April 6, 1943. G. M. BADER 2,315,890

DETERGENT DISPENSING DEVICE

Original Filed Dec. 8, 1939 2 Sheets-Sheet 1

Fig. 1.

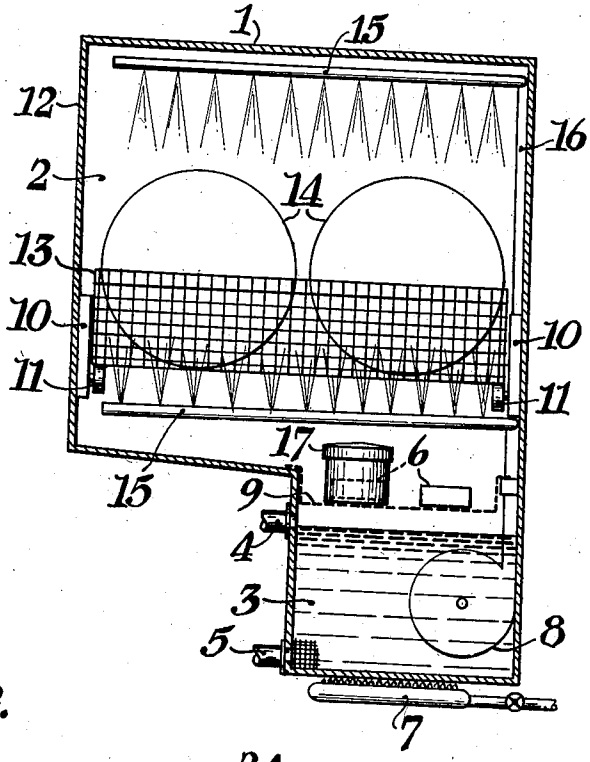


Fig. 2.

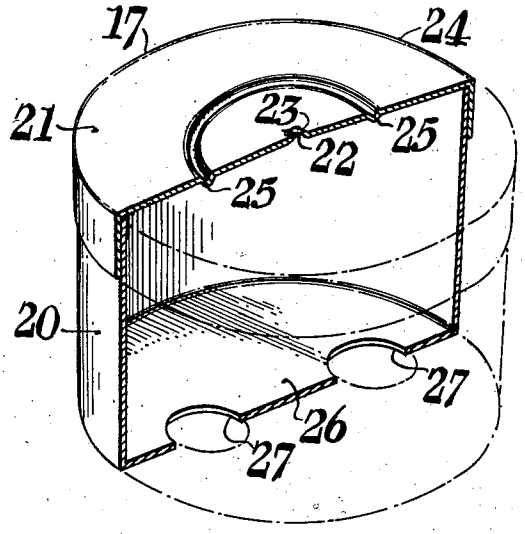
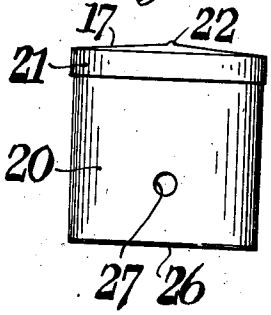


Fig. 3.



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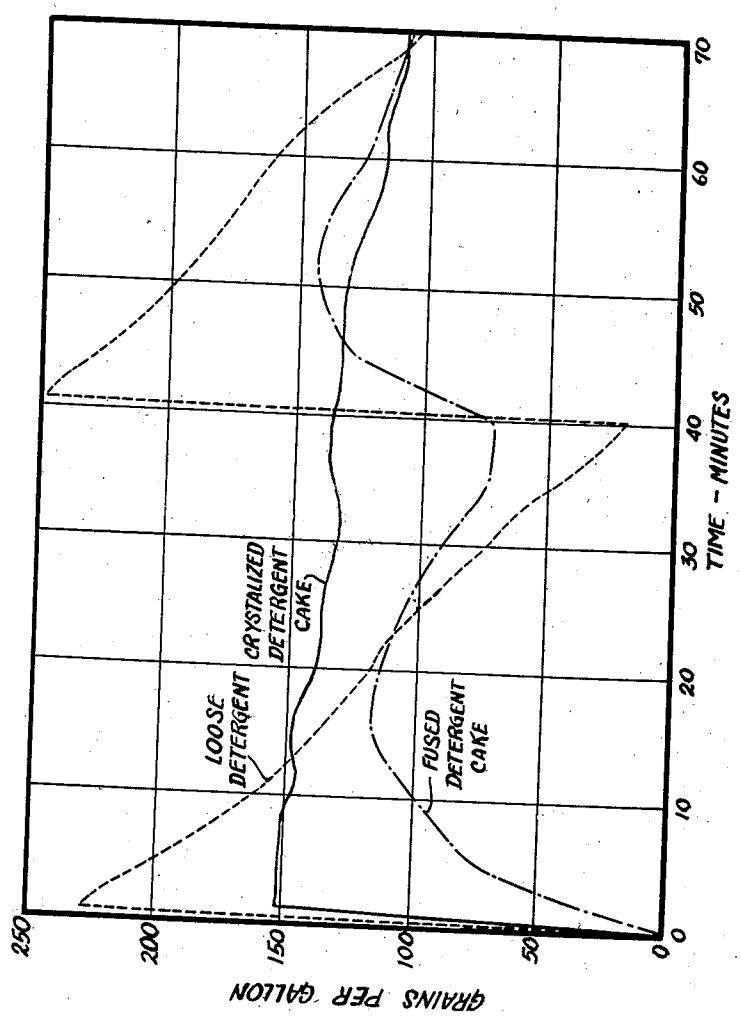


