Sept. 30, 1958 W. O. MANLEY 2,854,038

FEEDER UNIT FOR AUTOMATIC WASHING MACHINES

Filed July 9, 1956 2 Sheets-Sheet 1

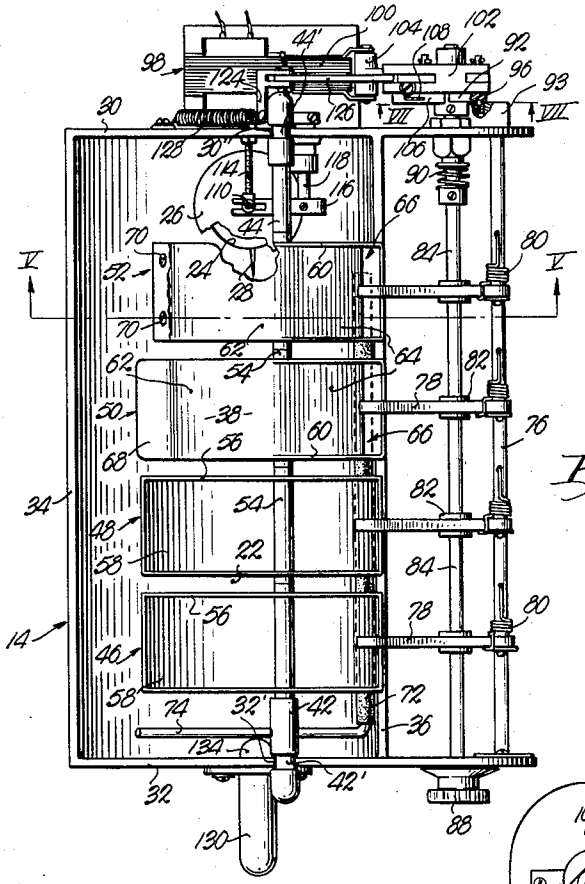


Fig. 1.

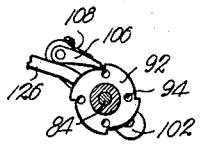


Fig. 7.

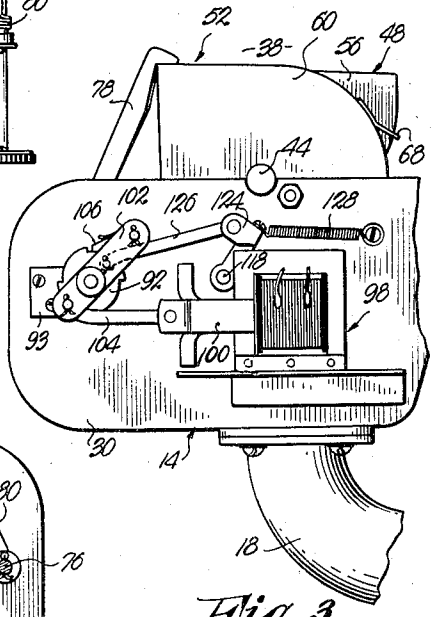


Fig. 3.

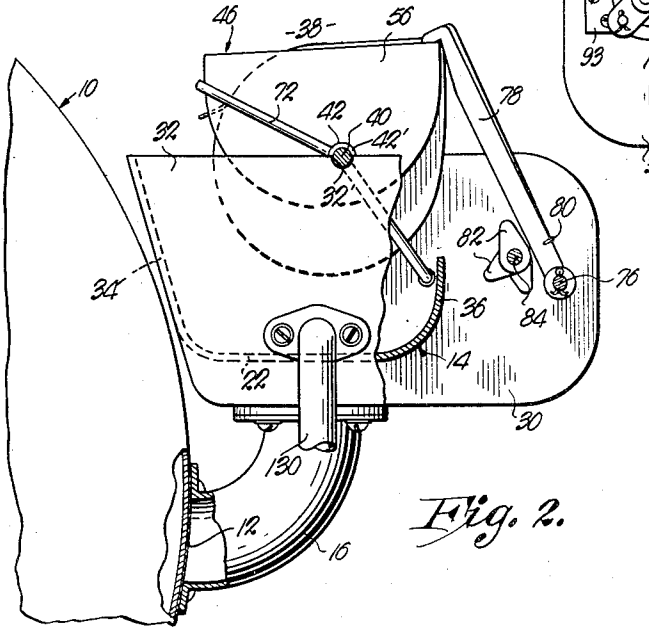


Fig. 2.

