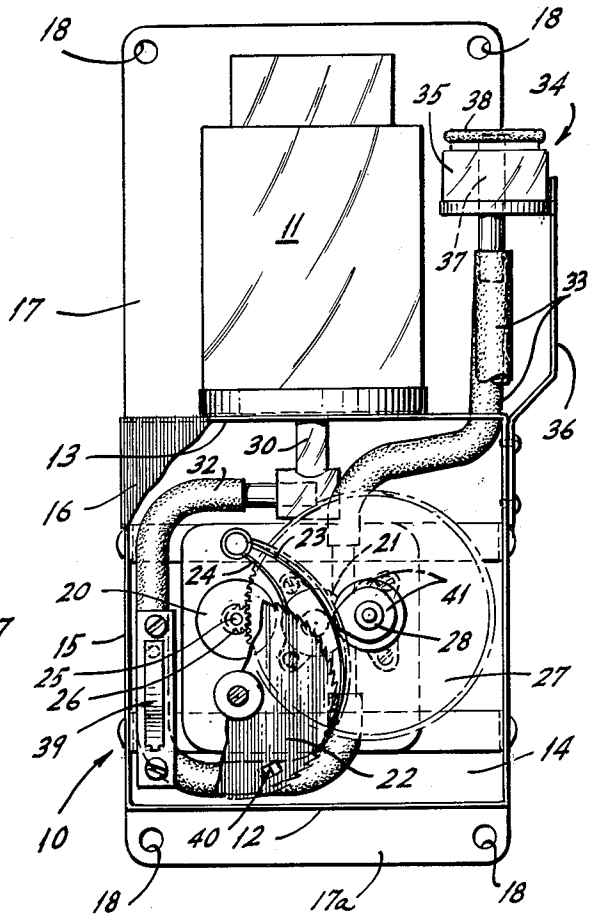
July 10, 1962 L. V. ADAMS ET AL 3,043,478

LAUNDRY EQUIPMENT

Filed July 1, 1959 2 Sheets-Sheet 1

FIG. 1.



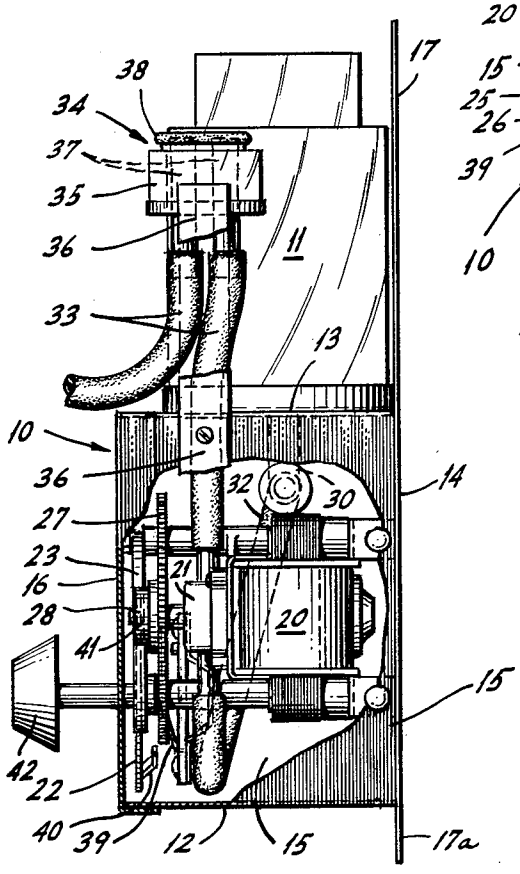


FIG. 2.

INVENTORS
LOWELL V. ADAMS
LEON SINIAWSKY

BY Albert W. Haarland

ATTORNEY

July 10, 1962 L. V. ADAMS ET AL 3,043,478

LAUNDRY EQUIPMENT

Filed July 1, 1959 2 Sheets-Sheet 2

FIG. 3.

