May 28, 1957 N. A. BENNETT 2,793,940

SOAP METERING AND DISPENSING DEVICE FOR WASHING MACHINES

Filed July 6, 1956 2 Sheets-Sheet 1

Fig-1

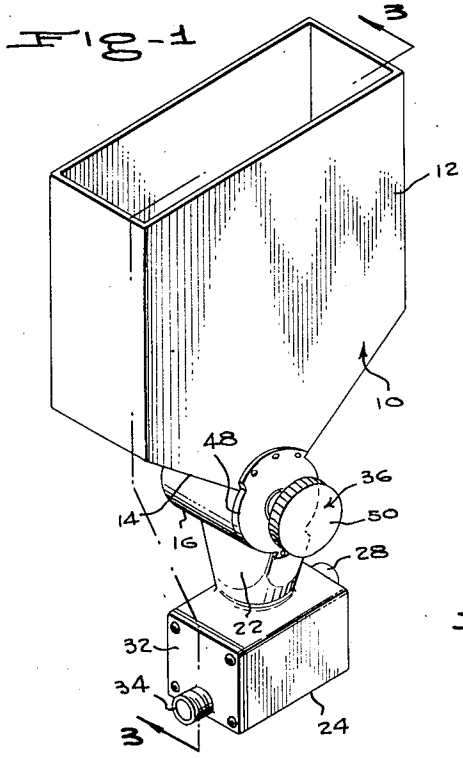


Fig-5

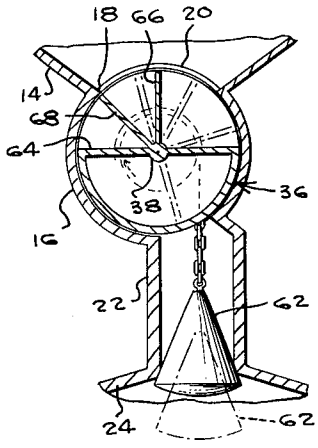


Fig-6

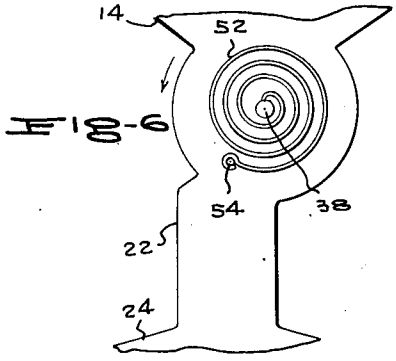


Fig-2

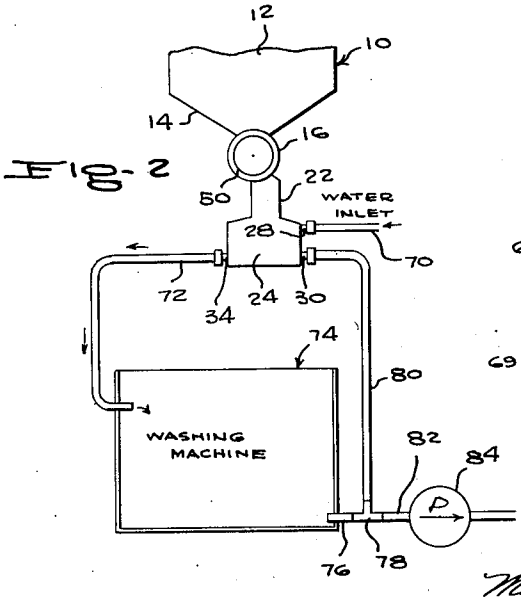
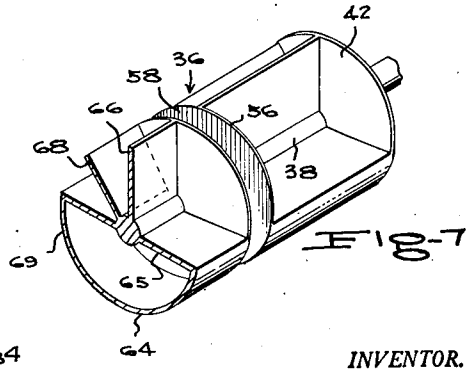