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Sept. 30, 1958 W. O. MANLEY 2,854,038

FEEDER UNIT FOR AUTOMATIC WASHING MACHINES

Filed July 9, 1956 2 Sheets-Sheet 2

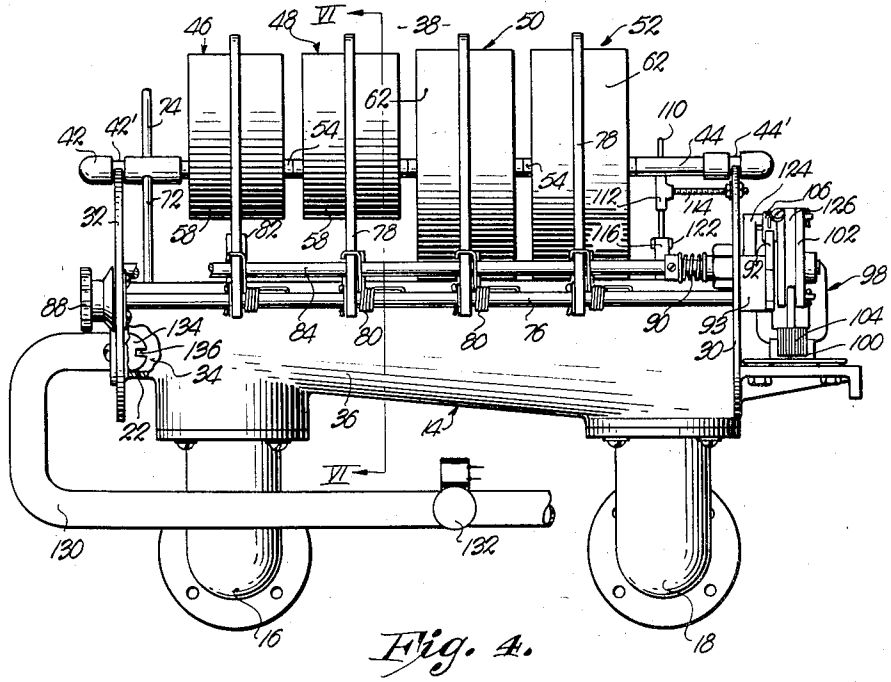


Fig. 4.

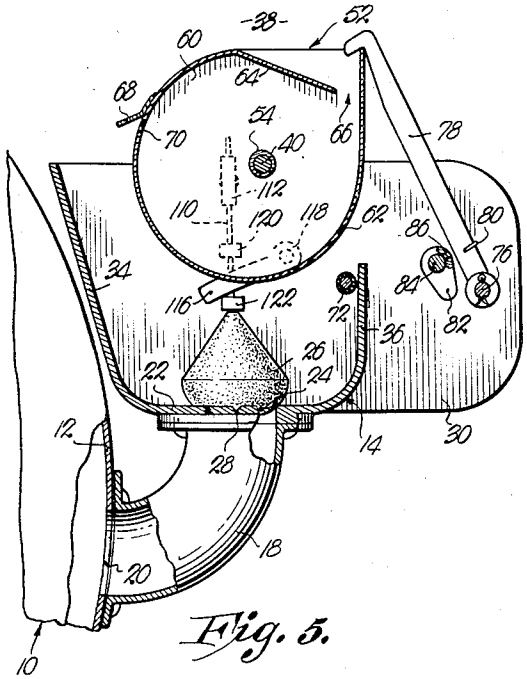


Fig. 5.