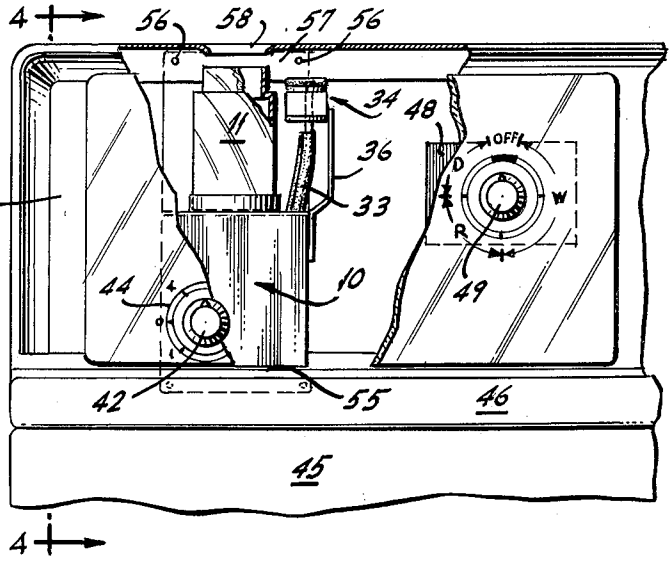


FIG. 4

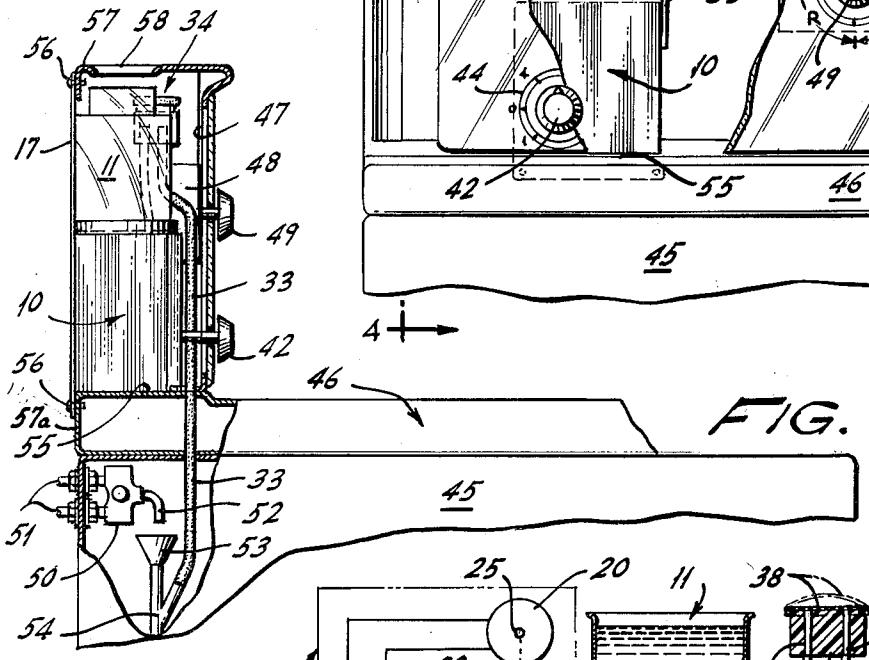
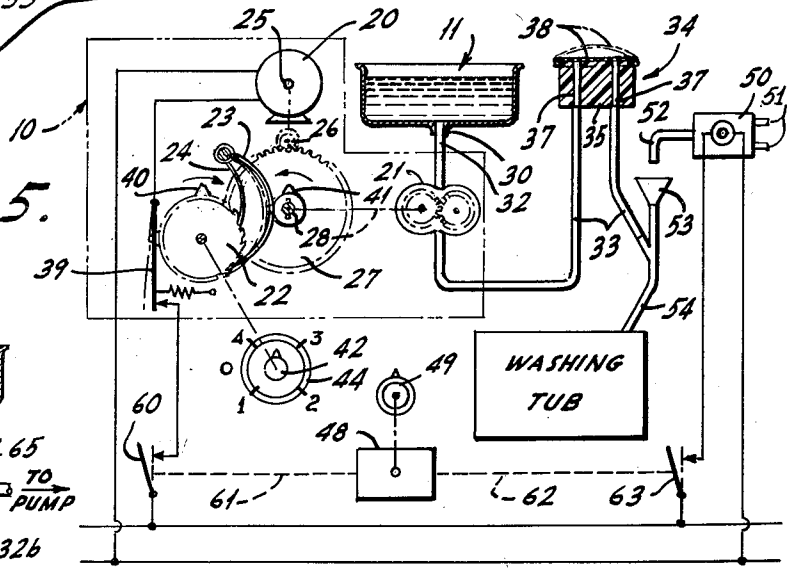