Fig-7



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SOAP METERING AND DISPENSING DEVICE FOR WASHING MACHINES

Filed July 6, 1956 2 Sheets-Sheet 2

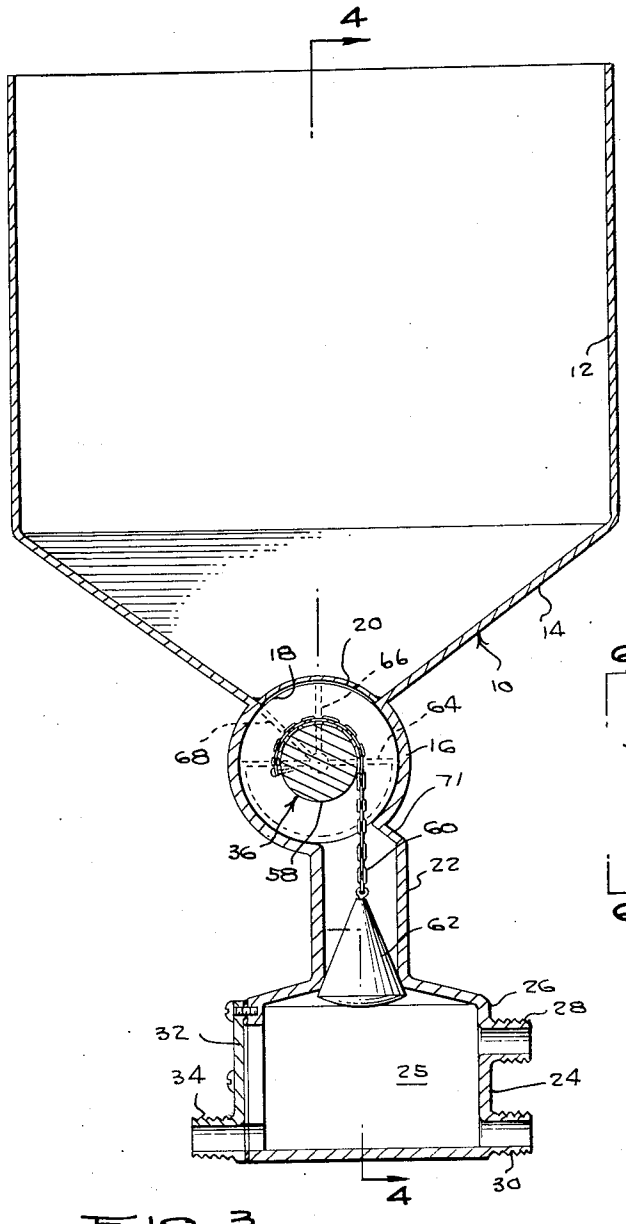


Fig-3

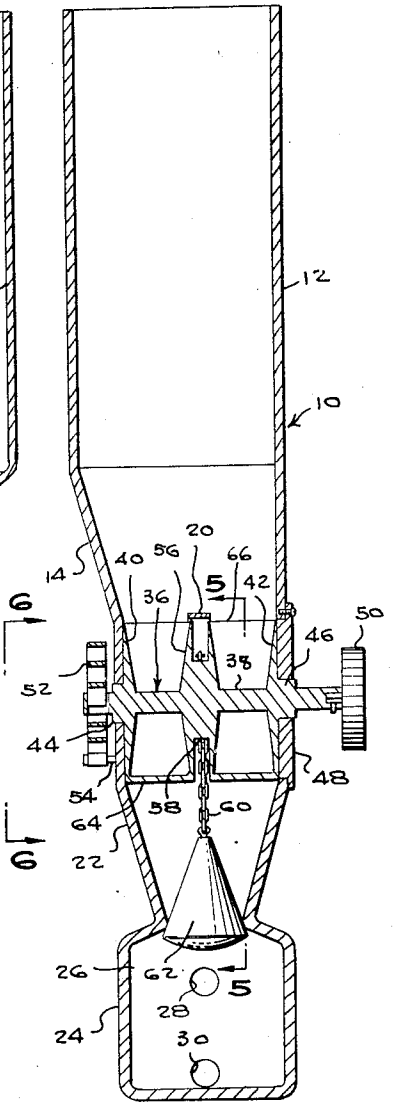


Fig-4

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SOAP METERING AND DISPENSING DEVICE FOR WASHING MACHINES

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7 Claims. (Cl. 23—267)

