Dec. 12, 1961 N. L. KENDT 3,012,696

DETERGENT DISPENSING MECHANISM

Filed Jan. 4, 1960

FIG. 1

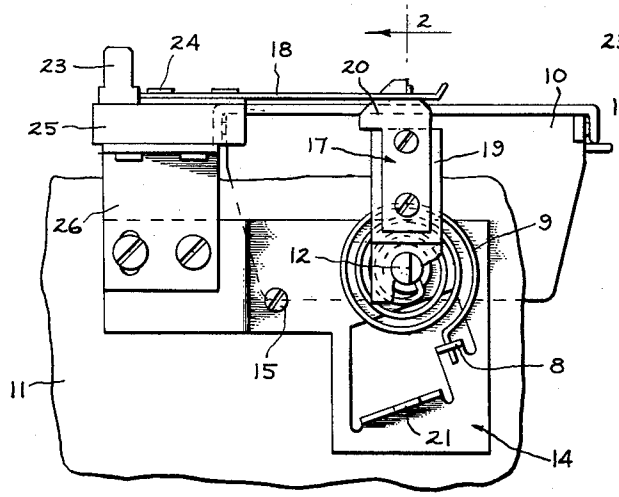


FIG. 2

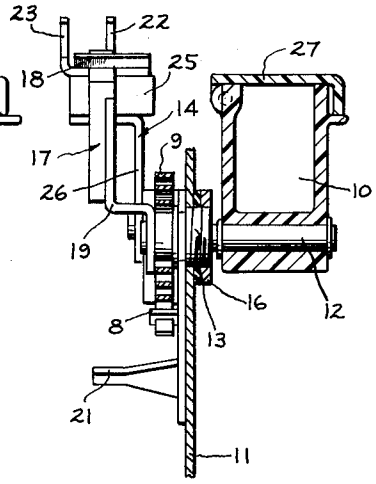


FIG. 3

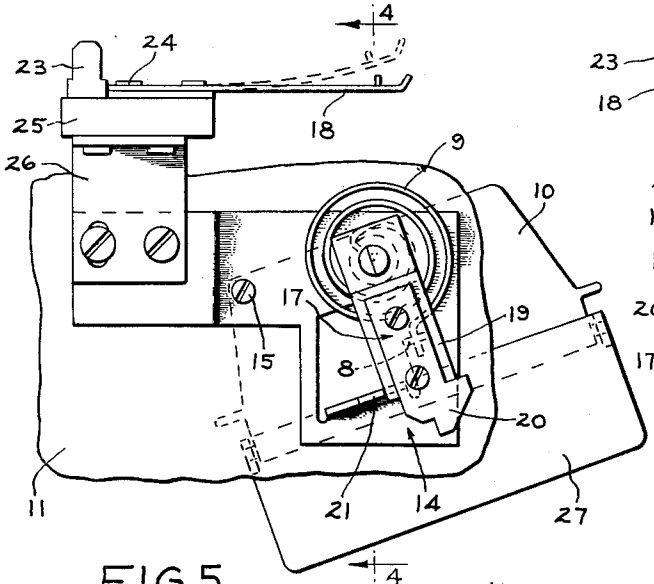


FIG. 4

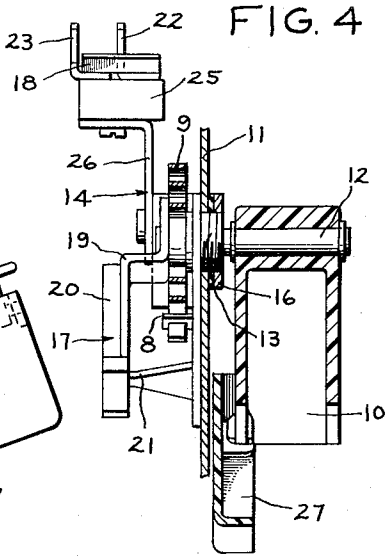
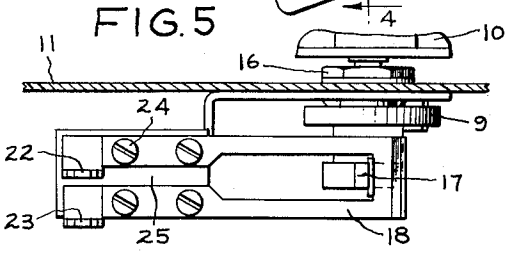


FIG. 5



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DETERGENT DISPENSING MECHANISM

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The present invention relates to a dispensing mechanism and particularly a low cost electrically controlled mechanism for dispensing detergent powders into a dishwasher tub.

