

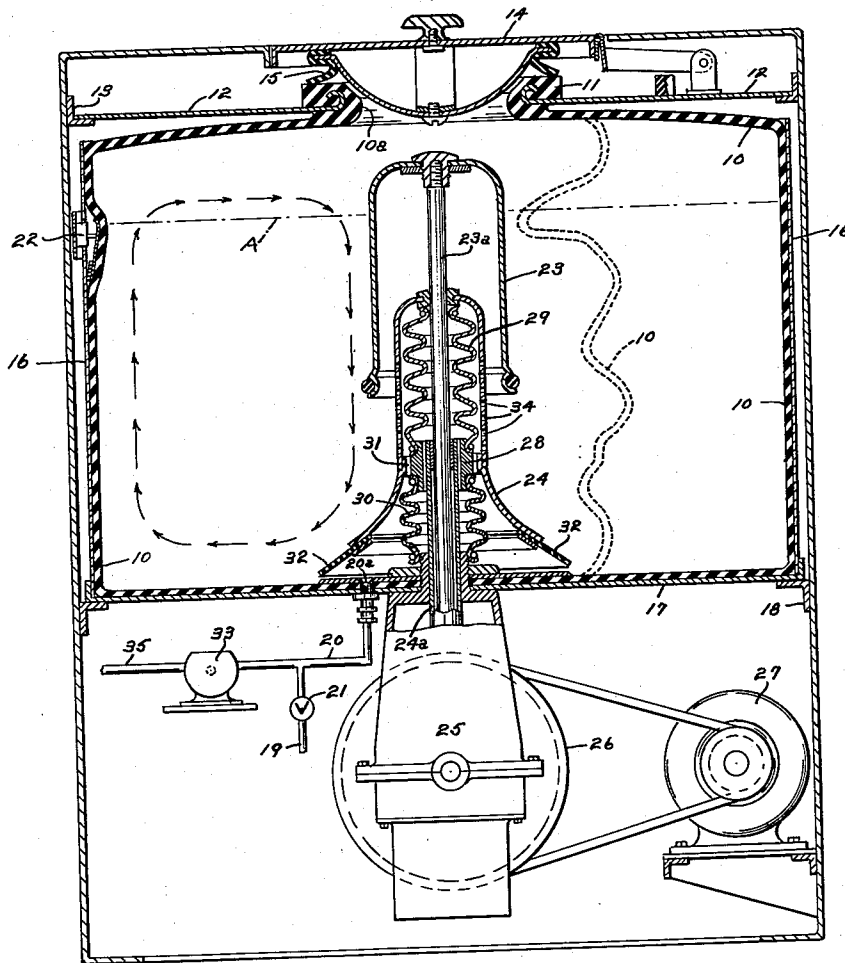
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PULSATOR WASHER WITH VACUUM DRYING

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PULSATOR WASHER WITH VACUUM DRYING

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1

This invention relates to improvements in a washing machine using pulsator type washing with vacuum drying.

An object of the present invention is to provide a novel washing machine wherein the washing action is carried on inside of a flexible liquid- and air-tight bag by means of a vertical pulsator, after which the water and air is withdrawn from the interior of the bag causing the latter to collapse against the clothes to squeeze the liquid out of them.

Another object of the present invention is to provide in a washing machine of the type described above, the novel combination of a pulsator having perforated walls and located centrally of the flexible bag, whereby after a washing operation, the liquid and air may be withdrawn through the perforations of the pulsator causing the flexible bag to collapse and squeeze the liquid out of the clothes.

Other objects and advantages of my present invention will be apparent from the accompanying drawing and description and the essential features thereof will be set forth in the appended claims.

The drawing illustrates a washing machine shown generally in central vertical section embodying the principle of my invention.

I have chosen to illustrate my invention in combination with a type of washing machine fully disclosed and claimed in United States Patent 2,275,444 granted March 10, 1942, to George Kuhn, to which reference may be had for a more complete description. A number of the features of the Kuhn invention have been modified as disclosed herein order to apply my invention.

In the device shown a flexible liquid- and air-tight bag 10 is provided with an opening 10a at the top only for the insertion of laundry and detergent. Around the opening is a neck 11 which is supported on a plate 12 which extends rigidly across the entire machine and is supported on the machine frame at 13. The opening 10a is adapted to be closed by a top cover 14 which is provided with a flexible seal 15 adapted to close the neck of the bag during a vacuum drying operation and permitting the escape of air from the bag when the same is being filled with liquid. This cover is more fully disclosed and claimed in my copending application, Serial No. 5,623, filed January 31, 1948. The side walls of the flexible bag are supported by a relatively rigid cylinder 16 outside of the side walls of the bag. The bottom of the bag is supported by plate 17 which in turn is mounted on the frame of the machine at 18.

2

The flexible bag is filled with a liquid detergent such as water from a faucet or the like through lines 19 and 20 under the control of valve 21. It will be noted that the line 20 passes through the bottom plate 17 and the bottom of the flexible bag in a liquid-tight manner. The flow of liquid into the interior of the bag is controlled automatically by a pressure actuated switch 22 which is more fully disclosed and claimed in my copending application, Serial No. 5,620, filed January 31, 1948.