FIG. 5.



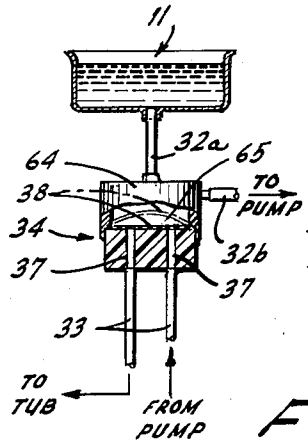


FIG. 6.

INVENTORS
LOWELL V. ADAMS
LEON SINIAWSKY
BY
Allen H. Cleveland
ATTORNEY

United States Patent Office 3,043,478 Patented July 10, 1962

3,043,478

LAUNDRY EQUIPMENT

Lowell V. Adams, Levittown, and Leon Siniawsky, Philadelphia, Pa., assignors, by mesne assignments, to Philco Corporation, Philadelphia, Pa., a corporation of Delaware

Filed July 1, 1959, Ser. No. 824,250
5 Claims. (Cl. 222—70)

The present invention relates to dispensing apparatus, particularly to devices adapted for use with washing machines to dispense laundering aids (detergents, water softeners, bleaches, etc.). More specifically, the invention has to do with improvements in mechanisms operable to dispense predetermined quantities of laundering aids in liquid form, or of gelatinous consistency, for mixing with water within the clothes container or tub of a washing machine.

Modern washing machines adapted primarily for domestic use, are designed to provide for washing clothes in loads which may vary as to the weight of the load as well as to the texture of the clothes making up the load. To prevent waste of laundering aid and still obtain satisfactory washing in these modern machines, it is desirable that laundering aids be used in quantities predetermined in accordance with the particular load of clothes to be washed.

It is therefore an object of this invention to provide a dispensing arrangement by means of which laundering aid is fed for discharge into a clothes washing and rinsing container or tub, the arrangement being such that it can be preset to stop the feed of the laundering aid when a desired predetermined amount thereof has been so discharged.

The invention is characterized in that the improved dispensing mechanism can be incorporated in a compact unit which is mountable either adjacent a washing machine or within a washing machine to become a part thereof.

The invention is particularly advantageous when employed in combination with a clothes washing machine of the type which operates automatically to wash and rinse clothes in water within a container or tub, and thereafter to extract water from the clothes and container. Machines of this type are governed by operation of a timer mechanism, and it is a specific object of this invention to provide a simplified system capable of being readily associated with such timer mechanism for initiating and terminating automatically the feed of laundering aid in the course of the sequential functions of the machine.

Toward realization of these main objects and characteristic features, the invention employs means operable to withdraw laundering aid from a reservoir and to discharge the withdrawn laundering aid for mixing with water supplied to the clothes washing and rinsing container. In a more specific aspect, the invention employs a motor driven pump for positively flowing laundering aid from the reservoir to the washing and rinsing container, the pump motor being arranged in circuit with switch means operable to stop the motor in response to a predetermined number of pump driving revolutions of the motor.

