

April 20, 1965

W. HERTEL

3,178,915

DOSAGE DEVICE FOR DISHWASHERS AND LAUNDERING MACHINES

Filed Feb. 20, 1962

2 Sheets-Sheet 1

Fig.1

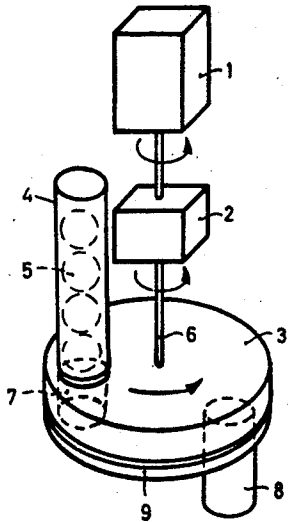


Fig.2

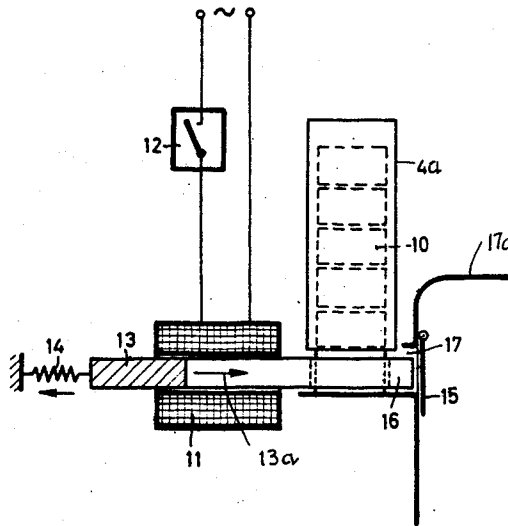


Fig.3

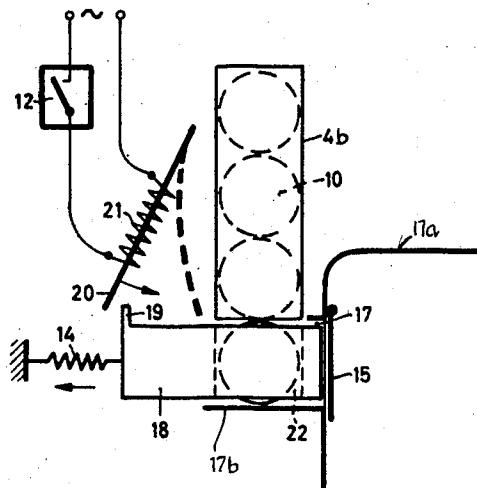
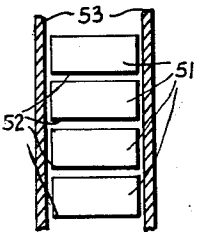


Fig.6



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Fig.4

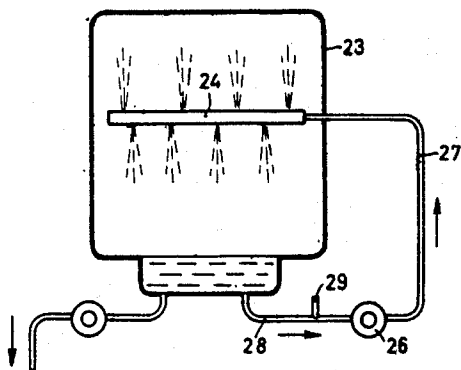
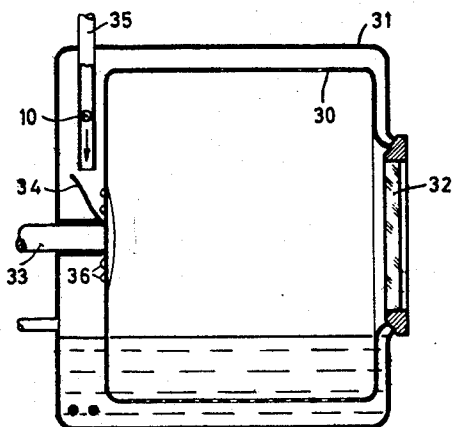


Fig.5



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3,178,915
DOSAGE DEVICE FOR DISHWASHERS AND LAUNDERING MACHINES

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S 72,654

6 Claims. (Cl. 68-17)

My invention relates to automatic washing appliances, particularly dishwashers and laundering machines, and in a more particular aspect to a dosing device for issuing predetermined quantities of detergent or other additives to the washing water in such home appliances.