Fig. 4.

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UNITED STATES PATENT OFFICE

2,315,890

DETERGENT DISPENSING DEVICE

Glenn M. Bader, Rochester, N. Y.

Original application December 8, 1939, Serial No. 308,266. Divided and this application June 10, 1940, Serial No. 339,834

2 Claims. (Cl. 141—9)

My invention relates to dispensers for detergents and the application thereof, and more particularly to their use in washing operations.

In the use of alkali detergents, it has heretofore been the practice to form dry mixtures of detergent materials which would be poured into the washing water. This practice has proven most unsatisfactory due to exceptionally fast dissolving of the detergent material and the failure thereof to maintain the wash water at a uniform strength over a period of time. In addition, it is practically impossible to retain the wash water at uniform strength, as the material has to be added to the water by attendants who merely pour a scoopful of varying quantities into the water periodically. Likewise, considerable loss of the granular material has resulted, particularly in restaurants and the like, due to careless handling and particularly in transportation from the storage receptacle to the washing apparatus. Furthermore, this granular material is subject to considerable deterioration due to absorption of moisture and the like.

Many attempts have been made to overcome the defects of the above described practices by the formation of detergent materials in cakes. Cakes have been supplied to the washing solution per se and have also been placed openly beneath the spray in spray-type machines, but this treatment permits the cakes to dissolve too fast. In addition, they have been placed in various types of dispensers but these dispensers have proved unsatisfactory due to the fact that the cakes therein are dissolved unevenly so that there was not a steady, even supply of detergent material supplied by the dispenser.

Having in mind the defects of the prior art devices, it is an object of my invention to provide a detergent dispensing unit that may be easily and cheaply produced, and yet, withstand hard usage, but, nevertheless, provide a uniform dispensing of the detergent materials contained therein.

The foregoing object and others ancillary thereto I prefer to accomplish as follows:

In using a fast dissolving detergent in the cake form, for instance such as that described in my copending application Serial No. 308,266, filed December 8, 1939, in a spray type automatic dishwashing machine, a cake may be placed on the tray or screen, and due to its ability to readily dissolve, the water softening and deterging properties will be supplied within two minutes. By the placing of another cake in a suitable dispensing container within the machine where it is subject to the spray, the solution will be maintained at a substantially uniform strength. I have found that the most satisfactory dispenser is in the form of a relatively simple container having a small hole in the top to admit a small amount of spray, and a pair of holes in the bottom to permit the discharge of the admitted spray and dissolved material. As the spray enters the dispenser it contacts the detergent cake contained therein, partially disintegrating the cake, and drains out of the discharge holes bearing detergent material to compensate for the amounts of material consumed in the solution during wash operations. The top of the container may slope away from the inlet hole to prevent water running freely therein.

The novel features that I consider characteristic of my invention are set forth with particularity in the appended claims. The invention itself, however, both as to its organization and its method of operation, together with additional objects and advantages thereof, will best be understood from the following description of specific embodiments when read in connection with the accompanying drawings, in which:

Figure 1 is a diagrammatic view of a vertical cross-section through a spray type automatic washing machine including two detergent cakes which may be embodiments of my invention, one of said cakes being located within my simplified type of dispensing unit;

Figure 2 is a cross-sectional view in perspective of my simplified container for dispensing my new detergent material;

Figure 3 is a view in elevation of a modified form of container for dispensing my new detergent material; and

Figure 4 is a graph showing the alkalinity of the wash water in a 15 gallon capacity dishwashing machine, the graph showing the results obtained by the use of an embodiment of my invention with fast dissolving crystallized detergent cakes.