The present invention relates to a device for metering out a selected quantity of a granular soap or detergent, and dispensing the same to the water intake of a washing machine, such as an automatic washer.

In the operation of automatic washers, care must be taken to place in the washer the proper amount of soap or detergent. The amount depends upon the size of the load, in this regard, and it is not uncommon, when an excess of soap or detergent is dispensed into the machine, to cause the resulting bubbles to produce an overflow, sometimes with disastrous results. Further, it is desirable that the proper amount of soap or detergent be placed in the machine according to the size of the load, with a minimum deviation from the quantity desired, for the reason that in this way the most effective cleansing action is obtained, and further, there is no wastage of the soap or detergent. It will be understood, hereinafter, that the material dispensed will include soap, detergents or any of various other granular cleansing agents used in washing machines, particularly home washers.

Summarized briefly, the metering and dispensing device according to the present invention is adapted to insure the dispensing of a particular quantity of soap to the water intake of the washing machine, which quantity will be selected by the housewife according to the size of the load and will be the proper amount for said load. The device includes a hopper adapted to hold the supply of soap, said hopper being preferably designed to hold a full box of soap so that it need not be replenished except at relatively infrequent intervals.

The hopper at its lower end communicates with a metering means in the form of a rotary drum having blades so arranged as to define compartments of different sizes, each holding a different quantity of soap. In this way, rotation of the drum to a selected position will cause one compartment to be emptied, dispensing enough soap for a small load. Further rotation of the drum in the same direction will cause an additional compartment to be emptied, for medium loads, and still further rotation of the drum in the same direction will cause emptying of yet another compartment, so that with soap dispensed from all three compartments, enough will have been dispensed for a large load.

The drum automatically is returned to its normal, rest position by means of a spring, and wound about the drum is a flexible element such as a chain, carrying a conical valve which, in the rest position of the drum, closes a passage into which the soap drops from the drum. In other words, on rotation of the drum in the manner described, the valve automatically is unseated, permitting the soap to drop into a mixing chamber below the valve, through which water passes to the washer to carry the soap with it.

Connected with the mixing chamber is a connection to the washing machine pump, so that at the end of the washing cycle, the pump will exhaust the mixing chamber to insure that the same will be dry when soap is dropped thereinto during the next use of the washing machine.

Among important objects of the invention are the following:

To provide a device of the character described that can be associated with conventional washers of various types and designs already in use;

To permit the installation of the soap metering and dispensing device with minimum difficulty;

To provide for maximum efficiency during use of the device, so that the proper amount of soap will be dispensed;

To insure that the soap will be dispensed to a location at which it will necessarily be carried away by the water entering the washing machine;

To provide a novel relationship between the valve and drum, such that when the drum is in its inoperative, rest position the valve will be in closed position with the valve moving to open or unseated position responsive to turning of the drum for the purpose of dispensing soap; and

To adapt the device for use with maximum ease and facility so far as the housewife is concerned.

Other objects will appear from the following description, the claims appended thereto, and from the annexed drawings, in which like reference characters designate like parts throughout the several views, and wherein:

Figure 1 is a perspective view of a metering and dispensing device formed according to the present invention;

Figure 2 is a somewhat diagrammatic view showing the connections of the metering device with the washing machine and the piping;

Figure 3 is an enlarged section longitudinally through the device on line 3—3 of Figure 1;

Figure 4 is a sectional view on line 4—4 of Figure 3;

Figure 5 is a detail sectional view substantially on line 5—5 of Figure 4, the valve being shown in full and dotted lines in seated and unseated positions respectively;

Figure 6 is a fragmentary elevational view of the device as seen from the line 6—6 of Figure 4; and

Figure 7 is a perspective view, part being broken away, of the rotary drum on an enlarged scale.