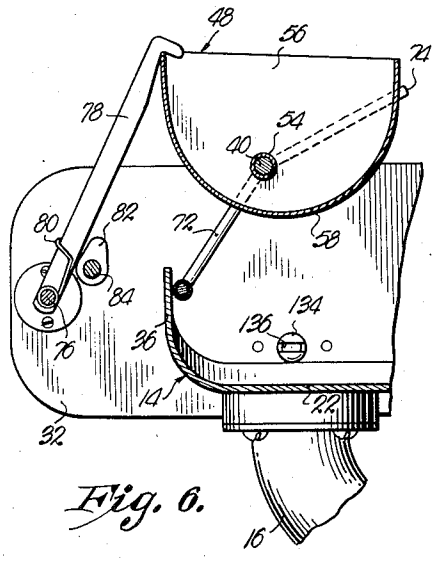


Fig. 6.

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2,854,038

# FEEDER UNIT FOR AUTOMATIC WASHING MACHINES

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8 Claims. (Cl. 141—67)

This invention relates to the dispensing of materials, both granular and liquid, and particularly to a feeder having a plurality of gravity actuated containers responsive to an automatic control forming a part of a washing machine for dumping the entire contents thereof into a hopper communicating with the machine in successive order as corresponding release mechanism for each container respectively is released by virtue of the aforementioned automatic controls.

This is an improvement over the invention of my U. S. Letters Patent No. 2,762,527, granted on September 11, 1956 upon application Serial No. 403,789, filed January 13, 1954, and has for its primary object to improve upon the "Automatic Feeder For Washing Machines" disclosed in such patent.

It is the most important object of the present invention to provide a feeder unit for automatic washing machines having a plurality of movably mounted supply containers properly weighted and therefore, rockable or tiltable for gravity discharge of the contents thereof into a hopper upon release of individual latches or locks for the containers, together with means for flushing the material dumped into the hopper through a valved outlet and thence into the machine each time a container is released.

Another important object of the instant invention is the provision of automatic means for opening the normally closed valve of the aforementioned outlet each time a container is released through mechanism operably coupled with the structure for controlling the release of the container locks or latches.

An important aim of this invention is to provide a feeder unit wherein the latch releasing structure imparts step-by-step rotative movement to a cam shaft for releasing the latches in predetermined sequence by virtue of a staggered arrangement of the cams on the shafts, together with indexing means operable in conjunction with spring means for holding the shaft biased toward one end of its path of travel, to positively yet yieldably hold the cam shaft in each of its stepped positions.

An object of the present invention is the provision of a dispenser having a container unit that may be quickly and easily removed from the hopper supporting the same for cleaning purposes, and having the individual containers rotatably and removably mounted on a rod that rests upon a pair of spaced uppermost edges forming a part of the material-receiving hopper.

A further aim of the instant invention is to provide a feeder unit wherein the individual containers are entirely depleted in predetermined order by virtue of pivotal movement about a fixed axis, the aforementioned removable container unit being in turn provided with a swingable actuator on the container supporting rod for permitting manual swinging of the containers to a normal upright position where they are held by the latches in hooked relationship to an engageable part of each container respectively.

A still further aim of this invention is the provision



of a spray head at one end of the hopper for flushing the materials therefrom during each movement of the containers to a dumping position for discharge into the machine while the valve of the outlet which places the hopper into communication with the machine is held in an open position.

Other aims and objects of the invention about to be described relate to important details of construction, all of which will be made clear or become apparent as the following specification progresses, reference being had to the accompanying drawings, wherein:

Figure 1 is a top plan view of a feeder unit for automatic washing machines made pursuant to my present invention;

Fig. 2 is an end elevational view of the feeder unit shown in Fig. 1, illustrating the same operably mounted on an automatic washing machine, parts being broken away and in section for clearness;

Fig. 3 is a fragmentary view showing the opposite end of the feeder;

Fig. 4 is a front elevational view thereof;

Fig. 5 is a vertical, cross-sectional view similar to Fig. 2, taken on line V—V of Fig. 1; and

Fig. 6 is a fragmentary, cross-sectional view taken on line VI—VI of Fig. 4.

