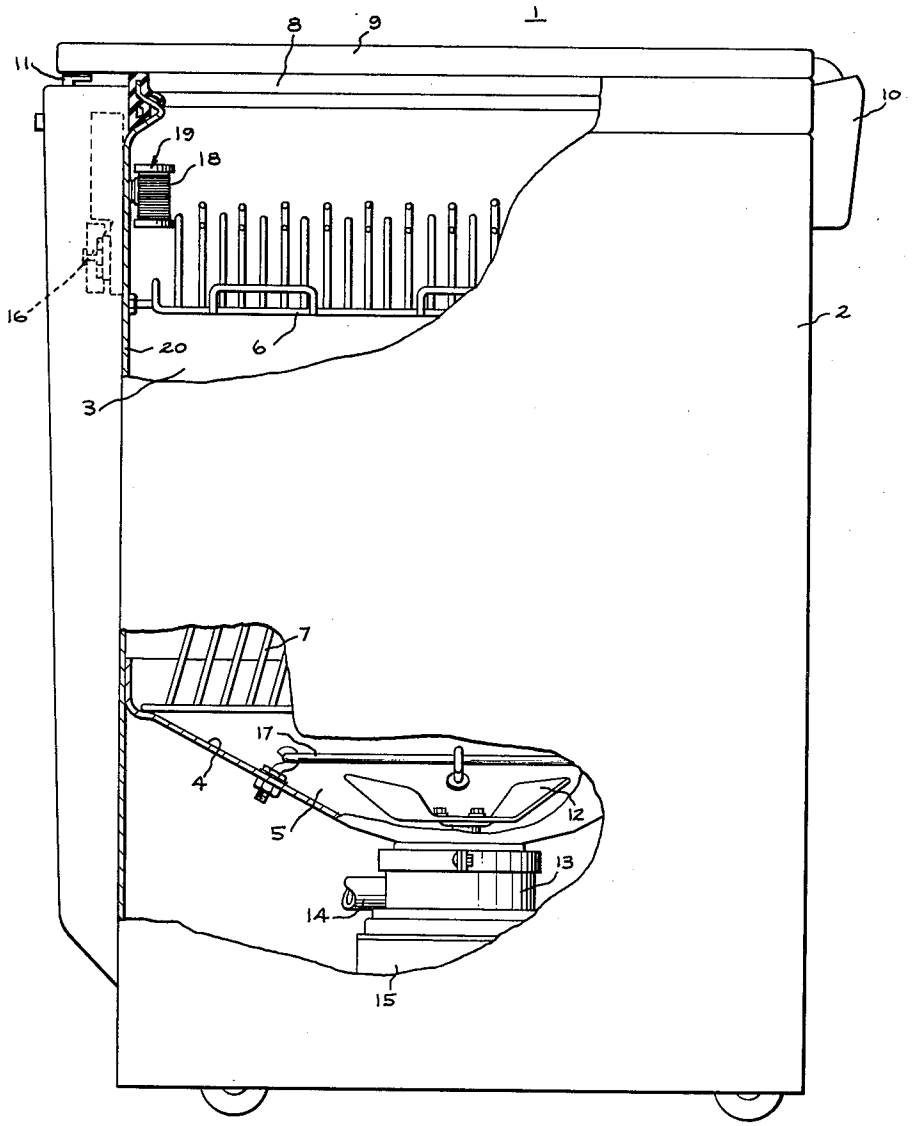
June 4, 1963 E. L. FLYNN 3,092,124

TREATING AGENT DISPENSER ARRANGEMENT

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FIG. 1



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FIG. 2

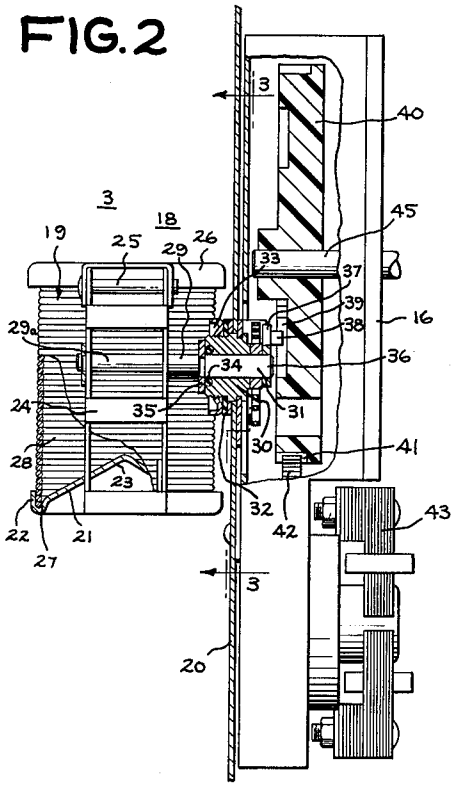


FIG. 3

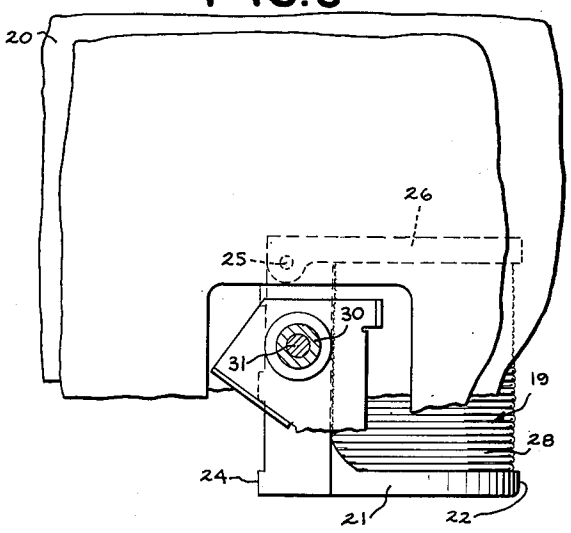


FIG. 4

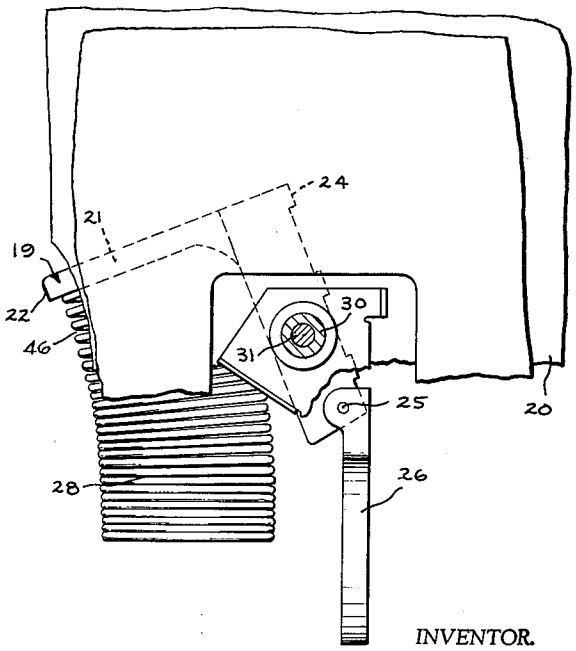
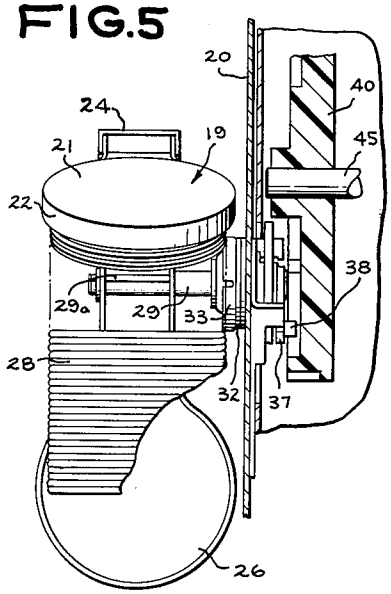


FIG. 5



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3,092,124

TREATING AGENT DISPENSER ARRANGEMENT

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5 Claims. (Cl. 134—93)

The present invention relates to a treating agent dispenser arrangement, and more particularly to such an arrangement which is particularly suited for use in appliances such as dishwashers or the like which have a substantial amount of liquid circulating throughout the washing area within which the dispensing structure is located.

It is an object of my invention to provide a dispenser which, in one position, serves to retain treating agent, and in the other position not only dispenses the treating agent but also assumes a new shape particularly conducive to effect washing by water circulation such as that which occurs in a dishwasher.

