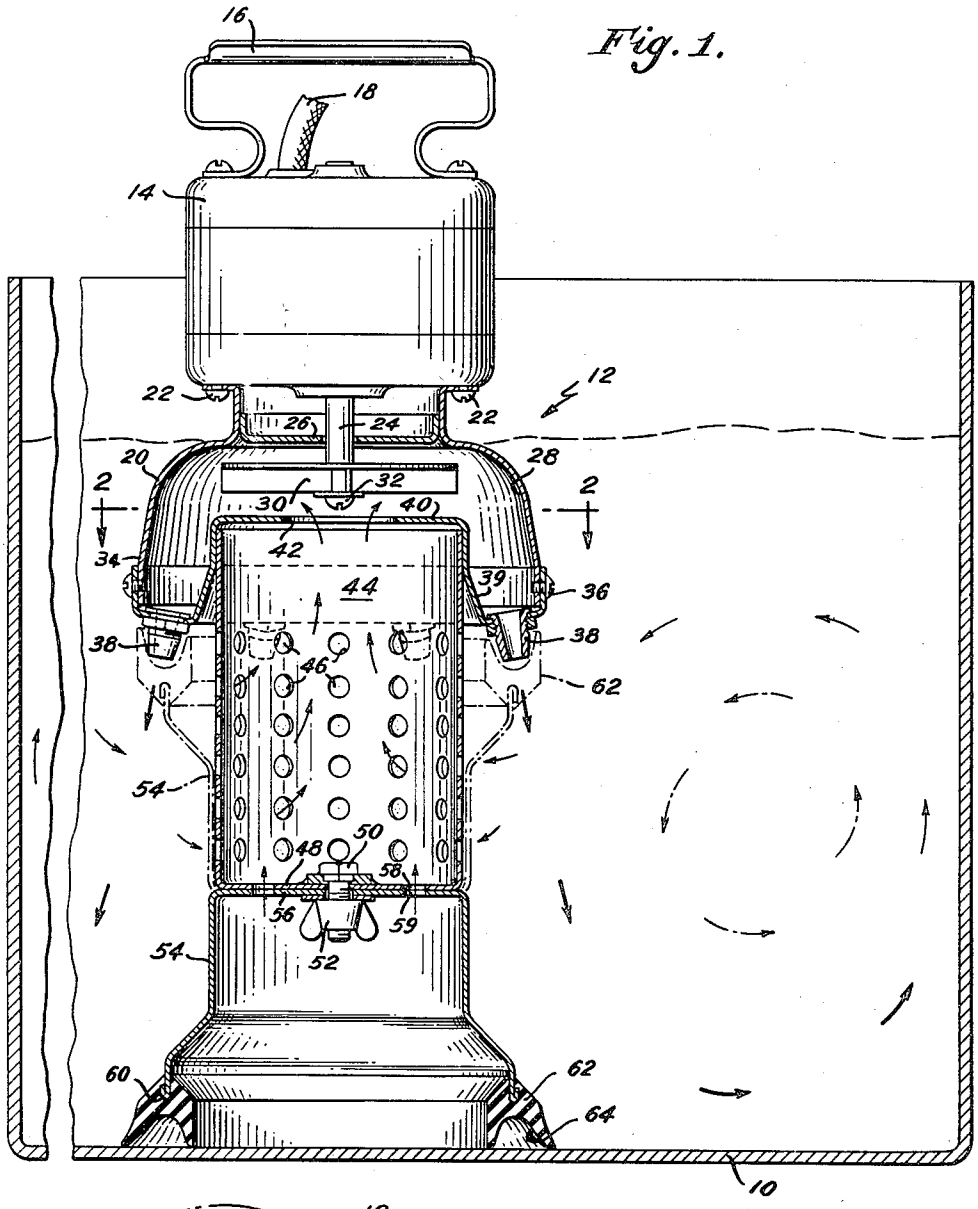
Nov. 13, 1956 R. R. WALTON 2,770,123

WASHING DEVICE, INCLUDING JET MEANS FOR CIRCULATING THE ARTICLES BEING WASHED

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Fig. 1.



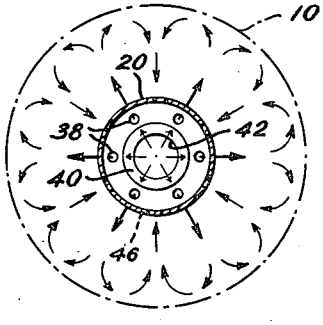


Fig. 2.