The full nature of the invention and the manner in which the above noted and other objects and features are achieved, will be more fully understood from the following description taken in conjunction with the accompanying drawings, in which:

FIGURE 1 is a front view of a dispenser unit constructed in accordance with the invention, parts of the unit being broken away for purpose of clear illustration of certain structural features of the dispensing mechanism;

FIGURE 2 is a side view of the unit shown in FIGURE 1 with portions of the casing broken away;

FIGURE 3 is a front view, partly in elevation and partly in section, illustrating a portion of a clothes washing machine provided with the dispensing unit shown in FIGURES 1 and 2;

FIGURE 4 is an elevational sectional side view looking in the direction of arrows 4—4 of FIGURE 3;

FIGURE 5 is a schematic view diagrammatically illustrating the mechanism as arranged in an automatic washing machine of the kind shown in FIGURES 3 and 4; and

FIGURE 6 is a fragmentary diagrammatic view illustrating a modified form of the invention.

With more particular reference to the drawings, the unit illustrated in FIGURES 1 and 2 includes a casing **10** which houses the dispensing mechanism, and a reservoir **11** which is adapted to hold laundering aid. The casing **10** has a bottom wall **12**, a top wall **13**, a back wall **14**, side walls **15** and a front cover **16**. The back wall **14** of the casing is provided with an upwardly directed extension **17** and a downwardly directed extension **17***a*, each having fastener receiving apertures **18** for mounting the unit. The mechanism housed within said casing **10** comprises an electric motor **20**, a pump **21** and a ratchet device including a ratchet wheel **22**, a ratchet pawl **23** and a dog **24**.

The motor **20** is provided with a shaft **25** having a pinion **26** which meshes with a gear **27** keyed or otherwise affixed to a shaft **28** drivingly connected to the pump **21**, the latter being thus driven at proper speed through the drive connection provided by said pinion and gear.

The reservoir **11** is mounted on the top wall **13** of the casing **10** and has an outlet member **30** depending from said reservoir and passing through said top wall for connection with a duct **32** which communicates with the inlet side of the pump **21**. Thus, upon operation of the pump, laundering aid is drawn from the reservoir **11** and ejected through a discharge conduit **33** leading from the outlet side of said pump. Back flow through the dispensing duct and conduit system is prevented by means of an antisiphoning valve **34** which, as shown in the drawings, is interposed between two separated sections of the discharge conduit **33**. The valve **34** includes a body **35** supported by means of a bracket arm **36** on the casing **10** and provided with ports **37** which extend through said body and open on opposite sides thereof. A diaphragm **38** is stretched over one of said sides so as normally to close one end of each of said ports, the other end of one of said ports being connected with that discharge conduit section which leads from the pump **21**, and the other end of the other of said ports being connected with the remaining discharge conduit section. Because of this construction, it will be understood that the pressure developed during operation of the pump **21** will cause movement of the diaphragm **38** to open the ports **37** for the ejection of laundering aid through the discharge conduit **33**, and that said diaphragm will collapse under atmospheric pressure and again seal said ports when the operation of the pump is terminated by stopping the motor **20**.

In accordance with the present invention, the motor is stopped automatically in response to a predetermined number of revolutions of the pump shaft **28**, that is to say in response to a predetermined number of pump driving revolutions of the motor which, it will be understood, determines the quantity of laundering aid ejected by the dispensing unit. In the illustrated arrangement, a normally closed switch **39** is included in the circuit of said motor **20**, and a projection **40** is carried by the ratchet wheel **22** to be brought, through step-by-step advancement of said wheel, into engagement with said switch to open the same for stopping the motor and, accordingly, terminating the flow of laundering aid. This step-by-step advancement of the ratchet wheel is obtained by means of a

cam 41 arranged on the gear 27 to rotate therewith and disposed to ride in engagement with the ratchet pawl 23 to activate the same once for each revolution of the pump shaft.