The automatic washing machine with which the feeder unit depicted by the drawings is adapted to be used forms no particular part of the present invention and therefore, in Figs. 2 and 5 such machine, broadly designated by the numeral **10**, is shown fragmentarily, illustrating the outermost shell **12** which contains therewithin the usual washing tub (not shown).

The feeder unit per se includes an elongated, open top hopper **14** that is supported by the shell **12** through the medium of one of more arms **16** and **18** that are preferably tubular, shell **12** being provided with an opening **20** placing the arm **18** into communication with the aforementioned tub in any suitable manner (not shown). The hopper **14** is provided with a bottom **22** that slopes downwardly toward the arm or tubular outlet **18** as seen in Fig. 4, and is provided with an outlet **24** presenting a seat for a vertically reciprocable valve **26** that is normally closed as illustrated in Fig. 5 of the drawings. A notch **28** in the upper face of bottom **22** extends laterally from the seat **24** to assure drainage of the hopper **14** of all of its contents, even when the valve **26** is closed.

The hopper **14** is closed at the ends thereof by a pair of walls **30** and **32** that are coextensive in height with rear wall **34** of hopper **14** and which extend beyond the shorter front wall **36** of hopper **14**, as illustrated in Figs. 1 to 3 inclusive, 5 and 6. The uppermost edges of the walls **30** and **32** removably support a container unit broadly designated by the numeral **38** and which includes an elongated rod **40** having tubular sleeves **42** and **44** telescoped over the ends thereof, the sleeve **44** being preferably readily removable. Annular grooves **42'** and **44'** fit within notches **30'** and **32'** within the upper edges of walls **30** and **32** respectively, to hold the unit **38** against displacement.

The rod **40** rotatably supports a plurality of containers **46**, **48**, **50** and **52** through the medium of tubes **54**, traversing such containers and telescoped on the rod **40**, it being seen in Figs. 1 and 4 that the tubes **54** extend beyond the sides of the containers to hold the same in spaced relationship between the collars **42** and **44**.

Containers **46** and **48** are identical and open at the top thereof, as seen in Figs. 1 and 6. A pair of spaced, vertical, substantially semicircular side walls **56** are interconnected by an arcuate bottom wall **58** and the tubes **54** thereof are rigid to the two side walls **56—56**.

The two containers **50** and **52** are likewise identical

and include a pair of spaced, vertical, substantially circular side walls **60** interconnected by a substantially circular third wall **62** that surrounds the rod **40** and is provided with a downwardly bent flap portion **64** presenting an inlet opening **66**. A wing or apron **68** on the outermost face of wall **62** overlies a plurality of outlet openings **70** in the wall **62** when the containers **50** and **52** are in the normal upright position shown in Fig. 5.

The tubes **54** of the containers **50** and **52** likewise interconnect the walls **60—60** thereof and it is to be noted that all of the tubes **54** are so positioned as to center of gravity for causing the containers to swing anticlockwise (viewing Figs. 2 and 5) when released from the normal upright position.

An L-shaped member **72** secured to the collar **42** is engageable with the wall **58** of containers **46** and **48** and with the apron **68** of containers **50** and **52** when swung through use of handle **74** secured to collar **42** in the manner illustrated by Fig. 2 of the drawings to return the four containers to the upright position illustrated in Figs. 5 and 6.

It is now seen that the entire unit **38** may readily be removed from the hopper **14** for cleaning or other purposes and that the collar **42**, together with the member **72** and handle **74** may be removed from the rod **40**, whereupon each of the four containers may in turn be removed from rod **40**.

The extended wings of the sides **30** and **32** are interconnected by a bar **76** upon which are swingably mounted a plurality of latches **78** in the nature of hooks that normally engage over the uppermost edges of walls **58** and **62** to hold the containers **46, 48, 50** and **52** against gravitational swinging movement to a dumping position. Springs **80** on the bar **76** yieldably bias the latches **78** against corresponding cams **82** rigid to a rotatable shaft **84** that extends through the walls **30** and **32**, adjacent to and in parallelism with the bar **76**. The relative positions of the cams **82** on the shaft **84** may be adjusted by loosening fasteners **86** that attach the cams **82** to the shaft **84**.