An automatic dishwashing machine has an operating cycle that consists of approximately six basic parts; two preliminary power rinses, a detergent wash, two final power rinses, and a drying period. An electric timer controls this washing cycle to introduce hot water into the tub, operate the wash impeller to circulate the water in the tub, the drain impeller for removing the water and to energize the electric heating unit in the tub for drying the air in the tub and hence the dishes. Many dishwashing machines have a detergent dispenser which is supported directly from the timer mechanism. Recently the timer mechanisms have become more intricate as they are designed to perform several different cycles that may be programmed depending on various types of loads put into the machine such as fine crystal, pots and pans, or heavily soiled dishes. These enlarged timers do not allow room for the conventional detergent dispenser so that it is necessary to design a dispenser which may be mounted and operated at a point remote from the timer mechanism. Mechanical linkage could be designed but this would be cumbersome and expensive.

The principal object of the present invention is to provide a dispenser which may be operated at a remote point from its control device by using a heat sensitive latch member that is operated by an electric current.

A further object of the present invention is to design a detergent dispenser for an automatic dishwasher using a bimetal latch for triggering the detergent cup and allowing it to dump its contents.

A further object of the invention is to provide a bimetal detergent dispensing mechanism using spring means for normally biasing the detergent cup in the dumping position and a bimetal latch that is to be heated by an electric current for triggering the precise moment when the detergent is to be dumped.

The preferred embodiment of the present invention incorporates a detergent cup that is supported on a rotatable shaft. The shaft is normally biased by a spring member to dump the cup. The entire unit is supported on a bracket or frame which is to be fastened to the outer surface of the tub of an automatic dishwasher. The end of the shaft opposite the detergent cup includes a trigger that is releasably held by a bimetal latch that is also fastened to the frame. Accordingly the detergent cup is emptied of its contents by passing an electric current through the bimetal latch which will suddenly raise its temperature to the point where it will flex out of engagement with the trigger and allow the spring member to exert a dumping force on the cup.

My invention will be better understood from the following description taken in connection with the accompanying drawing and its scope will be pointed out in the appended claims.

FIG. 1 is an elevational view of a bimetal dispenser mechanism embodying the present invention.

FIG. 2 is a cross-sectional side elevational view taken on the lines 2—2 of FIG. 1.

FIG. 3 is a view similar to that of FIG. 1 showing the detergent cup in its inverted position.

FIG. 4 is a cross-sectional side view similar to that of FIG. 2 but showing the detergent cup in the inverted position and taken on the line 4—4 of FIG. 3.

FIG. 5 is a top plan view of the dispenser of FIG. 1 showing the details of the bimetal latch and its engagement with the trigger of the detergent cup.

Turning now to a consideration of the drawing and in particular to FIG. 1, the dispensing mechanism comprises a detergent cup **10** supported from a wall **11** such as the wall of a dishwasher tub by means of a shaft **12** that extends through a bushing **13** of FIG. 2 mounted in an opening in the wall. The bushing **13** is fixed to a bracket member or frame **14**. The frame is in turn fastened to the outer side of the wall by means of fastening screw **15** and a lock nut **16** that is threaded onto the bushing from the inside of the tub wall **11**. The end of the shaft **12** opposite the detergent cup **10** supports a torsion spring **9** and a trigger member **17**. The torsion spring normally biases the shaft **12** to turn in a clockwise direction looking at FIG. 1 so as to dump the cup. The end of the torsion spring is inserted into a slot in the shaft while the other end is confined by a projection **8**. The trigger **17** cooperates with a bimetal latch **18** for holding the detergent cup in its upright position so that the cup may be loaded before the machine is closed and the washing cycle is initiated. A supporting arm **19** of the trigger is of metal while the latch engaging portion **20** is of insulating material because the bimetal latch **18** is to serve as an electrical conductor in an electric circuit so that its temperature may be raised suddenly for flexing it out of engagement with the trigger for releasing the shaft of the cup and allowing it to dump. It is important to restrict the amount of rotation of the cup. This is done by lancing out a stop member **21** from the supporting bracket **14** so that it projects into the path of movement of the trigger as is best seen in FIGS. 3 and 4.

