April 4, 1961 R. V. KLINT 2,977,963

DISHWASHER AND WATER DISTRIBUTOR THEREFOR

Filed Oct. 25, 1957

Fig. 1.

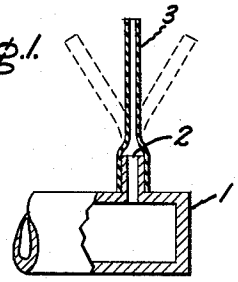


Fig. 2.

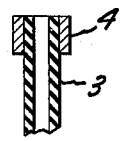


Fig. 3.

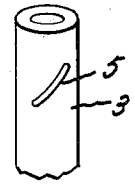


Fig. 4.

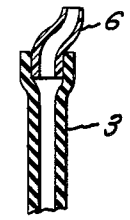


Fig. 5.

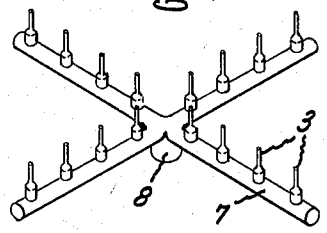


Fig. 6.

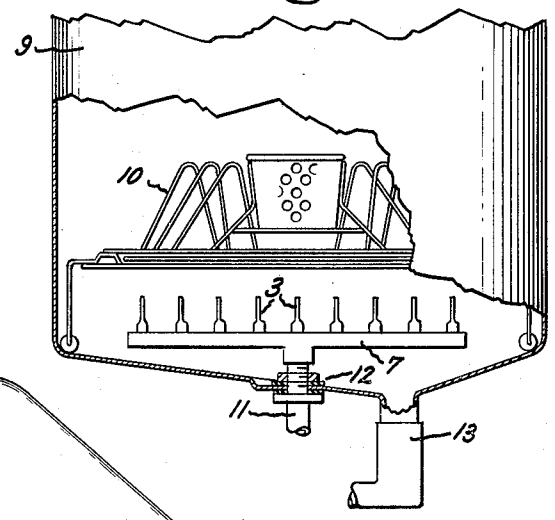
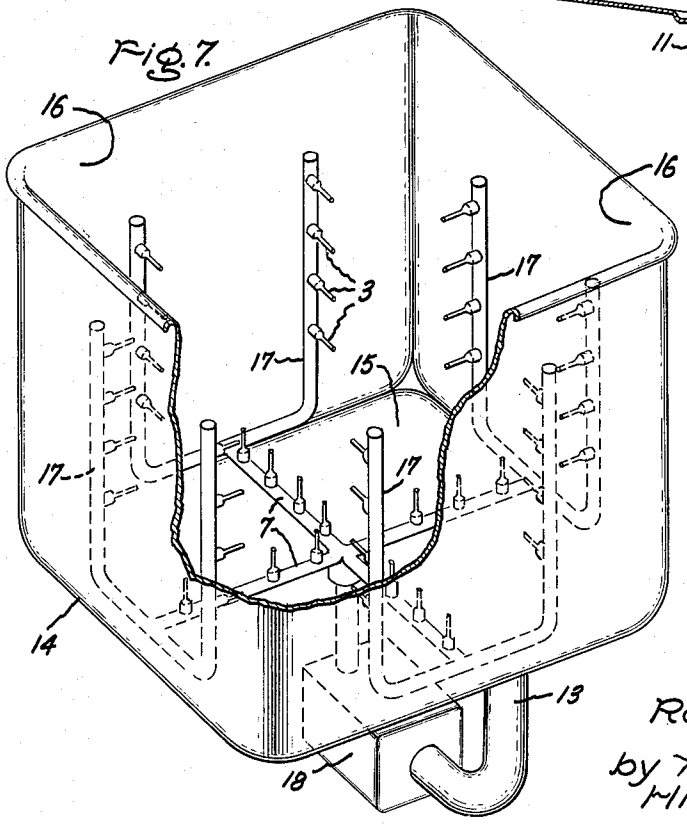


Fig. 7.



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DISHWASHER AND WATER DISTRIBUTOR THEREFOR

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1 Claim. (Cl. 134—179)

This invention relates to water distributors in dishwashers and other related apparatus, and more particularly, to a method and apparatus by means of which water sprays may be directed as required to all areas of the washing machine.

Dishwashers and other apparatus designed to wash or otherwise clean individual articles are generally required to be provided with some means to direct a stream of wash-water over all of the articles which may be randomly placed or stacked within the washing machine in order to obtain a certain degree of cleanliness. Heretofore, the distributor means have generally taken the form of mechanical devices, including variable, rotatable, or swivel type of nozzles which are in constant motion and direct a washwater spray in various directions. One of the inherent disadvantages in this type of water distributor is not only the relative expensiveness of the plurality of parts which make up a rotatable nozzle, but also the provision of lubrication and bearings for the moving parts. Another form of distributor heretofore used is the permanent positioning of a plurality of nozzles in the walls of the washing machine. This method also contains the economic disadvantage of the requirement of a large number of nozzles to provide the desired coverage. An economical and simplified device for providing fluid sprays which would cover the required area appears to be quite a desirable feature in increasing the efficiency of the modern type dishwasher and reducing the overall cost thereof.