Referring to the drawings in detail, the reference numeral 10 generally designates a hopper. The hopper may be of any desired shape or size, but preferably, as shown, includes a rectangular, upwardly opening top portion 12 merging into a downwardly tapering bottom portion 14. Preferably, the hopper is of a size adapted to hold a quantity of granular soap or detergent equal to that contained in the ordinary, popularly sized box of soap such as may be purchased in a super market.

Integral or otherwise made rigid with the hopper at the lower end thereof is a horizontally extending, cylindrical drum housing 16 disposed transversely of the hopper at the lower end of the tapered portion. The drum housing 16 is in communication at its top with the interior of the hopper, as shown at 18, and extending as a continuation of the circular cross section and the drum housing, within the discharge opening or outlet of the hopper, is an arcuate cross member 20, providing a closure for the intermediate portion of the drum, in a manner to be described in greater detail hereinafter.

Integral or otherwise made rigid with a drum housing, at the other side thereof, is a downwardly extending conduit 22 for the metered, dispensed soap. As shown in Figure 1, the conduit 22 tapers in a downward direction, and is so formed that at its upper end it is of rectangular cross section, merging gradually into a circular cross sectional shape as it approaches the lower end thereof, to provide a circular valve seat. The conduit 22 is in full communication with the interior of the drum housing, through the full length of the drum housing, that is, fully

from the front to the back end of said housing as shown in Figure 4.

Integral with the lower end of the conduit **22** is a rectangular casing **24**, providing a mixing chamber **25**. One end of casing **24** is permanently closed by an end wall **26**, on which are formed vertically spaced, tubular fittings **28**, **30**. The other end of the casing is formed open, but is closed by a closure plate **32** having a tubular, outwardly extending fitting **34**.

Rotatably mounted within the drum housing is a drum generally designated **36**. This includes a shaft **38** extending axially within the drum housing. Shaft **38** is integral (see Figure 4) adjacent its ends with drum heads **40**, **42**. Formed upon the shaft at the outer surfaces of the drum heads are collars **44**, **46** journalled in the front and back walls of the drum housing, The front wall **48** of the drum housing is removable to permit insertion, removal, and cleaning of the drum.

Shaft **38** projects forwardly from the housing and secured thereto is a knob **50**. The other end of the shaft projects rearwardly from the drum housing, and anchored at one end to the rearwardly projecting end of shaft **38** (see Figure 6) is a spiral spring **52** the other end of which is anchored to a pin **54** that projects rearwardly from the back wall of the drum housing. The spring is tensioned to normally turn the drum in one direction, to a rest position shown in full lines in Figure 5.

Intermediate its ends, the drum has a transverse partition **56**, formed with a circumferential, deep groove **58**. Secured at one end to the bottom wall of the groove is a chain **60**, looped about the partition as shown in Figure 3 and extending downwardly within conduit **22**. Connected to the lower end of the chain is a conical valve or plug **62**. On rotation of the drum under the force of the spring, the chain is wound upon the partition, elevating plug **62** until it bears firmly against the circular valve seat defined by the circularly formed lower end of the conduit **22**. The valve is shown in this position in Figures 3, and 4, and in full lines in Figure 5.

Extending the full length of the drum, and rigid at their opposite ends with the respective drum heads, are radial blades **66**, **68** spaced 45 degrees apart angularly about the axis of the drum. The drum also has a semi-cylindrical, permanently closed portion **64** extending the full length thereof, defining walls **65**, **69** lying in a common plane normal to the plane of the blade **66**. Blade **68** is disposed between the wall **69** and blade **66**, being equidistantly spaced from said wall **69** and blade **66**.