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WASHING DEVICE, INCLUDING JET MEANS FOR CIRCULATING THE ARTICLES BEING WASHED

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5 Claims. (Cl. 68—184)

My invention relates to washing machines, including devices for treating pliable fabrics with liquids of various kinds. More particularly, it concerns a new and improved device of the type described employing primarily the force of jets of liquid to circulate and wash the articles of clothing or treat the fabric with the liquid.

Most washing machines now on the market operate on one of two principles. There are those of the tumbling type, in which the articles are tumbled in a revolving cylinder and there are those of the conventional agitator type, including a tub with a paddle type agitator in the center, oscillating about a vertical axis. Both types have advantages and disadvantages which are at this time rather well-known. In the tumbling type of washer, all of the clothes are acted upon, but the action is rough and the articles of clothing tend to become tangled. The washing action performed by the tumbling type of washer is by no means ideal. On the other hand, the agitator type of washers, while they tend to be more gentle, nevertheless in most of them the clothes are not circulated sufficiently so that all of them come in contact with the scrubbing member. From researches conducted in the washing of articles of clothing, sheets, towels, etc., it has been found that the most effective action is perhaps performed by the hands of the hand laundress, the suds being squeezed through the clothes and the clothes flexed and rubbed simultaneously. So far as I am aware, no washing machine now on the market approaches duplicating these actions.

A principal object of the present invention is, therefore, to produce a washer in which the washing action will be as efficient as possible, tending to simulate the operations on the clothing performed by a hand laundress.

It is an object of the invention in one form thereof to provide a novel and simple portable washing unit adapted to be set in any convenient container in which it will effectively perform its washing operation.

Another object of the invention is to provide a novel washer of the type described embodying a novel construction permitting it to be packed in a minimum of space.

A further object of the invention is to provide a novel washing machine which will produce an effective washing action primarily by means of liquid circulation in a container of any size or shape.

The invention is featured by the provision of a unit, preferably portable, comprising a generally cylindrical vertically arranged hollow body provided with a series of openings in its cylindrical surface and mounting means for holding the same stationary in a predetermined position in a tub or basin. The hollow body is provided with a central opening at one end which, when the device is set in the tub, is below the liquid level, and, mounted on the hollow body and with its intake communicating with the central opening therein, is a centrifugal impeller and a housing therefor. The housing is provided with at least one nozzle providing a jet

directed into the body of liquid at an angle to the vertical. Preferably this housing is mounted above the hollow body and there are several nozzles directed downwardly and outwardly into the container and preferably surmounting this housing is a motor, the impeller being connected to the drive shaft of the motor and being driven thereby. Preferably the mounting means which supports the hollow body comprises a generally circular hollow member attached to the base of the hollow body and having one or more openings communicating into the hollow body. The base of the mounting is preferably provided with an annular rubber ring and, during operation of the impeller, the liquid within the hollow mounting tends to be drawn into the hollow body, thus causing a suction effect which holds the machine against accidental upsetting in the tub during operation. The operation of the impeller draws the liquid through the openings in the hollow body and expels the same outwardly into the container through the generally downwardly directed jets. The flow of liquid through the openings into the hollow body and the action of the jets carries the articles in a generally toroidal fashion, producing a flexing, squeezing and rubbing action thereon.

Still further objects, features and advantages of the invention will become apparent from the following detailed description of a preferred embodiment thereof taken in connection with the accompanying drawings in which like numerals refer to like parts in the several views and in which:

Fig. 1 is a vertical sectional view of a portable washer embodying the invention shown standing in a suitable container; and

Fig. 2 is a diagrammatic sectional view on a reduced scale of a portion of the washer taken on line 2—2 of Fig. 1 showing the mode of liquid circulation in the tub.