The washing action is carried out in a manner fully disclosed in the above-mentioned Kuhn patent. Briefly, this apparatus comprises an upper piston 23 and a lower pulsator piston 24 both of which are actuated by mechanism in the casing 25 driven through pulley 26 by means of an electric motor 27. One crank in the housing 25 is connected with piston rod 23a so as to cause vertical oscillation of the piston 23. Another crank in the housing 25 is connected with the piston sleeve 24a which in turn is connected by spider 28 with the pulsator piston 24. As fully described in the above-mentioned Kuhn patent, the pistons 23 and 24 oscillate vertically and in opposite directions whereby to cause a water circulation within the bag 10 in the direction of the arrows shown at the left hand portion of Fig. 1 of the drawings. Where the piston rod 23a and the piston sleeve 24a pass through the bottom of the bag there is a liquid-tight seal as shown in the drawing. The bellows 29 and 30 and the openings 31 perform the same function ascribed to them in the Kuhn patent. The flexible skirt 32 on the bottom of the pulsator piston 24 performs the function ascribed to it in the Kuhn patent with an additional function to be described later.

With the water or other liquid detergent filling the bag 10 to the dot-dash line indicated at A in Fig. 1, the clothes and detergent are placed within the bag and the cover 14 is positioned to close the neck of the bag. The motor 27 is then started by means not shown so as to cause the vertical oscillation of the pistons 23 and 24 so as to cause the liquid circulation in the direction of the arrows of Fig. 1 so as to wash the clothes within the flexible bag. At the close of a washing operation, the pump 33 is operated by means not shown to withdraw the liquid and air from the interior of the bag 10. This pump is of the type preferably as disclosed in my copending application, Serial No. 5,622, filed January 31, 1948, now U. S. Patent 2,499,163. The withdrawal of the liquid and air from the interior of the bag will cause the latter to collapse to a position similar

3

to that indicated in broken lines at the right hand side of Fig. 1 so as to press against the clothes to squeeze the detergent out of them. It will be noted that the pulsator piston 24 is formed of an imperforate sheet for the most part except for a series of perforations in the side wall thereof as indicated at 34. It will be noted also that the opening 20a leading to conduit 20 and to pump 33 is located beneath the pulsator piston 24. It results from this positioning of the parts that when pump 33 withdraws liquid and air through pipe 20, the clothes are squeezed in against the pulsator piston 24 by the bag 10 and the liquid in the clothes passes through the openings 34 and then downwardly through the openings 31 in spider 28 and finally through the opening 20a and conduit 20 to be discharged at 35. The arrangement of the skirt 32 is such that liquid entering the bag 10 from the opening 20a will push the skirt upwardly and flow easily into the tub whereas during the creation of a vacuum the skirt 32 will provide a seal at the bottom of the pulsator piston 24 if desired.

Those skilled in this art will appreciate that with this improved washing machine the laundry is washed in the manner provided in the Kuhn patent which is without vibration, following which the bag 10 will be collapsed against the laundry to squeeze the liquid detergent out of it and this is also a silent and vibrationless operation. With my improved machine, therefore, nothing is required of the operator except to place the clothes and detergent within the bag 10 and place the cover 14 in position. After this a quiet and vibrationless operation washes the clothes and dries the same to a wet-dry condition.

I claim:

1. In a washing machine, the combination of a flexible liquid- and air-tight bag having an opening at the top only and adapted to hold laundry and liquid detergent, an air-tight cover for closing said top opening, a pulsator extending upwardly in the central bottom portion of said bag and having perforations adjacent the lower portion thereof, means for oscillating said pulsator vertically, said pulsator having parts propelling liquid inside said bag in a manner to produce a washing action, and means interconnected with said perforations for withdrawing liquid and air from the interior of said bag creating a substantial vacuum therein whereby to cause said bag to collapse upon the laundry and to squeeze out the liquid therein through said perforations.

2. In a washing machine, the combination of a flexible liquid- and air-tight bag having an opening at the top only and adapted to hold laundry and liquid detergent, an air-tight cover for closing said top opening, a pulsator extending upwardly in the central bottom portion of said bag and having perforations adjacent the lower portion thereof, means for oscillating said pulsator vertically, said pulsator having parts propelling liquid inside said bag in a manner to produce a washing action, said pulsator including a piston, said piston communicating with the interior of

4

said bag, and means independent of said piston and interconnected with said perforations for causing a suction within said piston and for withdrawing liquid and air from the interior of said bag creating a substantial vacuum therein whereby to cause said bag to collapse upon the laundry and to squeeze out the liquid therein through said perforations.

3. In a washing machine, the combination of a flexible liquid- and air-tight bag having an opening at the top only and adapted to hold laundry and liquid detergent, an air-tight cover for closing said top opening, a pulsator extending upwardly in the central bottom portion of said bag, means for oscillating said pulsator vertically, said pulsator having parts propelling liquid inside said bag in a manner to produce a washing action, said pulsator including a piston having a cylindrical side wall and said piston being open at the bottom, there being openings through said side wall, and means communicating with said openings in said side wall and the interior of said bag beneath said piston for withdrawing liquid and air from the interior of said bag creating a substantial vacuum therein whereby to cause said bag to collapse upon the laundry and to squeeze out the liquid therein through said openings in said side wall.

4. In a washing machine, the combination of a flexible liquid- and air-tight bag having an opening at the top only and adapted to hold laundry and liquid detergent, an air-tight cover for closing said top opening, a pulsator extending upwardly in the central bottom portion of said bag and having perforations adjacent the lower portion thereof, means for oscillating said pulsator vertically, said pulsator having parts propelling liquid inside said bag in a manner to produce a washing action, there being a clearance space between the bottom of said pulsator and the bottom of said bag, a flexible member surrounding said pulsator adjacent the bottom thereof and at least partially closing said clearance space, and means interconnected with said perforations for withdrawing liquid and air from the interior of said bag creating a substantial vacuum therein whereby to cause said flexible member to seal said clearance space and to cause said bag to collapse upon the laundry to squeeze out the liquid therein through said perforations.

HENRY J. RAND.

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The following references are of record in the file of this patent:

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