This construction defines a first compartment defined between wall **65** and blade **66**, which compartment extends through 90 degrees of the drum circumference. A second, intermediate compartment is defined between blades **66**, **68** and extends through 45 degrees of the drum circumference. A third compartment is disposed between blade **68** and wall **69** and also extends through 45 degrees of the drum circumference.

The conduit **22** is offset to one side of the drum axis as shown in Figure 3, and includes a wall **71** which, in the normal position of the drum, is disposed in a plane substantially common to that of the blade **68**. Thus, the semi-cylindrical portion of the drum in the normal position of the same closes the upper end of the outlet as shown in Figure 5, with the valve plug firmly seated against the valve seat provided at the lower end of the conduit **22**, to prevent soap from dropping into the mixing chamber.

In use, and assuming that it is only desired to dispense enough soap for a small load, the knob is grasped and the drum is turned through approximately 90 degrees or perhaps a little less, as shown in dotted lines in Figure 5. This causes soap previously deposited in the leading, 90-degree chamber to drop into the conduit **22**, and simultaneously the valve will be moved downwardly to its dotted line position of Figure 5, to permit said soap to drop into the mixing chamber.

If soap for a medium load is desired, the drum is further rotated until the soap within the intermediate, 45-degree compartment drops into the conduit.

If soap for a large load is desired, the drum is still further rotated, sufficiently to cause the soap within the trailing 45-degree chamber to drop into the conduit **22**. The valve plug is rotated through the entire operation, of course.

It will be understood that the wall **48** can be provided with a scale or can be otherwise calibrated or marked to facilitate the rotation of the drum to the exact extent desired.

Referring to Figure 2, connected to fitting **28** is a line **70**, extending from a source of water under pressure. A line **72** is connected to the fitting **34** and constitutes the water supply pipe for a washing machine generally designated **74**. The outlet of the washing machine has been designated at **76**, and connected thereto is a T **78**. Connected between the T **78** and the fitting **30** is a line **80**, the T being connected to an outlet **82** extending to the washing machine pump **84**.

It will thus be seen that before the washing machine is put through its cycle, a predetermined quantity of soap can be dropped into the machine. Then, when the machine is turned on, water will move through the mixing chamber from the inlet **28** to the outlet **34**, carrying with it the soap.

Then, at the completion of the cycle, the pump operates to pump the water out of the washing machine in the usual manner, and since it is connected with the mixing chamber by means of the line **80** it will exhaust any water within the mixing chamber so that the mixing chamber will be dry, awaiting the next use of the device.

It will be apparent that the device can be installed upon a conventional washing machine with minimum difficulty, since it is merely necessary to connect the water intake hose or pipe with the mixing chamber. Said hose or pipe can be separated for installation of the mixing chamber therebetween. The device can of course be mounted upon a suitable bracket carried by the washing machine or an adjacent support. After the connection is made to the pump, the device is ready for use and will thereafter permit the swift and accurate metering and dispensing of the soap or detergent, according to the needs of the particular situation.

It is believed apparent that the invention is not necessarily confined to the specific use or uses thereof described above, since it may be utilized for any purpose to which it may be suited. Nor is the invention to be necessarily limited to the specific construction illustrated and described, since such construction is only intended to be illustrative of the principles of operation and the means presently devised to carry out said principles, it being considered that the invention comprehends any minor change in construction that may be permitted within the scope of the appended claims.

What is claimed is:

1. A metering and dispensing device for granular material comprising a hopper; a drum housing communicating therewith; a rotary drum in the housing having a plurality of segmentally shaped compartments communicating with the hopper on rotation of the drum; a conduit communicating with and extending downwardly from the housing into position such that said compartments are successively communicated with the conduit on rotation of the drum through selected angular distances; and valve means connected with the drum and normally closing the lower end of the conduit, said valve means being unseated responsive to rotation of the drum in one direction.