It is known to provide washing appliances with dosing devices for automatically dispensing such additive agents as soaps, detergents, softening means, rinsing aids and the like. As a rule such devices comprise a magazine container for the additive substance, and a dispensing mechanism which releases the liquid from the magazine container in dependence upon the washing operation of the machine. The known dosing devices contain the cleansing or other additive substance in liquid or pulverulent form. Dosing devices for dispensing liquids require great precision in manufacture. Dosing devices for pulverulent substances have the disadvantage that the powder occupies relatively much space and has the tendency to form lumps which may clog the dispensing device. Furthermore since the housewife using the dishwasher or laundering machine may sometimes touch the substance when refilling the magazine, the cleansing substance or other additive must stay below a certain concentration not injurious to the human skin.

It is among the objects of my invention to devise a dosing apparatus for automatic dishwashers and laundering machines which is suitable for accommodating large quantities of cleansing agents or other additives and secures a more reliable dispensing operation than devices operating with pulverulent substances, while requiring less precision work in its manufacture, and which can readily be so designed as to prevent to a greater extent any contact of the human skin with the additive substance being used in the machine.

According to the invention the magazine container of the dosing device is provided with addition substance in a plurality of apportioned quantities that are sufficient for at least one washing operation of the machine and have each a given spatial shape, and the dispensing mechanism of the device, controlled by the washing operation of the machine, is adapted to the same concrete shape of the portions of additive substance. The cross section of the magazine container, according to another feature of the invention, is preferably adapted to the cross section of the shaped body of additive, and the dispensing mechanism is designed to empty the magazine container each time over its entire cross section up to a given height.

According to further features of the invention, the additive substance is contained in the magazine in the shape of a rod, and the dispensing mechanism of the device severs a portion from the rod each time it performs a dispensing operation. Depending upon the strength of the rod material, the dispensing mechanism may thus chip, cut, rasp, or grind a portion from the rod material. The rod of additive substance can be notched for facilitating the proper portions to be broken or pushed off.

According to another, preferred feature of the invention, the magazine container is provided with additive substance in portions of much larger number than that of the washing operations to be served thereby, all of these portions having the same size and shape, and the dispensing mechanism being designed to issue each time a

given number of these shaped bodies of additive substance. In this case the bodies of additive substance may consist of tablets, pellets or granules.

For preventing the individual shaped portions of additive substance from disintegrating due to humidity or from sticking together, each quantity can be coated or enveloped in material that is not soluble in cold water but readily soluble in hot water such as gelatine or gelatinous substances for example. Preferably, the individually dispensable quantities have the shape of tablets and are stacked upon each other in a magazine tube. In this case it suffices if only one side of each tablet is coated to prevent sticking. To avoid the additive substance from contacting the skin of a person handling the magazine refills, they are preferably inserted into the magazine container together with at least part of the wrapper. However, the carton or wrapper of the tablets or other bodies of additive, or part of such packaging material, may also be designed to serve as a magazine container.

The above-mentioned and further features of the invention, as well as the advantages achieved thereby, will be apparent from the following description in conjunction with the embodiments of the invention illustrated by way of example on the accompanying drawings in which:

FIG. 1 shows in schematic perspective a detergent dispenser for home washing appliances, comprising a magazine with ball-shaped bodies of detergent.

FIG. 2 shows schematically a dosing device for issuing tablet-shaped bodies of additive substance from a magazine into a washing appliance.

FIG. 3 illustrates schematically a different embodiment of a device also suitable for the issuance of detergent tablets and the like into the washing liquid of appliances;

FIG. 4 is a schematic flow diagram of a dishwasher with an inlet duct for detergent portions dispensed from a device according to the invention;

FIG. 5 shows schematically by a vertical section a drum-type laundry washing machine with a device according to the invention; and

FIG. 6 shows schematically a modified container for the detergent tablets.