One end of the shaft **84** is provided with a knob **88** that may be manually manipulated to rotate shaft **84** and thereby properly position the cams **82** with respect to their corresponding latches **78** at the beginning of the cycle of operation, and in this respect, suitable indicating indicia (not shown) may be provided on the knob **88** and on the outer face of the wall **32** to guide the operator in such proper positioning of the cams **82**.

Shaft **84** is horizontally reciprocable longitudinally thereof within the walls **30** and **32** and held biased toward one end of its path of travel by a spring **90** coiled thereabout to yieldably hold a ratchet wheel **92** against a small block **93** mounted on the outer face of the wall **30**. Ratchet **92** is rigid to the shaft **84** and provided with a plurality of indentations **94**, one for each container respectively. A spring loaded ball **96** enters the indentations **94** upon ninety degree stepping of the ratchet wheel **92** and therefore, the shaft **84** as well as the cams **28** mounted thereon.

The structure for actuating the ratchet wheel **92** includes a solenoid broadly designated by the numeral **98** carried by the wall **30** and having its horizontally reciprocable core **100** pivotally connected to one end of a crank **102** that is swingable on shaft **84** by a link **104**. An actuating pawl **106** swingable on the crank **102** at the opposite end thereof is yieldably biased toward the periphery of ratchet wheel **92** for engagement with the teeth of the latter by a spring **108** carried by the crank **102**.

A pin **110** extending upwardly from ball type valve **26** is guided for vertical reciprocation within a tube **112** mounted on one end of a support **114** therefor, that is in turn adjustably carried by the wall **30** within the hopper **14**. A bifurcated extension **116** on a stub shaft **118** embraces the pin **110** between a pair of spaced set collars **120** and **122** adjustably secured to the pin **110**. The stub shaft **118** is rotatable in the wall **30** and has a small crank **124** rigidly secured thereto exteriorly of the hopper **14**, the crank **124** being pivotally connected with the crank **102** by a link **126**. A spring **128** interconnecting the wall **30** and the crank **124** yieldably holds the latter biased toward one end of its path of travel.

Water under pressure from a suitable source (not shown) is directed into the hopper **30** by a supply line **130** having a solenoid valve **132** interposed therein and extending through the wall **32** of hopper **14** adjacent the bottom **22** of the latter. The supply line **130** terminates within the hopper **14** in a dome-shaped spray head **134**, having a horizontal outlet slot **136** for completely flushing the bottom **22** of hopper **14** and the sides **34** and **36** thereof adjacent bottom **22**.

The valve **26** is provided primarily as a safety measure because of the fact that many users of automatic washing machines use an excessive amount of soaps and detergents, resulting in high, thin suds which would tend to flow into the hopper **14** by way of outlet tube **18** during operation of the machine. Those skilled in this art, however, are aware of the fact that dirt is carried away from the clothing and other materials being washed more effectively by low, heavy suds and in that event, the valve **26** would not be necessary.

At the beginning of the cycle of operation the containers of the unit **38** are all in the full line position shown in the drawings, held in such upright positions by the latches **78**. The solenoids **98** and **132** are controlled by the automatic control structure of the machine **10** (not shown) and the containers of unit **38** are initially charged with the materials to be dumped into the hopper **14** and subsequently washed into the machine **10**. For example, when a two-suds wash is contemplated, both of the containers **46** and **48** may include a powdered soap or detergent. The containers **50** and **52** are adapted, however, for containing liquid materials such as bluing, bleach, sour and the like. The four containers may be dumpd in any desired sequence simply by adjusting the cams **82** on the shaft **84** upon loosening of their setscrews **86**. In fact, two or more containers may be dumped simultaneously if desired through such adjustment of the cams **82**.