Accordingly, it is an object of this invention to provide an improved water distribution device for dishwashers and related apparatus.

It is another object of this invention to provide an economical apparatus for water distribution within washing apparatus.

It is also an object of this invention to provide a varidirectional water spray nozzle having no parts moving relative to one another, such as bearings and the like.

It is a still further object of this invention to provide full spray coverage of the areas required in a washing apparatus with a minimum number of nozzles.

Briefly described, in one form of this invention, a plurality of short flexible tubes are affixed in fluid flow relationship to a common water chamber or manifold. Upon the introduction of water into the manifold at a sufficient pressure, water is caused to issue from the flexible conduits in such a manner that the conduits move about, vibrate, or oscillate in diverse motions to provide a fluid spray which covers large and broken areas not normally accessible by a single fixed nozzle.

These and other objects and advantages of this invention will be better understood when taken in connection with the following description and the included drawings, wherein:

Fig. 1 is a sectional view of a single nozzle in accordance with this invention;

Fig. 2 discloses a modification of Fig. 1 wherein a weight is used for control purposes;

Fig. 3 discloses a further modification of Fig. 1 wherein an additional opening is used for control purposes;

Fig. 4 discloses a still further modification of Fig. 1 employing an additional nozzle for control purposes;

Fig. 5 discloses an assembly including the invention of Fig. 1;

Fig. 6 discloses a dishwasher using the assembly of Fig. 5; and

Fig. 7 discloses a dishwasher using a modified assembly of Fig. 5.

Fig. 1 illustrates an embodiment of this invention in the form of one of the plurality of nozzles utilized in this invention. In Fig. 1, 1 represents a conduit or manifold having an extension or nipple 2 thereon. A short section of flexible tubing or conduit 3 is positioned adjacent and surrounding the nipple 2 and in concentric relationship thereto. The conduit 3 may be stretched to be positioned over the nipple 2 and, if necessary, joined thereto by suitable affixation means or cementing to prevent separation therefrom. The internal diameter of the nipple 2 and tube 3 is made smaller than the internal diameter of the conduit 1 in order that a suitable pressure build-up may be maintained within the flexible tube 3. When water is introduced into the conduit 1 under pressure, it is caused to flow upwardly through nipple 2 and into the flexible conduit 3 which commences a series of oscillating motions which may be described as a thrashing movement, spreading the water in apparently all directions. The particular thrashing movement of the flexible nozzle varies with the individual nozzle being employed and the pressure in the conduit. It has been observed that some nozzles will oscillate to the extent of 270 degrees, or to rotate, or to randomly thrash about or a combination of all such motions.

A specific example of this invention included a manifold of approximately 1 inch tubing and about 15 inches in length with the nipples 2 being approximately ⅛ inch inside diameter. The flexible tubing 3 consisted of rubber tubing of about 1/16 internal diameter, about 1/16 wall thickness and approximately 2 inches long. The rubber tubing was pushed over the nipple 2 and when water was introduced at about 20 p.s.i. to the tubes, thrashing or vibrating movements of the flexible tube commenced. Upon examination with a stroboscopic light, the frequency was noted to be on the order of 30 through 60 cycles per second.

Various modifications may be utilized to increase or decrease or otherwise control the thrashing movement of the nozzles as disclosed in Fig. 1. Referring now to Fig. 2, there is disclosed in partial section a flexible tube 3 having a weight 4 at the free end thereof. Weight 4 may take the form, as illustrated, of an annular member of metal or other material, including an enlarged, thicker portion of tube 3, of a predetermined weight, and affixed to the free end of the flexible tube 3. While weight 4 is shown as not interfering with the fluid flow from the flexible conduit 3, it is contemplated that weight 4 may take the form of a nozzle in the flow channel of flexible conduit 3, and the combination thus provides not only a nozzle action to control the particular type of spray, but also causes the flexible conduit 3 to commence a rotational movement for better fluid distribution. Additionally, it is understood that a weight on the free end of the flexible conduit 3 accordingly affects the rate of motion of the free end proportional to a predetermined water pressure.

Additional or modified rotation of the flexible tube may be obtained by the modification disclosed in Fig. 3. In Fig. 3, there is shown a partial section of a flexible conduit 3 having a slit 5 near the free end thereof. The angle of the slit 5 relative to the vertical axes of the flexible conduit affects the rate of rotation of the flexible tube due to the nozzle effect of water escaping through the slit.

