The invention concerns a spraying rotor for an industrial glassware washing machine, characterized by the fact that it comprises a main arm pivoted along its transverse symmetry axis, provided with a propulsion nozzle. Said main arm carries at each of its ends a rotatable injector that is mounted on the main arm by means of a push compensation device. Thus in working, the injector revolves freely and is not subjected to axial forces.
SPRAYING Rotor FOR A DISH WASHING MACHINE OR AN INDUSTRIAL GLASSWARE WASHING MACHINE

The present invention relates to dish washing machines and to industrial glassware washing machines and more particularly to those of these machines which comprise a spraying rotor provided with a main arm on which an injector is pivoted.

This invention has for its object a spraying rotor for a dish or industrial glassware washing machine, characterized by the fact that it comprises a main arm pivoted along its transverse symmetry axis, provided with a propulsion nozzle, carrying at each of its ends a rotatable injector and by the fact that the assembly of each injector on the main arm comprises a compensating device of the push so that in working the injector revolves freely.

The attached drawing shows schematically and by way of example one embodiment of the rotor and some variants of it.

FIG. 1 is a partial cross-section of the rotor.
FIG. 2 is a partial view of it seen from above.
FIG. 3 is a plan view, certain parts being broken away showing the central part of an injector.
FIG. 4 is a cross-section taken along line IV—IV of FIG. 1.
FIG. 5 is a partial cross-section of a variant of the pivoting system of an injector on the main arm.
FIG. 6 is a schematic side view of a washing machine for industrial glassware provided with the rotor as well as with an accessory.
FIG. 7 is a plan view of the machine shown in FIG. 6.

The rotor shown, intended to equip a washing machine for industrial glassware comprises a main arm 1 pivoted in a known way on the end of a duct 2 feeding water into the tank of the washing machine. Generally the duct 2 merges into the tank of the machine at the center of its bottom. The bearing of this main arm is such that water coming by the duct 2 is able to penetrate practically without leakage within the main hollow arm 1.

Near each end of the main arm 1 is located an injector 3 pivotally mounted on this main arm 1. This assembly is realized in such a way that the water introduced under pressure into the main arm 1 is able to be introduced in the injector 3 in order to be projected within the tank of the machine by the nozzles 4, 5, disposed in the vicinity of the ends of the injector 3. The nozzles are directed upwardly and obliquely so as to provide the horizontal component of force which drives, through reaction, the injectors in rotation.

It is to be noted that the inclination of the nozzles are such that the injectors 3 is driven in rotation in reverse sense the one from the other.

One of the injectors comprises at one of its ends a nozzle directed vertically upwards as well as a lateral nozzle.

This arm 1 comprises also nozzles 7 at each of its ends to drive it in rotation through reaction.

The rotative assembly of each injector 3 on the main arm 1 is as follows:

The injector is fast with a hub 8 fixed on its lower and upper walls 9 and 10. This hub is provided with self-lubricating bearings 11. An axle 12 is fixed on the upper wall 13 of the main arm 1 and extends upwardly crossing the two bearings 11 of the hub 8 and emerging from the upper bearing 11. A cup 14 is fastened on the upper end of this axle 12 so that its axial and angular position will be fixed with respect to this axle 12. A certain play is provided between the upper bearing 11 and this cup 14 to permit a free rotation of the injector 3.

Holes 15 are provided in the upper wall 13 of the arm 1, disposed around the axle 12, corresponding to holes 16 provided in the lower wall 9 of the injector and located around the hub 8. In this manner water can pass from the arm 1 into the injector 3.

A joint is provided to avoid too heavy water losses between the arm 1 and the injector 3. This joint comprises a circular flange 17 fast with the lower wall 9 of the injector and surrounding the holes 16 as well as a ring 18 for example of plastic material, located between the injector 3 and the arm 1 around the axle 12. The outside diameter of this ring 18 is slightly less than the internal diameter of the flange 17 but its internal diameter is at least sufficient to encircle all the holes 16 and 15. The height of this ring 18 is slightly less than the distance separating the walls confronting each other of the injector 3 and the arm 1 so that this ring will be freely located.

To avoid that in operation the water pressure displaces axially the injector 3 against the cup 14 and causes thus an abnormal wear, the assembly of the injector comprises a thrust compensating device constituted by passages 19 located around the hub 8, provided in the upper wall 10 of the injector. These passages are disposed within a periphery having a smaller diameter than the cup 14.

A sealing joint between the cup 14 and the injector 3 is constituted by a ring of plastic material 20, similar to the ring 18, located with radial and axial clearance within the space comprised between the upper wall 10 of the injector 3 and the cup 14.

One creates thus in operation a water cushion between the cup and the injector which permits to balance the axial thrust to which this injector is subjected so that it will freely revolve.

A similar compensating device for the thrust due to the water pressure could be mounted on the pivoting axis of the main arm 1. However, in certain embodiments where the water pressure is not to high, comprised between 0.2 and 0.7 atmosphere, the weight of the assembly of the rotor and the reaction of the water jets expelled by the injectors suffices to balance the main arm 1 and a conventional bearing may be used.