The numeral 10 denotes a container or tub of any convenient size or shape, the size or shape being unimportant so far as concerns the principle of operation of the novel washing machine of the invention. Standing on the bottom of the tub is the washer of the invention, indicated generally by the numeral 12. The washer comprises a suitable electric motor 14 provided with a convenient carrying handle 16 and with a suitable extension cord 18 to permit the same to be plugged into a convenient electrical outlet. Held to the bottom of the motor housing is a casing 20 fastening thereto by means of machine screws 22. The motor shaft 24 extends downwardly into the housing 20 and through a partition 26 therein and into a chamber 28 formed by downwardly depending portions of the housing 20 for accommodating the centrifugal impeller 30. The impeller 30 is keyed to the bottom end of the shaft 24 and held in place tightly by means of a machine screw 32. Portions of the casing 20 are formed into downwardly and outwardly directed conduits 34 to which are connected by means of machine screws 36 nozzles 38. Still further portions of the housing 20 recurve to form a centrally apertured plate portion 40 whose central opening 42 is directly beneath the intake of the impeller 30. Portions of the housing 20 adjacent the conduits 34 surround and are firmly attached by any suitable means to a generally cylindrical hollow member 44.

The hollow member 44 is provided with a plurality of openings 46 which permit entry of the liquid held in the tub 10. The hollow member 44 is further provided with a bottom plate 48, which may be a recurving portion of the cylindrical side wall thereof, and to this bottom plate 48 by means of a bolt 50 and a wing nut 52, a hollow base 54 is firmly attached. The bottom 48 of the hollow body 44 and the top portion 56 of the base member 54 are provided with aligned openings 58 and 59 in an annular series surrounding the bolt 50. The hollow

mounting member 54 is provided along its lower rim 60 with an annular ring 62, having a downwardly facing groove 64. The ring 62 is formed of rubber or other suitable material and supports the washer on the bottom of the tub 10, as will hereinafter be explained, assisting when the machine is running to prevent accidental upsetting.

The hollow base member 54 is especially adapted for being removed and reattached in a reversed position, as indicated by the broken lines in Fig. 1, permitting an adjustment with substantial reduction in the size of the washer to facilitate transportation and packing thereof while at the same time protecting the jets 38 against accidental displacement and closing most of the openings 46 against the entry of dust and dirt. This reversal is effected by taking off the wing nut 52, removing the hollow base member 54, turning it over and replacing it in inverted position with the rubber ring 62 facing upwardly. The annular groove 64 is so located as to receive therewithin and protect the nozzles 38 when the base is reversed in this manner while the cylindrical walls of the base 54 effectively cover the openings 46.

The mode of operation of the novel washer, according to the invention will now be explained. The washing and circulating action is induced primarily by a combination of a radially inwardly directed flow of liquid toward and through the openings 46, produced as hereinafter explained, and a series of downwardly and somewhat outwardly directed strong jets of liquid emitted by the nozzles 38, as indicated generally by the arrows in the two views of the drawings. Operation of the centrifugal impeller 30, it will be observed, draws liquid upwardly through the opening 42 tending to exhaust the liquid from within the hollow member 44. At the same time it tends to draw liquid upwardly through the openings 58 and 59, thus reducing the pressure within the hollow base member 54 and causing a suction effect tending to seal the rubber ring 62 against the bottom of the tub 10. The output of the impeller 30 leads through the conduits 34 to the nozzles 38 and since the impeller is of substantial size and capacity, strong jets of liquid are emitted from the nozzles 38 downwardly and angled somewhat radially outwardly in the tub 10. These strong jets, in this case six in number, indicated by the heavy arrows in both Fig. 1 and Fig. 2, gradually diminish in intensity as they circulate past the bottom of the tub 10 and upwardly along the side wall. The combination of liquid and articles being washed, therefore, tends to take on a toroidal motion as indicated by the arrows in broken lines to the right of the machine as seen in Fig. 1. In addition, liquid drawn from within the hollow member 44 is replaced by liquid flowing radially inwardly through all the openings 46. This subsidiary motion tends to draw the articles toward the hollow member 44 and these articles will be rubbed against the outer surface of the member 44 during the washing operation.

As seen most clearly in Fig. 2, the inwardly directed currents of liquid tend to rush toward the exterior of the member 44 at locations between the nozzles 38. Thus, in addition to the toroidal flow as observed in Fig. 1, there are radially inwardly flowing currents in between each of the jets emitted by the nozzles 38.

The circulation of the articles being washed is such as to present successive areas of each article to a rubbing action against the member 44, tangling is avoided, and the operation is gentle but, nevertheless, effective.

The novel washer of the invention is particularly adapted for embodiment in portable form, as shown. The space which it occupies during packing and transportation is minimized by the reversing feature of the hollow base 54 which also serves to keep the machine clean. Since the flow of liquid toward the hollow member 44 will take place irrespective of size or shape of the container, effective circulation and agitation of the articles being washed will take place whether the machine be used in bath tub, wash tub, or small hand basin.