2. A metering and dispensing device for granular material comprising a hopper; a drum housing communicating therewith; a rotary drum in the housing having a plurality of segmentally shaped compartments communicating with the hopper on rotation of the drum; a conduit communicating with and extending downwardly from the

housing into position such that said compartments are successively communicated with the conduit on rotation of the drum through selected angular distances; valve means connected with the drum and normally closing the lower end of the conduit, said valve means being unseated responsive to rotation of the drum in one direction; and resilient, yielding means normally rotating the drum in an opposite direction to seat the valve means, said valve means when seated engaging the conduit to prevent further rotation of the drum in said opposite direction.

3. A metering and dispensing device for granular material comprising a hopper; a drum housing communicating therewith; a rotary drum in the housing having a plurality of segmentally shaped compartments communicating with the hopper on rotation of the drum; a conduit communicating with and extending downwardly from the housing into position such that said compartments are successively communicated with the conduit on rotation of the drum through selected angular distances; valve means connected with the drum and normally closing the lower end of the conduit, said valve means being unseated responsive to rotation of the drum in one direction; and resilient, yielding means normally rotating the drum in an opposite direction to seat the valve means, said valve means when seated engaging the conduit to prevent further rotation of the drum in said opposite direction, the valve means comprising a flexible element coiled about the drum and a conical plug carried by said flexible element and adapted to seat against the lower end of the hopper.

4. A metering and dispensing device for granular material comprising a hopper; a drum housing communicating therewith; a rotary drum in the housing having a plurality of segmentally shaped compartments communicating with the hopper on rotation of the drum; a conduit communicating with and extending downwardly from the housing into position such that said compartments are successively communicated with the conduit on rotation of the drum through selected angular distances; valve means connected with the drum and normally closing the lower end of the conduit, said valve means being unseated responsive to rotation of the drum in one direction; and resilient, yielding means normally rotating the drum in an opposite direction to seat the valve means, said valve means when seated engaging the conduit to prevent further rotation of the drum in said opposite direction, the valve means comprising a flexible element coiled about the drum and a conical plug carried by said flexible element and adapted to seat against the lower end of the hopper, the drum being formed with a transverse partition intermediate its ends peripherally grooved to receive said flexible element.

5. A metering and dispensing device for granular material comprising a hopper; a drum housing communicating therewith; a rotary drum in the housing having a plurality of segmentally shaped compartments communicating with the hopper on rotation of the drum; a conduit communicating with and extending downwardly from the housing into position such that said compartments are successively communicated with the conduit on rotation of the drum through selected angular distances; and valve means connected with the drum and normally closing the lower end of the conduit, said valve means being unseated responsive to rotation of the drum in one direction, one of said compartments extending through 90 degrees of the drum circumference, and being the leading compartment in the sense of rotation of the drum in said one direction, the other compartments following said first named compartment and being each extended through 45 degrees of the drum circumference.

6. A metering and dispensing device for granular material comprising a hopper; a drum housing communicating therewith; a rotary drum in the housing having a plurality of segmentally shaped compartments communicating with the hopper on rotation of the drum; a conduit communicating with and extending downwardly from the housing into position such that said compartments are successively communicated with the conduit on rotation of the drum through selected angular distances; valve means connected with the drum and normally closing the lower end of the conduit, said valve means being unseated responsive to rotation of the drum in one direction; and a mixing chamber connected with the lower end of the conduit to receive the materials dispensed through the conduit.

7. A metering and dispensing device for granular material comprising a hopper; a drum housing communicating therewith; a rotary drum in the housing having a plurality of segmentally shaped compartments communicating with the hopper on rotation of the drum; a conduit communicating with and extending downwardly from the housing into position such that said compartments are successively communicated with the conduit on rotation of the drum through selected angular distances; valve means connected with the drum and normally closing the lower end of the conduit, said valve means being unseated responsive to rotation of the drum in one direction; and a mixing chamber connected with the lower end of the conduit to receive the materials dispensed through the conduit, said mixing chamber including a pair of tubular fittings at one end and a single tubular fitting at the other end, one of the first named tubular fittings comprising a water inlet, the other of said first named fittings comprising means for connecting the mixing chamber with a pump of a washing machine, said fitting at the other end of the mixing chamber providing a connection for a line etxending from the mixing chamber to a washing machine.

No references cited.