More specifically it is an object of my invention to provide a treating agent dispensing structure of the type set forth above wherein the container for the agent is made up of a solid base on which is seated a coil spring whose adjacent coils are contiguous when it seats substantially vertically on the base and which can separate in other positions of the base.

In one aspect of my invention, I provide a treating agent arrangement in which, as mentioned above, a coil spring of tubular construction is secured at one end on a base, the combined structure being held by suitable positioning means so as to be movable between first and second positions. In the first position, the base is substantially flat, with the spring extending generally vertically upwardly from it. The second position involves tilting the base, by any suitable means, to a substantial angle from the first position. The spring has a gradient such that its adjacent coils remain, as baised, contiguous to each other so as to form with the base a container when the base is in its first position. However, when the base moves to its second position at least some of the coils become seperated by gravity from each other. This is particularly conducive to permitting the interior of the container to be cleansed by circulating water within a dishwasher tub after the treating agent has been dispensed from within the container.

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

In the drawings,

FIGURE 1 is a side elevational view of dishwashing apparatus incorporating my invention, the view being partly shown in section and partly broken away so as to illustrate certain details of construction;

FIGURE 2 is a cross sectional side elevational view of the front wall of the tub of the dishwasher of FIGURE 1, showing a detergent cup within the tub and a cooperating timer mechanism supported outside the tub;

FIGURE 3 is a cross sectional elevational view taken on line 3—3 of FIGURE 2;

FIGURE 4 is a cross sectional view simliar to that of FIGURE 3, showing the detergent container in a second position; and

FIGURE 5 is a cross sectional side elevational view similar to that of FIGURE 2 showing the container in the second position.

Referring to FIGURE 1 of the drawings, there is shown a portable automatic dishwasher, generally indicated by the numeral 1, having a cabinet 2 forming an enclosed tub 3 of generally rectangular configuration, it

being understood that the tub forms the washing compartment. Tub 3 may be provided with a sloping bottom 4 which forms a sump space 5. In the interior of the tub 3 are appropriate racks, shown by the numerals 6 and 7, on which dishes to be washed may be placed, access to the interior of tub 3 being provided through the top 8 thereof when closure member or cover 9 is pivoted about hinges 10 to an open position from the closed position shown. In the closed position of cover 9, a suitable latching structure, partly shown by the numeral 11, may be provided to maintain the structure secured in the closed position until it is time for the cover to be opened, it being understood that suitable means are provided to permit opening of the cover at such time.

Liquid is supplied to the machine by any suitable means (not shown), the particular supply arrangement forming no part of the present invention. Positioned at the bottom of the tub 3 and arranged to circulate the washing fluid through the washing compartment is a rotary impeller 12. A drain pump 13 having an inlet communicating with tub 3 and an outlet connected to drain conduit 14 is supported beneath the tub, the housing of pump 13 being arranged to support an electric motor 15 which drives the impeller 12 so as to circulate fluid in the tub when rotating in one direction and to operate pump 13 so as to discharge fluid through conduit 14 when driven in the other direction. Automatic operation of the dishwasher 1 is effected by a suitable timer control assembly, shown in dotted outline in FIGURE 1 by the numeral 16 and again referred to hereinafter in connection with FIGURE 2. The control assembly controls several functions including the control of the energization of the water supply means as well as the electric motor 15.

Typically, a dishwasher of the type illustrated in FIGURE 1 is arranged to provide a plurality of washing steps, in each of which a measured quantity of water is admitted to the tub, circulated for a predetermined period of time, and then discharged from the tub in preparation for the next washing step. At the end of the complete washing operation, the dishes in the washing compartment may be dried, preferably by circulation of heated air, a heating unit such as sheathed electrical heating unit 17 being used for this purpose.

It is generally preferable not to have the washing or treating agent, such as detergent, dispensed into the machine during the first washing step, but rather to let the first washing step, and possibly an additional one, constitute rinsing steps so as to remove a substantial amount of the food particles on the dirty dishes prior to the actual chemical cleansing thereof. For this reason, it is highly desirable to have a suitable detergent dispensing structure such as that shown by the numeral 18. Preferably, the dispensing arrangement 18 is arranged so that it can retain the treating agent throughout the first one or two washing steps and then dispense it into the tub 3 for use during the second or third wash step. While the delaying of the operation of the dispensing structure may be effected in various ways, one suitable means of doing this is by use of the timer control assembly 16 and FIGURE 2 illustrates such an embodiment of my invention.