As hereinbefore indicated, the dispensing unit of the invention is adjustable to eject laundering aid in various preselectable amounts so as to insure adequate washing of various types and loads of fabrics without undue waste of the laundering aid. In the illustrated arrangement, this preselection is accomplished by rotatably setting the ratchet wheel 22 to locate the projection 40 in any one of a plurality of positions from which said projection will travel over a longer or shorter arc in reaching the switch 39 so that opening of said switch occurs after a greater or lesser number of revolutions of the pump shaft 28, which as stated above, determines the amount of laundering aid ejected by the dispensing arrangement. Setting of the ratchet wheel is readily accomplished by means of a manually operable element in the form of a knob 42 on said ratchet wheel. This knob is associated with indicia means 44 (FIGURES 3 and 5) to indicate the amount of laundry aid to be delivered by the dispenser unit when said knob is moved to a selected position indicated by said indicia means.

As also previously indicated, the dispensing unit can be used as a separate entity, but is most advantageous when incorporated in an automatic washing machine in the manner illustrated by way of example in FIGURES 3 and 4. In these figures, there is shown a portion of a washing machine cabinet 45 adapted to enclose the usual clothes and water retaining container or tub. The cabinet is provided with a top 46 having a back splash panel 47 upon which is conveniently mounted the usual timer 48 for controlling the operation of the washing machine. This controlling timer which may be and preferably is of the ordinary well known type including a manually settable dial element 49, functions to put the machine automatically through its customary sequence of operations, including washing, rinsing and spin-drying operation. The timer also controls a solenoid valve 50 for supplying water from hot and cold connections 51, through an outlet 52, the latter discharging into a funnel member 53 which opens into a conduit 54 leading into the washing tub of the machine.

As seen in FIGURES 3 and 4, the dispensing unit of the invention is conveniently mounted behind the back splash panel 47, the setting knob 42 being accessible from the front of said panel. The unit rests on a portion 55 of cabinet top 46, and is retained in place by means of fasteners 56 passing through the apertures 18 in the back wall extensions 17 and 17*a* of said unit and engaging a rearward portion 57 of the panel 47 and a rearward portion 57*a* of the cabinet top 46. The portion 57 has an opening 58 registering with the reservoir 11 of the dispensing unit to provide for filling thereof.

The manner in which automatic activation of the dispensing unit is accomplished will be clearly understood upon reference to FIGURE 5 of the drawing which diagrammatically illustrates said unit and its association with elements of the automatic washing machine. As seen in this FIGURE 5, the normally closed switch 39 in the circuit of the motor 20 is connected in series with a control switch 60 which, as represented at 61, is mechanically connected to the timer 48, the latter being also connected mechanically, as represented at 62, with a switch 63 for controlling energization of the solenoid valve 50.

In operation, the timer 48 is adapted to close the switch 60 so that electrical energy flows through the normally closed switch 39 and energizes the motor 20 to actuate the pump 21, thus initiating discharge of laundering aid through the valve 34 and conduit 33 into the washing tub. At about the same time, the timer 48 functions to close the switch 63 which activates the solenoid valve 50 to admit water into the funnel member 53 so as to provide a mixture of water and laundering aid for discharge into the washing tub through the conduit 54. The cam 41 rotating with the pump 21, effects the previously mentioned step-by-step advancement of the ratchet mechanism so that the ratchet wheel 22 eventually brings the projection 40 into engagement with the switch 39 whereupon the latter opens, thereby stopping the motor 20 and discontinuing the discharge of laundering aid.

In FIGURE 6 there is diagrammatically shown a modified arrangement in which the anti-syphon device or valve 34 is associated with the reservoir 11 in such a manner that hydrostatic pressure acts to close said valve when the pump ceases to function. In this modified arrangement the valve 34 is located below the reservoir 11 so that the diaphragm 38 is exposed to the head pressure developed by the laundering aid contained in said reservoir. For that purpose, a hollow member 64 defining a chamber 65 is interposed between two separated sections 32*a* and 32*b* of the duct leading from the reservoir 11 to the inlet side of the pump, and at least that portion of the valve 34 which carries the diaphragm 38 is housed in said chamber. With this arrangement, the pump pressure effects opening of the valve ports 37 for circulation of laundering aid from the reservoir 11 through the duct section 32*a*, the chamber 65, the duct section 32*b* and into the pump. From the pump, the laundry aid flows out the sectional discharge conduit 33 through the valve 34 and into the washing tub of the machine. Except for the above described changes, the illustrated modified arrangement is combined with and operates in the washing machine in the same manner as was described above with reference to FIGURE 4.