Mechanical dishwashing may be simplified to the degree of becoming practically fool-proof by the use of small fast dissolving crystallized cakes of solid detergent. Cakes may be produced of a size to properly charge the cleaner tank of a mechanical spray type dishwashing machine, that is, to soften the water and provide sufficient alkalinity and washing power. Consequently the operation becomes substantially automatic and practically eliminates the judgment of the machine operator, whereby careless waste and the varying quantities of material at each run are

eliminated. One of the cakes placed inside the machines will dissolve in 45–50 seconds in water of 145–130° F. A cake dissolving this quickly will provide sufficient washing strength by the time the operator is ready to introduce his first lot of dishes to the machine. To maintain sufficient washing strength during the entire washing period, one or more of the cakes may be placed inside a suitable container within the machine that will allow the solution to dissolve some of the cake material and thereby keep the solution within washing limits.

In the drawings I have illustrated the manner in which fast dissolving crystallized solid cakes may be employed to produce a suitable washing solution in connection with a typical dishwashing machine, diagrammatically illustrated. A complete description of a suitable fast dissolving crystallized detergent cake and a method for making same may be found in my co-pending application Serial No. 308,266, Filed December 8, 1939, from which this application has been divided. Referring to Fig. 1 of the drawings, the machine may be enclosed within a housing 1 having an entry at one end and an exit at the other. The housing 1 is divided into a large upper washing chamber 2 and a lower reservoir compartment 3 which is reduced in size. This reservoir compartment is provided with a water inlet 4 and an outlet 5. Hot water may be supplied and the temperature maintained by a burner 7 positioned under the reservoir compartment 3. A pump 8 is located within the reservoir 3 which may be driven by any suitable source of power.

A wire grating 9 separates the reservoir 3 from the washing chamber 2 and the detergent cakes 6 are placed thereon, as will be more fully discussed hereinafter. Racks 10 extend along the side walls 12 of the washing chamber 2 and are adapted to receive wire baskets 13 or other suitable containers filled with soiled dishes 14 or the like. These racks are provided with a series of rollers 11 for movably supporting the baskets 13 so that they may be readily moved along the length of the washing chamber 2. Elongated spray nozzles 15 are located in the top and bottom of the washing chamber 2 so that the baskets 13 may pass therebetween. The spray nozzles 15 are connected to the pump 8 by a conduit 16.

As mentioned above, the detergent cakes 6 are placed on the grating 9 located between the washing chamber 2 and the reservoir 3. Actual practice has disclosed the fact that two detergent cakes can be arranged to provide and maintain a very constant and efficient solution. One of these cakes 6 is placed openly on the grate so that it may be immediately subjected to the spray and heat, whereupon it will quickly disintegrate and disperse through the water to form an efficient washing solution. The other of the cakes 6 may be located within a dispensing container 17 so as to gradually supply additional detergent to maintain the solution at a substantially constant alkalinity.

The dispenser 17, which is best shown in Fig. 2, comprises a body portion or housing 20 which is large enough to receive one of the cakes 6, and a cover 21. The cover 21 has a very small hole 22 in the center thereof to admit spray, and the surface of the cover 21 may be slightly conical in shape and may taper downwardly from the rim 23 of the hole 22 to the outer edge 24 of the cover 21. This construction is preferred so that water cannot accumulate on said cover 21 and/or flow through said hole 22. The rim 23 of the hole 22 may be turned up slightly, if desired, to insure against the flowing of water through the hole 22 so that only water directly entering the hole 22 may pass therethrough. As it has been found that the water that enters the container 17 has a tendency to flow down the inner walls instead of dropping directly into the container, it is preferred to provide a drip ring 25 on the under side of the cover 21. This ring may be formed in any desired manner as by stamping a downwardly extending ridge in the cover 21. Any water that starts to flow down the inner walls of the cover 21 will be stopped by this ring 25 and will thus drip down into the container body 20.

The body portion 20 of the dispenser 17 may be a perfectly round container having a bottom 26 which is provided with a plurality of dispensing apertures 27. In the majority of instances it has been found more desirable to have these apertures 27 in the bottom 26 of the body portion 20, as shown in Fig. 2. Under certain extreme conditions, however, it has been necessary to have the dispensing apertures 27 located in the side walls of the body portion 20 and spaced from the bottom 26, as illustrated in Fig. 3. In addition, this latter structure is more suitable if it is desired to use a ground product.