In a variant shown in FIG. 5, the shaft 12 of the pivoting device of the injector 3 on the main arm 1 is mounted on the lower wall 21 of the arm 1. The tightness as well as the balance of the injector 3 are realized in the manner described herebefore. This variant has the advantage of a very great passage section for the water from the arm 1 towards the injector, in effect this passage is constituted by a circular passage 22 concentric to the hub 8 provided in the upper wall 13 of the arm 1 as well as by a similar passage 23 provided in the lower wall 9 of the injector.

It is to be noted that during operation the central arm revolves in the direction of the arrow a, one of the injectors 3 revolves in the same direction according to the arrow c, whereas the other injector 3 revolves in the opposite sense b.

In this manner one obtains different sweeping speeds for the water jets emitted by the different injectors which increases the washing action and which above all tends to render without importance eventual speed variations of the rotation of the main arm 1 due to pressure variations of the water. It is to be noted that the direction of rotation of the injectors 3 is determined by the direction of inclination of the nozzles 4.

As seen hereabove, due to its vertical nozzle 5, the rotor described is particularly well adapted for the washing of industrial glassware having small necks.

When it is necessary, however, to wash glassware with very narrow necks the performance of this rotor may be increased by the use of an accessory shown in the variant of FIGS. 6 and 7.

In this variant the rotor is provided with a rod 25 connecting the main axle 24 to the vertical nozzle 5. This rod 25 is simply provided at each of its ends with a hole intended to receive the one the nozzle 5 and the other axle 24. In this way the vertical jet emitted by the nozzle 5 describes in operation a circle of a determined diameter d and it suffices to place the glassware, having a very narrow neck v, so that its opening will be aligned vertically on this diameter d. In effect, in that way it is ensured that the jet emitted by the nozzle 5 penetrates this glassware.

Furthermore as in this position the injector is locked, its nozzle 4 which is oblique counteracts the effect of the nozzle 7 of the main arm 1 which then revolves more slowly which still enhance the washing action of the jet emitted by the vertical nozzle 5.

Finally it is to be noted that in modifying the position of the locked injector for example in varying the length of the rod 25, the slowing down action of the nozzle 4 is modified the
lever arm of its action is modified. In modifying the length of the rod 25 or in choosing a rod 25 of a determined length from among a series of rods which are at one's disposition, it is thus possible to vary the speed of rotation of the main arm 1 and thus the efficiency of the jet emitted by the vertical nozzle 5.

It is evident that numerous other variants of the rotor could be provided without departing from the scope of the attached claims. Particularly, the rings 18 and 20 could be provided with a slot or with a groove 26 (FIG. 3), provided in its internal peripheral wall, in order to permit the evacuation of wastes between the ring 18 and the flange 17 or between the ring 20 and the cup 14. In variants, this groove 26 could be replaced by a recessed formation provided in the internal peripheral walls of the cup 14 and of the flange 17.

I claim:

1. A spraying rotor for an industrial glassware washing machine, which comprises a main arm pivoted along its transverse symmetry axis, provided with a propulsion nozzle, carrying at each of its ends a rotatable injector and in which the mounting of each injector on the main arm comprises a thrust compensation device, so that in working the injector revolves freely, the thrust compensation device comprising holes in the upper wall of the injector and located around its axis of rotation as well as a cup located in front of these holes, angularly and axially fixed with the axis of the pivoting device of the injector onto the arm, a sealing device between this cup and the upper wall of the injector around the said holes, the sealing device comprising a ring disposed between this cup and the upper wall of the injector with axial and radial clearance, and a second sealing device between each injector and the main arm, each second sealing device comprising a circular flange concentric with the pivoting axis of the injector emerging from the lower face of the injector and a ring between the injector and its flange and the arm with axial and radial clearance.

2. Rotor according to claim 1, in which the ring has a recess in its external peripheral surface.

3. Rotor according to claim 1, in which the flange comprises its internal peripheral wall a recessed formation and the cup comprises in its internal peripheral wall a recessed formation.

4. Rotor according to claim 1, in which the pivoting axis of the injectors is fast with the upper wall of the main arm, and a hub pivoted on this axis and fixed to the upper wall of the injectors.

5. Rotor according to claim 1, in which the pivoting axis of the injectors is fast with the lower wall of the main arm, and a hub pivoted on this axis and fixed to the upper wall of the injectors.

6. Rotor according to claim 1, in which one of the injectors comprises a vertical nozzle as well as an oblique nozzle each disposed in the vicinity of one end of the injector, the other injector comprising two inclined nozzles, located each in the vicinity of one end of the injector.

7. Rotor according to claim 6, in which the inclined nozzles are directed in such a way that in working the injector having the vertical nozzle revolves in the reverse direction from the rotation of the main arm whereas the other injector revolves in the same direction as the main arm.

8. Rotor according to claim 7, and a locking device for the injector comprising the vertical nozzle, with respect to the main arm, this locking device comprising at least one rod having a hole at each of its ends to be fitted on a central axle of the central arm and on the vertical nozzle.

9. Rotor according to claim 8, which comprises several interchangeable said rods of different lengths.

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