The dosage issuing device according to FIG. 1 comprises a magazine container 4 of tubular shape which contains detergent in form of balls 5. A rotatable disc 3 has a bore 7 which, when registering with the tubular container 4, can receive a single ball 5. The shaft 6 of disc 3 is connected with a schematically represented drive 2 which is controlled from a likewise schematically illustrated program controller 1 of the dishwasher or laundering machine (not further illustrated in FIG. 1). During each rotation of disc 3 a single ball 5 of detergent drops into the bore 7 and then travels on a fixed plate 9 until it enters into an outlet tube 8 from which it drops into the water in the washing chamber of the appliance. The drive 2 may consist of a snap-action mechanism which is coupled with the program controller to be released thereby. Depending upon the number of rotations of the disc 3 thus released, a corresponding number of balls 5 passes through the outlet tube 8 into the washing chamber. The number of rotations can be controlled or preselected, for example, in accordance with the amount of water being supplied or the degree of soiling of the dishes or laundry to be washed. If desired, several magazines 4 can be mounted above the disc 3 and may contain respectively different addition agents such as water softeners, soap, starch or bleach substances.

In the dosing device according to FIG. 2 the magazine container 4a is also tubular although in this embodiment it may also have a cross section of square or other shape. The detergent or other additive substance is charged into the container 4a in the form of individual tablets 10 whose cross-sectional shape corresponds essentially to that

of the magazine container. The dispensing device comprises an electromagnet 11 of the solenoid type whose armature 13 is connected with a pusher rod 16 which passes through lateral openings in the bottom portion of the magazine container 4a. The armature 13 is biased by a pull-spring 14. When an electric switch 12, forming part of the automatic program controller of the washing appliance is closed, the magnet coil 11 is energized and pulls the armature 13 to the right, as indicated by an arrow 13a, in opposition to the force of the spring 14, thereby pushing a single tablet 10 from the magazine through an opening 17 into the washer space enclosed by the sheet metal housing 17a of the appliance, the opening 17 being normally closed by a sufficiently sealed lid 15. Thereafter the magnet coil 11 is de-energized by opening of the switch 12 so that the armature 13 with the pusher rod moves to the left and is ready for the next dispensing operation.

In the embodiment of the apparatus shown in FIG. 3, the tablets 10 of detergent or other additive substance are placed flat beside each other in the magazine 4b. The inner cross section of the magazine is sufficiently adapted to the cross-sectional, for example rectangular, cross section of the tablets 10. Located beneath the magazine container 4b is a slider 18 with an opening 22 so dimensioned that it can receive only one tablet at a time which then rests upon a support 17b firmly secured to the housing structure 17a of the appliance. The slider 18 is biased by a pull-spring 14 and is controlled by a bimetal strip 20. When the strip 20 is sufficiently heated, it pushes the slider 18 to the right in opposition to the force of spring 14, thus opening the lid 15 and dropping a single tablet 10 into the washer chamber. The bimetal strip 20, engageable with a lug 19 of the slider 18, is surrounded by an electric heater winding 21 which causes the strip to bend when the switch 12 is closed. As in the embodiment of FIG. 2, the switch 12 in FIG. 2 preferably forms part of the program control device or timer of the appliance.

To promote complete and rapid dissolution of the additive substance in the washing chamber, the dispensing device may be equipped with means for comminuting the additive substance. For example, in a dishwasher equipped with a circulatory system for rinsing water impelled by a pump, the pump of the water circulation system may also serve as a comminuting device, this being the case in the embodiment shown in FIG. 4 and described presently.

In FIG. 4, the sheet metal housing of the dishwasher appliance is denoted by 23. It comprises a nozzle system 24 for issuing jets of hot water under pressure. It will be understood that the nozzle system is shown only schematically and that any suitable system of this kind, comprising any desired number and arrangement of nozzles, may be used. The nozzle system 24 receives water from a pump 26 through a pipe 27. The water collecting at the bottom of the washer chamber in housing 23 drains through a pipe 28 back to the pump 26. The opening for the supply of the individual tablets or other shaped bodies of detergent or additive substance is located at a branch pipe 29. The vanes or gears of the pump 26 destroy the shaped tablet or body of additive substance, thus promoting its dissolution in the rinsing water. The dispensation of the body of additive agent is preferably effected prior to the moment when the pump is switched on by the programming controller of the appliance, and the supply opening at branch pipe 29 is preferably closed by a sealing flap or valve during operation of the pump 26.