The bimetal latch **18** is of thin flat stock that is cut into a U-shaped configuration as is best seen in FIG. 5. The bend in the U-shape is adapted to engage over the cam shaped end of the insulation portion **20** of the trigger. The cup may be dumped manually by tilting the cup counterclockwise in FIG. 1 so that the trigger **17** may pass through the arms of the U-shaped spring. Moreover, the arms of the U-shape are connected to male electrical terminals **22** and **23** by means of fastening screws **24**. These terminals are supported from an insulating terminal block **25** that rests on the top of an angle bracket **26** and is adjustably supported from the main bracket or frame **14**.

It will be understood that the detergent cup **10** is provided with a pivoted lid **27** that is normally closed when the cup is in its upright position as shown in FIG. 2. This is necessary so that the detergent will remain in the cup during the preliminary power rinses that occur before the detergent wash portion of the cycle.

Lead wires (not shown) are connected to the electrical terminals **22** and **23** of the bimetal latch from the automatic timer so that at the beginning of the detergent wash portion of the cycle the total motor current and heating element current is sent through the bimetal latch **18** for a fraction of a minute which immediately raises the temperature of the bimetal causing it to flex out of its flat shape into an arcuate shape as seen in dotted lines in FIG. 3. This raises the latch above the trigger **17** thereby disengaging the trigger and allowing the torsion spring **9** to turn the shaft in a clockwise direction until the trigger swings around into engagement with the stop member **21**. As is seen in FIGS. 3 and 4 the lid **27** of the top automatically flies open when the cup is inverted allowing the detergent to discharge into the tub.

Having described above my invention of an electrically controlled bimetal detergent dispensing mechanism it will be readily apparent to those skilled in this art that I have

devised a simple mechanism for holding a detergent cup in an upright or loaded position, while the dispensing mechanism is both quick acting and reliable in operation for many thousands of cycles.

Modifications of this invention will occur to those skilled in this art and it is to be understood therefore, that this invention is not limited to the particular embodiment disclosed but that it is intended to cover all modifications which are within the true spirit and scope of this invention as claimed.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A dispenser comprising a cup, a wall having an opening therein, a shaft extending through said opening and being rotatable through an angle of approximately 180°, the cup being mounted on one end of said shaft so that in an upright position the cup may be loaded while later the cup may be emptied by turning the shaft and inverting the cup, the other end of the shaft having a trigger mounted thereon, a support bracket mounted on the said wall, said shaft being rotatably supported from the bracket, spring means normally biasing the shaft to place the cup in the inverted position, a bimetal latch supported at one end on the bracket and engageable with the trigger at its other end for releasably holding the cup in an upright position, the bimetal latch being an electrical conductor, and an electric circuit means for energizing said bimetal latch for raising the temperature of the latch to cause it to flex out of its normal shape and release the trigger whereby the said spring means dumps the cup.

2. A dispenser comprising a supporting bracket, a shaft supported by the bracket and being rotatable through an angle of approximately 180°, a cup mounted on one end of said shaft so that in an upright position the cup may be loaded while later the cup may be emptied by turing the shaft and inverting the cup, the other end of the shaft having a trigger mounted thereon, spring means

normally biasing the shaft to place the cup in the inverted position, a bimetal latch supported at one end on the bracket and engageable with the trigger at its other end for releasably holding the cup in an upright position, the bimetal latch being an electrical conductor, and an electric circuit means for energizing said bimetal latch for raising the temperature of the latch to cause it to flex out of its normal shape and release the trigger whereby the said spring means dumps the cup.

3. A detergent dispenser as recited in claim 2 wherein the supporting bracket includes a stop member that is in the path of movement of the trigger to limit the amount of rotation of the container shaft once the bimetal latch disengages the trigger.

4. A detergent dispenser comprising a supporting frame, a shaft pivotally supported on the frame, a cup for receiving the detergent, a cup being mounted on one end of said shaft, a trigger fixed to the opposite end of the shaft, a bimetal latch supported on the frame and releasably engageable with the trigger, said bimetal latch being U-shaped and the bend in the U latch being engageable with the trigger for holding the cup in an upright position, spring means associated with the shaft for upsetting the cup when the trigger is disengaged from the latch, electric circuit means for passing an electric current through the bimetal latch so that the electrical resistance of the latch will cause the temperature of the latch to rise rapidly and thereby deflect the bimetal member out of engagement with the trigger, and the dispenser being capable of manual manipulation by tilting the cup so that the trigger passes between the arms of the U-shaped latch and away from the bend in said latch.

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