From the foregoing description, it will be appreciated that the present invention provides a compact and efficient unit capable of being used separately or as part of a washing machine to introduce selectable predetermined amounts of laundering aids into a washing machine, at a desired time in the operation thereof. Although a preferred embodiment and a modified form thereof have been shown and described, it will be understood that the invention embraces such changes and variations as may come within the scope of the subjoined claims.

What we claim is:

1. A device for introducing laundering aid into a clothes washing machine, comprising a reservoir for laundering aid, a pump communicating with said reservoir and operable for flowing laundering aid from said reservoir and into the washing machine, a rotatable pump shaft for driving said pump, an electric motor drivingly connected to said pump shaft, a switch in circuit with and operable to stop said motor, a rotatable ratchet wheel having a fixed projection adapted to be brought in a position to engage and operate such switch, manually operable means for rotating said ratchet wheel in a direction to locate said projection in a selected position away from said switch, a ratchet pawl engaging said ratchet wheel and actuatable at each operation to rotate said wheel in a direction advancing said projection incrementally toward said switch, and a cam connected with and driven through said pump shaft to operate said ratchet pawl once during each pump driving revolution of said shaft.

2. A device for introducing laundering aid into a clothes washing machine, comprising a reservoir for laundering aid, a pump having an inlet conduit communicating with said reservoir and an outlet conduit adapted to discharge into the washing machine, valve means normally closing said outlet conduit and adapted to open the latter in response to pump pressure, a rotatable pump shaft for driving said pump, an electric motor drivingly coupled to said pump shaft, a switch in circuit with and operable to stop said motor, a rotatable ratchet wheel having a fixed projection adapted to be brought in a position to engage and operate such switch, manually operable means for rotating said ratchet wheel in a direction to locate said projection in a selected posi-

tion away from said switch, a ratchet pawl engaging said ratchet wheel and actuatable at each operation to rotate said wheel in a direction advancing said projection incrementally toward said switch, and a cam connected with and driven through said pump shaft to operate said ratchet pawl once during each pump driving revolution of said shaft.

3. A device as set forth in claim 2, in which the mentioned outlet conduit consists of two separate sections, and the mentioned valve means consist of a valve body and a diaphragm, said body having a pair of ports connected with and establishing communication between said sections, said diaphragm normally closing said ports to seal the communication therebetween.

4. A device as set forth in claim 2, in which the mentioned outlet conduit consists of two separate sections, and the mentioned valve means consist of a valve body and a diaphragm, said body having a pair of ports connected with and establishing communication between said sections, said diaphragm normally closing said ports to seal the communication therebetween, one side of said diaphragm being exposed to pump pressure through one of said ports, the other side of said diaphragm being exposed to ambient atmosphere.

5. A device as set forth in claim 2, in which the mentioned outlet conduit consists of two separate sections, and the mentioned valve means consist of a valve body and a diaphragm, said body having a pair of ports connected with and establishing communication between said sections, said diaphragm normally closing said ports to seal the communication therebetween, one side of said diaphragm being exposed to pump pressure through one of said ports, the other side of said diaphragm being exposed to head pressure developed by the laundering aid within the mentioned reservoir.

References Cited in the file of this patent

UNITED STATES PATENTS

2,206,330	Pierce	July 2, 1940
2,284,051	Gilbert	May 26, 1942
2,563,665	Thomas	Aug. 7, 1951
2,870,941	Steidley	Jan. 27, 1959
2,899,815	Hetrick	Aug. 18, 1959
2,907,340	Kenny	Oct. 6, 1959
2,914,217	Warhus	Nov. 24, 1959
2,966,278	Drury	Dec. 27, 1960