Still another modification of motion control as applied to the flexible conduit of this invention is illustrated in Fig. 4 which shows a partial section view of a flexible tube 3. Flexible tube 3 has joined in fluid flow relationship to the free end thereof an angled or otherwise curved or offset nozzle member 6. It is understood that the flexible tube 3 itself may be made in accordance with the curvature of the nozzle element 6, or as illustrated, a particular nozzle element 6 may be joined to the flexible tube 3. Depending upon the curvature or angle of the flexible nozzle 6, a controlled motion of the flexible tube 3 may be obtained.

The nozzle apparatus as disclosed in any of the Figs. 1 through 4 may be utilized to obtain highly efficient and randomly dispersed fluid streams in a conventional dishwashing apparatus. When employed in such a dishwashing or other related washing apparatus, a plurality of these nozzles are affixed to a conduit or manifolding of the desired configuration. Fig. 5 discloses one form of manifolding incorporated in this invention and shows a conduit or manifold 7 in an X or cross-configuration, being supplied with water by a central inlet 8. A plurality of flexible tubes 3 are mounted in spaced apart relationship along the X member.

Referring now to Fig. 6, there is shown a conventional washing machine comprising generally a tub or casing 9 having a suitable framework or bracket 10 utilized to receive the articles to be washed. Below the bracket or framework 10 there is positioned the manifold assembly as illustrated in Fig. 5 with the plurality of nozzles 3 directed upwardly therefrom. The manifold assembly is mounted in the casing 9 by means of a pipe or other conduit 11 which leads to a source of water (not shown), and which incorporates the necessary seals 12 between the pipe and the casing 9 to prevent water leakage therebetween. A suitable drain 13 is provided in the bottom of the casing 9 to carry off the wash water and the foreign particles obtained from the cleaning of the articles to be washed.

It may be seen that when the illustration of Fig. 6 is taken in connection with the description given for Figs. 1 through 5, there is provided a plurality of streams of wash water which are directed by the thrashing movement of the nozzles 3 into substantially all directions required for efficient cleaning of articles contained on the bracket 10.

A still more efficient type of dishwashing apparatus, wherein the articles to be washed may contain hollow chambers such as cups, bowls, and other related china, is illustrated in Fig. 7. Referring now to Fig. 7, there is disclosed a dishwasher, tub or casing 14 which incorporates a plurality of manifolds 17 and related flexible nozzles 3 along both the bottom surface 15 and the wall surfaces 16 thereof. In Fig. 7 the particular configuration of the manifolds is that of a U-shape manifold 17 for each of the four walls and the U's being interconnected at the bottom by the X type of manifold disclosed in Fig. 5. This arrangement provides the dispersion of fluid streams in substantially all directions required for the proper cleaning of not only flatware articles, but also articles having hollows or cavities therein. It is to be understood that the particular manifold configurations are not restrictive to this invention, and may take the various shapes to be positioned along the wall surfaces and/or

the bottom surfaces of a casing or tub in suitable directions which may provide a required fluid stream dispersion. It is also to be understood that this invention is equally applicable to the type of washing machine where the wash water may have means for the addition of a suitable soap solution or detergent before emission from the nozzle, or where the basket or tub 14 contains a sump and a pump by means of which the wash water may be recirculated. These elements are generally illustrated by numeral 18 which is inclusive of the well known devices for sequentially timing, mixing and recirculation filtering, and the like.

This invention, therefore, contemplates the employment of a manifold assembly in a conventional dishwashing or other washing apparatus. The manifolding assembly is supplied with a series of flexible tube nozzles affixed thereto which vibrate, oscillate, and/or rotate when water issues therefrom under a predetermined pressure, and there is thus provided streams of wash water either containing a detergent or not, which project into substantially all areas of the washing machine which require streams of water for the effective and efficient cleaning of articles therein. Additionally, it is to be understood that the flexible tubes 3 of this invention may be applied to the well known rotating type of nozzle for increased area coverage.

While other modifications of this invention and variations of apparatus which may be employed within the scope of the invention have not been described, the invention is intended to include all such as may be embraced within the following claim.

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

An improved dishwasher and the like washing apparatus comprising in combination, a tub adapted for the placing of articles to be washed therein, and a plural moving stream washwater sytem for said tub, said system including a manifold conduit along the bottom of said tub and extending adjacent the inner side surfaces thereof, a series of short flexible tubes attached to said manifold along the length thereof at the bottom of said tub and upwardly directed, a series of short flexible tubes attached to said manifold along the length thereof adjacent the inner side surfaces of said tub and inwardly directed, said tubes being about 2 inches in length, means introducing washwater through said manifold under a predetermined pressure to cause said tubes to oscillate in the range of about 60 cycles per second to direct streams of water in diverse direction so that the articles to be washed are exposed to plural washwater streams from the bottom of said tub and plural washwater streams from all sides of said tub, and means on some of said tubes to affect and control oscillations thereof.

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