Referring now also to FIGURES 2 through 5, and more particularly initially to FIGURE 2, it will be seen that the detergent dispensing arrangement 18 is mounted with the detergent container 19 mounted within tub 3 and with the timer mechanism 16 mounted outside the tub on the other side of the front wall 20 thereof. The detergent container constitutes a most significant part of my invention, and has a base member 21 which may, as shown, be provided with an upwardly extending retaining flange 22 at its outer edge and, toward its center portion 23, may be formed as a cone. Base 21 may be formed of any suitable material such as a rigid detergent

and water resistant plastic. Rigidly secured to this base is a member 24 which extends upwardly therefrom and, at its top, pivotally supports a hinge 25 for a cover member 26 for the container 19.

Between the cover member 26 and the base 21, and secured to the base 21 by seating within the groove 27 formed by flange 22, is a tubular coil spring 28 which is formed of any suitable material such as conventional spring wire. Spring 28 has a bias and a spring gradient such that, in the position shown in FIGURE 2, that is, with the spring extending generally vertically up from base 21, the adjacent coils of the spring are contiguous to each other. As a result, they form a solid cylindrical wall so that the spring and the base together form a container within which treating agent such as detergent may be placed and will be retained. The length of the spring and the positioning of the cover 26 is such that the cover 26, when pivoted to the generally horizontal position shown, closes the top of the spring so as to form a completely enclosed compartment.

A shaft 29 having one end 29*a* secured to member 24 extends through the wall 20 in rotatable relationship thereto. Any suitable structure may be provided for effecting the rotatable passage of shaft 29 through wall 20 without leakage. In the present construction this takes the form of a bushing member 30 extending through the wall 20 and within which a section 31 of the shaft is positioned. Suitable washer means 32 are secured over the bushing within the tub, and a clamping nut 33 effects the securement of the bushing against the wall. The shaft 29 extends out of the bushing as shown, with a suitable O-ring 34 being provided to prevent moisture from leaking through the bearing of the bushing, and with a spring clip 35 being provided to hold the O-ring in place. Thus, this structure provides the desired result of rotatably supporting the shaft 29, and as a result the shaft 29 effects the support of the container structure 19 within the tub. The position of the container structure within the tub is, then, dependent upon the relative rotary position of the shaft 29 about a horizontal axis. In FIGURE 2, the structure is shown in a first position wherein it will retain treating agent placed therein as discussed above.

Still referring to FIGURE 2, in conjunction with FIGURE 3, the outermost end 36 of shaft 29 supports a lever arm 37 and a cam follower 38 in the form of a pin member for riding on a track 39 of a cam member 40. The cam member 40 is provided with external gear teeth 41 which mesh with the terminal gear 42 of a gear train driven by a standard clock motor 43.

The nature of the structure driving shaft 29, including the cam 40 as driven by the motor 43, is such that the shaft 29 is maintained in the position of FIGURE 2 during as many preliminary rinsing and draining operations as are desired. Then, when the washing operation is being provided and the instant for dispensing the detergent has arrived, the structure is effective to cause a sudden rapid rotation of the shaft 29 through an appropriate angle, generally within the 90°–270° range, and in this particular case 130°. In effect, what happens is that the detergent container 19, through rotation of the shaft 29, is moved from the position shown in FIGURES 2 and 3 to the position shown in FIGURES 4 and 5. To maintain clarity as to my invention the precise cam structure and mechanism for effecting this movement is not described herein in detail, many such arrangements being available. For instance, application Serial No. 31,760, filed May 25, 1960, by Donald S. Cushing for Detergent Cup Trip Mechanism, and assigned to General Electric Company, assignee of the present invention, discloses in full and claims a camming and motivating structure suitable for my purposes.