A special advantage resides in the creation of lowered pressure within the base 54 during operation of the machine, thus tending to hold the machine firmly against accidental upsetting even in tubs or containers whose bottom surface is not flat.

While the novel washer according to the invention has special advantages in portable form, it will be appreciated that it is possible to embody the novel washing mechanism in a so-called integrated washing machine with self-contained tub, pumps for filling and emptying, etc. Therefore, I do not intend to confine the invention to portable washing machines as such. Furthermore, while a specific embodiment of the invention has been illustrated and described as applied to a clothes washing machine, it will also be appreciated that the same may be useful for agitating or circulating pliable materials in liquid treating solutions of various kinds. Therefore, the invention is not limited to domestic or commercial clothes washing machines, but embraces any use which may be made of the mechanism herein shown and described.

I claim:

1. A washing device for use in a tub to contain liquid and articles to be washed, comprising, in combination, an elongated stationary hollow member, the side walls thereof forming an external article engaging surface, a base member upon which said hollow member is mounted, said base member being adapted to support said hollow member in said tub in spaced relation to the bottom thereof and in upright fashion so that said surface is generally vertically arranged, said hollow member being open at the upper end thereof and being provided over substantially the entire immersed portion of said side walls with a multiplicity of openings communicating with its interior, said device including means sealing off the bottom of said hollow member from communication with the liquid contained in said tub, pump means mounted on the upper end of said hollow member with its intake in communication with the open end of the latter for withdrawing liquid from within said hollow member, conduit means connected in communication with the output of said pump means, and at least one nozzle mounted externally of and near the upper end of said hollow member and in communication with said conduit means, said nozzle being directed downwardly at an angle into said tub, operation of said pump means causing liquid from the tub to pour inwardly through said openings to replace the withdrawn liquid and at the same time to carry the articles towards said hollow member and press portions of the articles against said article engaging surface, said liquid being expelled from said nozzle in the form of a strong jet for causing circulation in a generally toroidal fashion within said tub of said liquid and any articles carried therein.

2. A device in accordance with claim 1 in which said base is also hollow and said hollow member and said base are provided with intercommunicating openings, the lower rim of said base being provided with an annular sealing ring adapted to rest on the bottom of the tub, whereby the action of said pump means tends to reduce the pressure within said base member thereby causing it to adhere to the bottom of the tub by atmospheric pressure.

3. A device in accordance with claim 1 which is provided with a plurality of nozzles spaced symmetrically about the top of said hollow member and said pump means comprises a centrifugal impeller, said device including an electric motor mounted above said conduit means and impeller in driving connection to said impeller.

4. A device in accordance with claim 2 including means detachably interconnecting said hollow member and said base member and in which said base member is so proportioned and arranged that it may be removed and reattached to said hollow member in inverted form, the walls thereof being so dimensioned that when so reattached

said base member will substantially surround and protect said hollow member for packing and transportation of said device.

5. A washing device for use in a tub to contain liquid and articles to be washed, comprising, in combination, a stationary generally cylindrical hollow member, the cylindrical wall thereof forming an external article engaging surface, a hollow base member mounting said first named member in spaced relation to the bottom of said tub in upright fashion so that said surface is generally vertically arranged, said cylindrical member having a substantial opening at the upper end thereof and being provided over substantially the whole of the immersed portion of its said cylindrical wall with a multiplicity of liquid admitting ports, an impeller mounted on the upper end of said cylindrical member with its intake in communication with said opening for withdrawing liquid from within said hollow member, a motor mounted on said device in driving connection to said impeller, and a plurality of nozzles mounted externally of and near the upper end of said hollow member and in communication with the output of said impeller, said nozzles being directed downwardly at an angle into said tub, operation of said pump means causing liquid from the tub to pour inwardly of said ports to replace the withdrawn liquid and at the same time to carry the articles towards said hollow member and press

portions of the articles against said article engaging surface, said liquid being expelled from said nozzles in the form of strong jets for causing circulation in a generally toroidal fashion within said tub of said liquid and any articles carried therein, said cylindrical member and said base being provided with intercommunicating openings and the lower rim of said base being provided with an annular sealing ring adapted to rest on the bottom of the tub, the action of said impeller tending to reduce the pressure within said base member thereby causing it to adhere to the bottom of said tub by atmospheric pressure.

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