Assuming, however, that the cams **82** are set for successive dumping of the four containers, as soon as the automatic control structure (not shown) of the machine **10** energizes the solenoids **98** and **132** simultaneously, the first cam **82** will rotate to a position retracting its latch **78**, thereby permitting the container **46** to gravitate anticlockwise viewing Fig. 2. This is accomplished by inward movement of the core **100** of solenoid **98** which swings the crank **102** anticlockwise, viewing Fig. 3, through the link **104**. Pawl **106** engaging one of the teeth of the ratchet wheel **92** advances the latter and thereupon falls into place behind the next succeeding tooth of the ratchet **92** by action of spring **108**.

Swinging of the crank **102** imparts a swinging movement to the crank **124** through link **126**, thereby rotating stub shaft **118** and swinging the arm extension **116** upwardly to raise the valve **26** off its seat **24** when the arm **116** moves into engagement with the set collar **120**. Water flowing into the hopper **14** through the spray head **134** flushes away the material dumped by the container **46** by virtue of the slot **136** and manifestly, with valve **26** held open such flushing water admixes with the soap or detergent and flows in a diluted condition into the machine **10** by way of outlet pipe or tube **18**.

After a predetermined period of time the solenoids **98** and **132** are deenergized, thereby moving pawl **106** to the next succeeding tooth of ratchet **92** as aforementioned, and permitting valve **26** to move the closed position against seat **24** under the added influence of spring **128**. It is to be noted that the arm **116** engages collar **122**, holding valve **26** firmly seated and preventing backflow

of high suds into the hopper **14** as above mentioned. Any material remaining in the hopper **14** after closing of the valve **26** will seep into the outlet **18** by way of notch **28**.

During each ninety degree rotation of the ratchet **92**, spring loaded ball **96** enters one of the indentations **94** and positively holds the shaft **84** against rotation incident to vibration of the machine. Furthermore, during each ninety degree cycle of operation one or more containers is dumped, valve **26** is held open and flushing water is permitted to flow into the hopper **14**. When the containers **50** and **52** are dumped flaps **64** and **68** prevent undue splattering and the liquid flows therefrom through openings **70**. The admixture of the flushing water with liquids emanating from the openings **70** to dilute the same before passage from the hopper **14** into the machine **10** is particularly important and advantageous. After all containers have been dumped the operator may quickly and easily return the same to the normal upright position by grasping handle **72** and swinging the element **72** against the walls **58** as well as the aprons **68**. The latches **78** readily yield against the action of springs **80** and the containers snap into place beneath the hook-like terminal ends of the latches **78**. In the upright position the four containers may be easily refilled with the desired materials and the machine is ready for the next cycle of operation. In the event that the cams **82** are set to dump more than one container upon a single actuation of solenoid **98**, it will be necessary for the operator to reset the shaft **84** after each cycle and such may be done easily by manipulation of knob **88** as hereinabove described.

Having thus described the invention what is claimed as new and desired to be secured by Letters Patent is:

1. In a washing machine, a hopper having a valved outlet communicating with the machine; a plurality of containers carried by the hopper for gravitational movement to a position dumping the contents thereof into the hopper, each container having a latch-engaging part; a latch for each container respectively engageable with said part thereof for holding the containers against movement to said position; a rotatable shaft; a cam member for each latch respectively rigid to the shaft, said cam members having cam surfaces disposed to engage their latches to move the latter out of engagement with said parts upon rotation of the shaft; and structure operably coupled with the shaft and with the valve of said outlet for simultaneously rotating the shaft and opening the valve of said outlet.

2. In a washing machine, a hopper having a valved outlet communicating with the machine and a valved water inlet; a plurality of containers carried by the hopper for gravitational movement to a position dumping the contents thereof into the hopper, each container having a latch-engaging part; a latch for each container respectively engageable with said part thereof for holding the containers against movement to said position; a rotatable shaft; a cam member for each latch respectively rigid to the shaft, said cam members having cam surfaces disposed to engage their latches to move the latter out of engagement with said parts upon rotation of the shaft; and structure operably coupled with the shaft and with the valve of said outlet for simultaneously rotating the shaft and opening the valve of said outlet as the valve of said outlet as the valve of said inlet is opened.

