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SPRAY SPOUT FOR USE IN A DISHWASHING MACHINE

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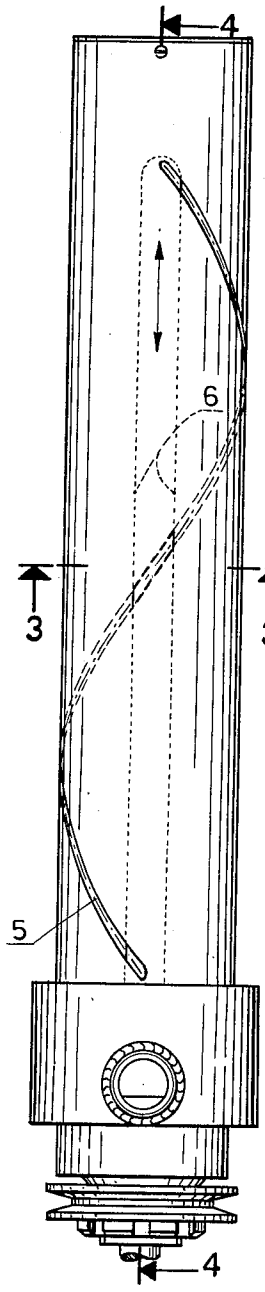


Fig. 2

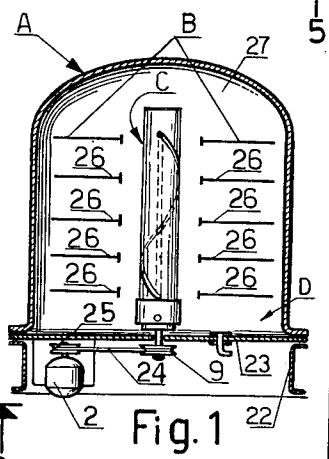


Fig. 1

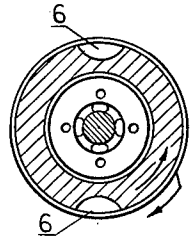


Fig. 3

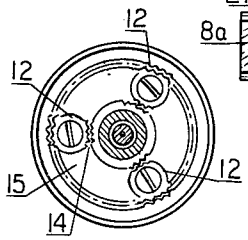
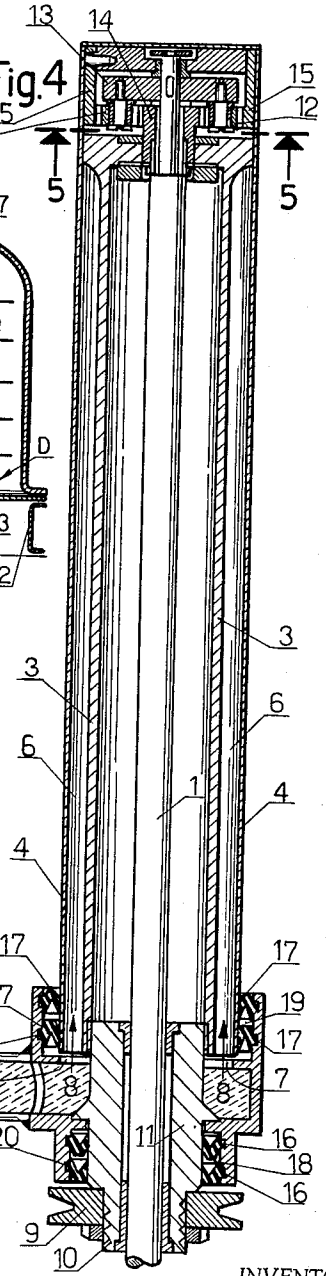


Fig. 5

Fig. 4



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SPRAY SPOUT FOR USE IN A DISHWASHING MACHINE

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The present invention relates to a spray device for a dishwasher.

It is known that present-day dishwashers have a perfectly tight housing in which the dishes to be washed are placed and that the washing is performed by water jets impinging on the dishes.

It also is known that such dishwashers are subject to drawbacks.

One drawback arises from the fact that the water jets are not strong enough and are not able to strike the insides of objects to be washed. Very often the cleaning water strikes the inside and outside surfaces of dishes, etc., only on the rebound. It also should be noted that the water jets generally are sprayed on the dishes by gravity and this explains the poor cleaning efficiency.

In addition, the water jets are not directed in a sufficient variety of directions to strike the dishes from every possible angle so as to perform a thorough cleaning.

It is an object of this invention to overcome the drawbacks above mentioned by using in a dishwasher a spray device that is practical and useful and is less expensive than existing ones.

These and further objects of the invention are achieved by employing in a dishwasher, of the type including an outer water tight housing and a series of dish holding racks, a spray device which essentially includes at least two coaxially and relatively rotatable elements that are provided with means which, by their relative motion, eject one or more movable water jets, issuing concurrently, in several directions and at several heights, said directions being cyclically variable, the inside element constituting at least a chamber with a supply of water under pressure.

In an embodiment of the present invention, the spray device consists of two coaxial cylinders, vertically mounted and rotating at different angular velocities, this including opposite directions of rotation, and located at the center of the dishwasher. On the exterior of the inner cylinder there is provided at least one groove, i.e., passageway, coincident with a generatrix of the inner cylinder. Said groove connects the inner cylinder containing the water with the outside cylinder in which there is provided a helical slot of constant or variable pitch so that due to the relative motion of the two cylinders several jet issuing orifices are defined at continually varying heights and radial locations, said orifices constituting those portions of the groove and slot that, at any moment are in common, i.e., superimposed.