The operation of my method should be readily understood in view of the foregoing description. As the machine is started, the outlet 5 to the reservoir 3 is closed and hot water of the desired temperature is admitted through the inlet 4. The water is then circulated through the machine by the pump 8 which forces the water through the conduit 16 to the spray nozzles 15. As the water is sprayed from the nozzlese 15, it flows from the washing chamber 2 back to the reservoir 3 through the grate 9, enveloping the detergent cake 6 which is openly mounted on said grate 9. This detergent cake 6 is attacked both by the moisture and by the heat, so that it rapidly disintegrates and drips down into the water in the reservoir 3 to form a highly efficient washing solution. As the water is recirculated through the system by the pump 8, the detergent material is thoroughly dispersed therethrough. The cake 6 is of a suitable size to properly treat the water to quickly form a washing solution having the desired properties.

Simultaneous with this action, a restricted amount of spray enters the dispenser 17 to attack the second cake 6 which is contained therein. Due to the construction of the entrance hole 22 in this cover 21, only a very small amount of spray is admitted. The spray has to pass directly through the aperture 22 to gain admittance, in view of the fact that moisture is not permitted to accumulate on the cover 21 of the dispenser 17 and/or to drain through said aperture 22. Consequently the disintegration of the second cake 6 within the container is due to the very small amount of moisture which gains admittance into the dispenser 16 serving as a transporting medium for small amounts of detergent material to replenish that which has been used in the solution, and thereby maintain the solution at a relatively constant strength. The speed of the replenishing action can be somewhat varied by changing the size of the aperture 22 in the dispenser 17. The arrangement should be such that the supply of additional small amounts of detergent material is started at the proper time to maintain the solution at a relatively constant strength.

Upon the disintegration of the first cake 6 which is openly mounted upon the grate 9, the

solution has gained substantially the maximum strength, and the baskets 13 containing the soiled dishes 14 or the like may be placed in the washing chamber 2 on the movable supporting racks 10. As these baskets 13 are moved into the chamber 2, they are subjected to the spray of the washing solution from both the top and bottom by the nozzles 15. The solution then drains therefrom, back into the reservoir 3 to be recirculated, meanwhile small amounts of spray finding their way into the dispenser 17 to act upon the second detergent cake 6 and thereby maintain the solution at a relatively constant strength. While this process has been described as relating to dishwashing machines it is evident that the same process may be employed in other types of machines for washing bottles, glasses, cans, and other containers and the like.

A fast dissolving solid detergent is a decided improvement over loose material or the slow dissolving fused or pressed detergent cakes for mechanical dishwashing. Tests made in a mechanical dishwasher, as described hereinbefore, using a fast dissolving solid detergent, disclosed the fact that maximum alkalinity can be obtained after 45 seconds when using water at 145° F. The resulting solution provided maximum washing conditions substantially at the start of the run. Loss of detergent power may be readily compensated for by following the method outlined above so as to maintain approximately the starting strength of the solution throughout the operation.

The graph shown in Fig. 4 illustrates the results obtained through the use of fast dissolving crystallized detergent cakes handled according to my method in a spray type dishwashing machine, in contrast to the results obtained through the use of loose detergents or the slow dissolving cakes under identical conditions. It has been found in the use of cakes that if the machine is started and one of the cakes is placed on the tray or screen, by the time the operator has enough dishes ready to wash, the maximum solution strength is reached. It may be seen that during washing the uniformity of solution strength is maintained relatively constant and is greatly improved over the other methods. It is to be noted that the use of slow dissolving cakes in the above described manner will not render the same satisfactory results due to the fact that the wash solution will require several minutes to gain maximum strength.

Although I have shown and described certain specific embodiments of my invention, I am fully aware that many modifications thereof are possible. My invention, therefore, is not to be restricted except insofar as is necessitated by the prior art and by the spirit of the appended claims.

This application is a division of application Serial No. 308,266, filed December 8, 1939 by the present applicant.

I claim:

1. A dispensing unit for housing and controlling the discharge of alkaline detergent material, said unit being adapted to be subjected to the moisture within a washing machine, which comprises a container having a small opening in the top thereof, the rim of said opening being raised above the surface of said top, whereby to limit the amount of moisture entering said container to contact and promote disintegration of the cake therein to form a concentrated solution, and dispensing apertures in said container below the top thereof, whereby to discharge said concentrated solution to said washing solution.

2. A dispensing unit for housing and controlling the discharge of alkaline detergent material, said unit being adapted to be subjected to the moisture within a washing machine, which comprises a container having a small opening in the top thereof, the rim of said opening lying above the surface of said container, whereby to limit the amount of moisture entering said container to contact and promote disintegration of the cake therein to form a concentrated solution, a drip ring depending from the top into said container, said ring being concentric with said opening and spaced a substantial distance therefrom to distribute the drippings from said ring over a relatively large area of said container, and dispensing apertures in said container below the top thereof, whereby to discharge said concentrated solution to said washing solution.

GLENN M. BADER.