3. In a washing machine, a hopper having a valved outlet at one end thereof communicating with the machine; a plurality of containers carried by the hopper for gravitational movement to a position dumping the contents thereof into the hopper; a valved water inlet terminating in a spray head within the hopper at the opposite end thereof for flushing said contents into said outlet, each container having a latch-engaging part; a latch for each container respectively engageable with said part thereof for holding the containers against movement to said position; a rotatable shaft; a cam member for each latch respectively rigid to the shaft, said cam members having cam surfaces disposed to engage their latches to move the latter out of engagement with said parts upon rotation of the shaft; and structure operably coupled with the shaft and with the valve of said outlet for simultaneously rotating the shaft and opening the valve of said outlet as the valve of said inlet is opened.

4. In a washing machine having a hollow tub; a hopper; an arm for attaching the hopper to the tub, said arm being tubular for placing the hopper into communication with the tub when the hopper is attached thereto; a valve in the hopper normally closing said arm; a plurality of containers carried by the hopper for gravitational movement to a position dumping the contents thereof into the hopper, each container having a latch-engaging part; a latch for each container respectively engageable with said part thereof for holding the containers against movement to said position; a rotatable shaft; a cam member for each latch respectively rigid to the shaft, said cam members having cam surfaces disposed to engage their latches to move the latter out of engagement with said parts upon rotation of the shaft; and structure operably coupled with the shaft and with the valve for simultaneously rotating the shaft and opening the valve.

5. In a washing machine, a hopper having a valved outlet communicating with the machine; a plurality of containers carried by the hopper for gravitational movement to a position dumping the contents thereof into the hopper, each container having a latch-engaging part; a latch for each container respectively engageable with said part thereof for holding the containers against movement to said position; a rotatable shaft; a cam member for each latch respectively rigid to the shaft, said cam members having cam surfaces disposed to engage their latches to move the latter out of engagement with said parts upon rotation of the shaft; a movable element normally holding the valve of said outlet closed; means engageable with said element upon movement of the latter toward one end of its path of travel for opening said valve; and structure operably coupled with the shaft and with said element for simultaneously rotating the shaft and moving the element to said one end of its path of travel.

6. In a washing machine, a hopper having a valved outlet communicating with the machine; a plurality of containers carried by the hopper for gravitational movement to a position dumping the contents thereof into the hopper, each container having a latch-engaging part; a latch for each container respectively engageable with said part thereof for holding the containers against movement to said position; a rotatable shaft; a cam member for each latch respectively rigid to the shaft, said cam members having cam surfaces disposed to engage their latches to move the latter out of engagement with said parts upon rotation of the shaft; a movable element normally holding the valve of said outlet closed; means engageable with said element upon movement of the latter toward one end of its path of travel for opening said valve; means operably connected with said element for yieldably holding the latter biased to the opposite end of its path of travel; and structure operably coupled with the shaft and with said element for simultaneously rotating the shaft and moving the element to said one end of its path of travel against the action of said means.

7. In a washing machine, a hopper communicating with the machine; a plurality of containers carried by the hopper for gravitational movement to a position dumping the contents thereof into the hopper, each container having a latch-engaging part; a latch for each container respectively engageable with said part thereof for holding the containers against movement to said position; a rotatable shaft; structure operably coupled with said shaft for imparting step-by-step rotative movement thereto; a cam member for each latch respectively, said cam members being disposed on the shaft to engage and release at least

one latch each time the shaft is stepped; and indexing means for yieldably holding the shaft in each of its stepped positions.

8. In a washing machine, a hopper communicating with the machine; a plurality of containers carried by the hopper for gravitational movement to a position dumping the contents thereof into the hopper, each container having a latch-engaging part; a latch for each container respectively engageable with said part thereof for holding the containers against movement to said position; a rotatable shaft reciprocably carried by the hopper; structure operably coupled with said shaft and including a device on the shaft for imparting step-by-step rotative movement thereto; a cam member for each latch respectively, said cam members being disposed on the shaft to engage and release at least one latch each time the shaft is stepped; indexing means engageable with said device for holding the shaft in each of its stepped positions; and means biasing the shaft toward one end of its path of reciprocable travel for yieldably holding the device against said indexing means.



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