Thus the dishes to be washed (radially arranged in the dishwasher housing) are struck by the water jets as the latter are variously oriented and disposed at varying heights.

The invention now will be described with reference to a preferred embodiment, given as an example only and shown in the accompanying drawings in which:

FIG. 1 shows the dishwasher in a vertical sectional view to a reduced scale;

FIG. 2 shows on a larger scale an elevational view of the spray device only;

FIG. 3 shows a sectional transverse view taken along the line 3—3 of FIG. 2;

FIG. 4 shows the spray device of FIG. 2 in a longitudinal sectional view, the same being taken along the line 4—4 of FIG. 2; and

FIG. 5 shows a sectional transverse view taken along the line 5—5 of FIG. 4.

Referring to the accompanying drawings, A indicates the dishwasher housing (FIG. 1). B denotes the racks. C is the spray device that issues the water jets in several directions. A vertical shaft 1 constitutes a journal and supports the gears that transmit rotation of a motor 2 to an inner cylindrical element 3 and to an outer cylindrical element 4, both rotating but in opposite directions.

The shaft 1 also supports the outer cylindrical element 4 which latter consists of a hollow metal tube provided with a slot 5 connecting the interior to the exterior of the tube, said slot being in the shape of a circular helix of 360° length (FIG. 2).

The inner element 3 consists of a hollow cylinder ensheathed by and in rotatable contact with the outer element 4. Said inner element is formed with two external longitudinally extending grooves 6 (passageways) on diametrically opposite sides of its external side surface, the grooves running for substantially the full height of the element 3.

As mentioned earlier, the particular object of the present invention is to allow the distribution of the water under pressure successively at different locations through the orifices formed by the superimposition of the spiral slot 6 in the outer element 4 over the grooves 6 in the inner element 3.

For this purpose water under pressure is supplied to the two straight grooves 6 of the inner element 3. The water enters through the annular orifice 7 of a chamber 8 into which it is fed through a pipe 8*a*.

Two diametrically opposite water jets, located 180° apart, are thus obtained. The radial positions and heights of said jets are continuously varied by the relative rotation between and the absolute rotation of the two cylindrical elements 3 and 4.

Due also to the fact that the inner cylindrical element 3 rotates, the positions of the water jets vary continuously in a horizontal plane, i.e., issue in continuously different radial direction; as a result, both the orifices through which the two spouts are ejected generate a helix.

For the foregoing purpose, the rotary motion is transmitted to the inner cylindrical element 3 by a pulley 9 keyed on a collar 10 of a sleeve 11 in one piece with the bottom end of the inner cylindrical element 3.

To transmit rotary motion to the outer cylindrical element 4, an epicyclic gear train is provided consisting, for example, of three planet gears 12 rotatably supported on a disc 13. The planet gears mesh with a pinion 14 which turns with the inner cylindrical element 3. The planet gears also mesh with an internally toothed ring gear 15 that turns with the outer cylindrical element 4.

The chamber 8 is water tight with respect to the cylindrical elements 3 and 4, this being accomplished, for example, by sealing rings 16 and 17 received in grooves 18 and 19 formed in collars 20 and 21, respectively.

By varying the relative speed between the cylindrical elements 3 and 4 it is possible to vary the radial and elevational speeds of the water jets.

In FIG. 1 there is shown in section a bottom casing D consisting of a shroud 22 and a bottom plate 23 through which passes the shaft 1 that supports the collar 10. Said collar is turned by the motor 2 through a belt 24 and pulleys 9 and 25. In said FIG. 1 it also is possible to see the positions of the racks B constituted by the elements 26 located at different heights and conforming to the outline of the chamber 27 defined by the housing A in the center of which is disposed the spray device C that operates the movable water jets.

What is claimed as new is:

1. For use in a dishwashing machine of the type described, a spray device comprising:

(*a*) an elongated inner cylinder,

(*b*) an elongated outer cylindrical tube ensheathing and coaxial with the inner cylinder in rotatable contact therewith,

(*c*) means continually turning the cylinder and tube at different angular velocities so that both the cylinder and the tube turn and experience relative angular motion,

(*d*) means providing an elongated passageway on the exterior of the cylinder and running longitudinally thereof,

(*e*) means providing an elongated slot connecting the interior of the tube to the exterior thereof and running longitudinally of the tube,

(*f*) at least one of the passageways and the slot extending in a circumferential as well as a longitudinal direction so that points along the length thereof vary progressively in a radial and an axial manner, and

(*g*) means to introduce water under pressure into the passageway,

(*h*) whereby a water jet issues from the spray device at the continually longitudinally and radially shifting point that the slot is superimposed over the passageway.

2. A spray device as set forth in claim 1 wherein the cylinder and tube have their longitudinal axes vertically arranged.

3. A spray device as set forth in claim 1 wherein the one of the passageway and slot is of helical configuration.

4. A spray device as set forth in claim 3 wherein the helix is 360° in length.

5. A spray device as set forth in claim 3 wherein the other of the passageway and slot is straight.

6. A spray device as set forth in claim 1 wherein the slot is of helical configuration.

7. A spray device as set forth in claim 1 wherein the cylinder and tube are turned in opposite directions.

8. A spray device as set forth in claim 1 wherein the cylinder has more than one passageway.

9. A spray device as set forth in claim 1 wherein the turning means includes a prime mover in driving engagement with the cylinder and a gear train interconnecting the cylinder with the tube.

10. A spray device as set forth in claim 9 wherein the gear train is epicylic.

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