Referring to FIGURES 4 and 5, it will readily be seen that, in the second position, the base has moved away from its original position and has been rotated so that the spring 28 now extends at a very substantial angle from its first position. The calibration of the spring is such that in this position there is some spreading of the coils of the spring (as shown at 46 in FIGURE 4) as a result of the force of gravity acting on the weight of the spring. As an example, a spring 1⅞ inches long which opens to 5 inches in response to a two-ounce force and to ten inches in response to an eight-ounce force has been found to be entirely suitable for this purpose and to perform in this manner when subjected to the type of movement shown.

Another result of the movement from the position of FIGURES 2 and 3 to the position of FIGURES 4 and 5 is that the hinged lid 26 now also reacts to the force of gravity by falling to an open position as shown. As a result of the movement to the second position the treating agent falls out of the dispenser because of the force of gravity. In addition, any sticking of a powder type treating agent will tend to be inhibited by the movement of the coils relative to each other, i.e., the coil movement tends to break up the caked or packed material and make it also pass out of the detergent container as desired.

In addition, there is the factor that a substantial amount of water is being circulated and this water may effect a cleansing action on the interior of the container because of the separation of the spring coils as shown at 46. In other words, this separation of the coils actually permits water to pass into the interior of the container through the walls thereof when the container is in its second position, and thus a clean condition of the interior of the container is always insured.

This cleansing action is further enhanced by the fact that any detergent or other treating material remaining stuck to the interior of the container near the top thereof (where the coils may not separate because of gravity) will be subject to the cleansing influence of the water entering through the coils separated at 46. Further, the increased weight which may result from sticking of detergent within the container will tend to cause separation of the coils near the base to an increased extent. Thus, automatically in response to a greater amount of detergent stuck within the container a greater amount of cleansing action is provided to clean the container out.

A further advantageous feature is obtained by the very rapid movement of the container 19, from the first position of FIGURES 2 and 3 to the second position of FIGURES 4 and 5, which is provided by the structure of the aforesaid Cushing application. Because of the force, resulting both from the acceleration and from centrifugal action, which acts on the spring during its movement from the first position to the second position, the coils of the spring tend to be distended during this movement to a much greater extent than at any other time. Therefore, the unsticking of the detergent and the effective removal of the detergent from the container is very easily effected.

In summary then, the container structure shown and the movement thereof effect retention of treating agent when the container is in its first position, as shown in FIGURES 2 and 3, and permit dispensing of that treating agent when positioned as shown in FIGURES 4 and 5. In addition, there is the significant advantage that there is an actual opening of the walls of the container so as to permit washing out thereof by the water circulated by impeller 12.

While I have shown and described a specific embodiment of my invention, I do not desire the invention to be limited to the particular construction disclosed, and I intend by the appended claims to cover all modifications within the true spirit and scope of my invention.

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

1. A dispenser arrangement comprising:

(*a*) a base;

(*b*) a coiled spring of tubular construction secured at one end to the base;

(c) positioning means for holding said base in a first position substantially flat with said spring extending substantially vertically upwardly from said base and in a second position at a substantial angle about a horizontal axis from said first position;

(d) moving means for moving said positioning means from said first position to said second position; and

(e) said spring having its adjacent coils contiguous so as to form with said base a container when said base is in its first position, at least some of said coils becoming separated by gravity when said base is in its second position.

2. The apparatus defined in claim 1 wherein a lid is mounted at the end of said coil spring remote from said base, said lid being arranged to close said remote end of said spring in its first position and to move to open position by gravity when said base is in its second position.

3. The apparatus defined in claim 1 wherein said base in its second position is between 90 and 270° removed from said first position about a horizontal axis.

4. The apparatus defined in claim 1 wherein said moving means provides rapid motion from said first position to said second position to provide increased coil separation during said motion.

5. A dishwasher comprising:

(a) a tub;

(b) means for circulating water within said tub; and

(c) a dispenser arrangement comprising a base within said tub, a coiled spring of tubular construction secured at one end to said base, positioning means for holding said base within said tub substantially flat with said spring extending substantially vertically upward from said base and in a second position at a substantial angle about a horizontal axis from said first position, and moving means for moving said positioning means from said first position to said second position; said spring having its adjacent coils contiguous so as to form with said base a container when said base is in its first position, at least some of said coils becoming separated by gravity when said base is in its second position whereby the water circulated by said circulating means may enter between said coils to cleanse the interior of said spring and to cleanse said base.

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