FIG. 5 shows a washing machine of the drum type. The drum 30 is rotatable within a sheet metal housing 31 and is to be charged with laundry through a lateral opening 32 which is closed during washing operation. The drum 30 is fixed on a drive shaft 33. Mounted above the shaft 33 is a catch sheet or tray 34. The detergent

tablet 10 is supplied from a dosing device of the type described above and passes through a pipe 35 onto the sheet 34 where it is ground to particles between the sheet 34 and the adjacent wall of drum 30. For this purpose it is preferable to provide the drum wall with sharp-edged bosses 36 or the like projections which have a grating or grinding action upon the tablets caught in the wedge-shaped interspace between the sheet 34 and the drum.

The magazine container in a device according to the invention, containing the detergent or other additive in form of tablets, pellets or the like, can be made partly of transparent material to permit inspection of the amount of additive bodies still available in the device. As mentioned, the container, such as the tube 4 shown in FIG. 1, may also consist of the enclosure or packaging material in which the tablets are sold to the customer, so that it is only necessary to remove a depleted tube and insert a new, filled tube. Such a tube preferably consists of transparent plastic.

FIG. 6 shows several stacked detergent tablets 51 in a tube 53, the tablets 51 each having protecting sheets 52 provided only on one side. The tube 53 may constitute the container for the tablets 51, and may be secured as a magazine to a machine at the tablet entrance.

To those skilled in the art, it will be obvious upon a study of this disclosure that my invention permits of various modifications with respect to structural details, design of components and their arrangement, and hence can be given embodiments other than particularly illustrated and described herein, without departing from the essential features of my invention and within the scope of the claims annexed hereto.

I claim:

1. With an automatic washing appliance having a washing chamber, means for supplying water to said chamber and control means for controlling the washing operation of the water, in combination, an apparatus for sequentially issuing shaped portions of additive substance to the water in dependence upon said washing operation, said apparatus comprising a magazine having a magazine space dimensioned for receiving a total number of said shaped portions beside each other and having an inner cross section substantially matching that of said shaped portions, said total number being sufficient for a plurality of complete washing operations, and a dispensing device engageable with said magazine and connected with said control means to be controlled thereby for dispensing during each washing operation a number of said portions from said magazine and granulating means communicating with said water supply means for comminuting the dispensed quantity.

2. With an automatic washing appliance having a washing chamber, means for supplying water to said chamber and control means for controlling the washing operation of the water, in combination, a dosing apparatus for issuing additive substance to the water in dependence upon said washing operation, said apparatus comprising a magazine having a capacity corresponding to a total quantity of additive substance sufficient for a plurality of complete washing operations, said magazine when in operative condition containing said substance in at least one coherent piece of a given spatial shape, dispensing means connected with said control means to be controlled thereby for dispensing a given shaped portion of said substance from said magazine, and comminuting means disposed between said dispensing device and said chamber for comminuting said dispensed quantity before it reaches the water in said chamber.

3. In apparatus according to claim 2, said dispensing device having a member movable transversely through said magazine space and having a given height less than that of said magazine space so as to discharge said magazine space up to said given height over the entire cross

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section of said magazine each time said dispensing device is actuated.

4. In apparatus according to claim 2, said shaped portions of additive substance in said magazine space having in totality the shape of a rod, and said dispensing device removing each time a given longitudinal portion of the rod.

5. In apparatus according to claim 1, said additive substance being present in said apparatus in at least partly packaged form and having packaging material forming part of said magazine when in use.

6. With an automatic washing appliance having a washing chamber, means for supplying water to said chamber and control means for controlling the washing operation of the water, in combination, an apparatus for issuing additive substance to the water in dependence upon said washing operation, said apparatus comprising a magazine having a storage capacity for a total quantity of additive substance corresponding to a plurality of complete washing operations and containing when in operative condition, said substance in at least one coherent piece of a given spatial shape, a dispensing device engaging said

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magazine and connected with said control means to be controlled thereby for dispensing upon each control operation from said total quantity a given shaped portion of said substance from said magazine, said means for supplying water to said chamber including a pump, and granulating means for comminuting the dispensed quantity, said granulating means including said pump.

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