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RINSING HEAD FOR AUTOMATIC DISHWASHERS

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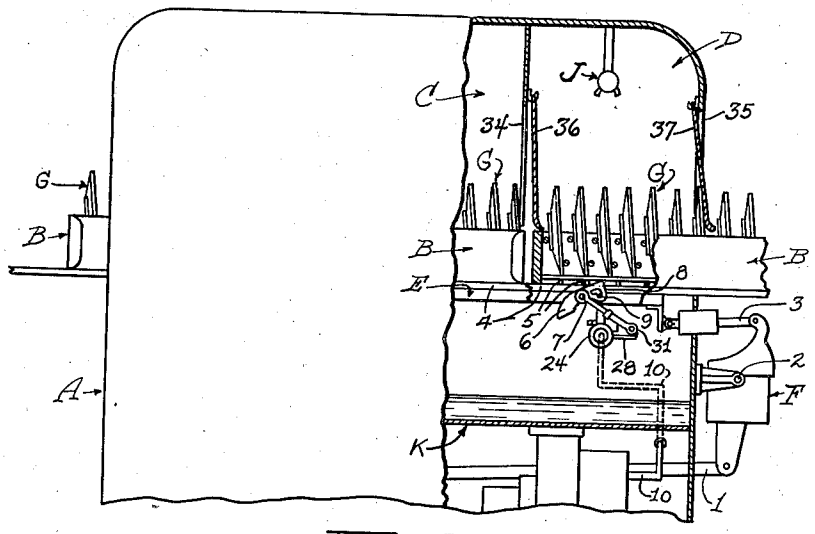


Fig. 1.

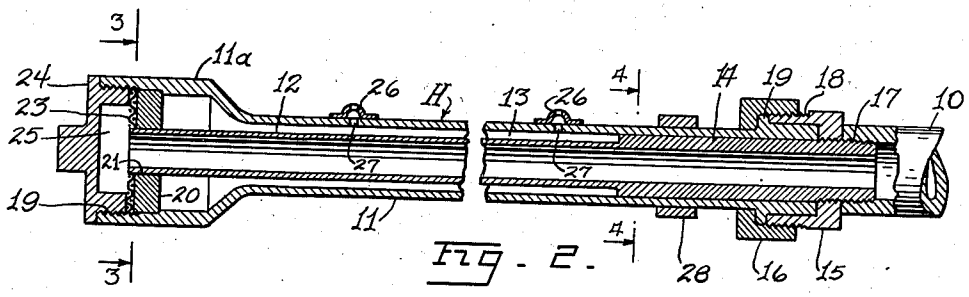


Fig. 2.

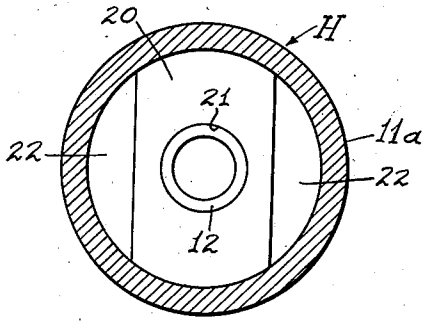


Fig. 3.

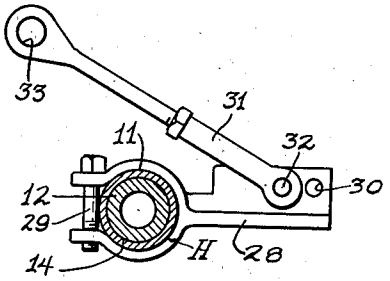


Fig. 4.

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RINSING HEAD FOR AUTOMATIC DISHWASHERS

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8 Claims. (Cl. 299—62)

The present invention relates to improvements in a rinsing head for automatic dish washer, and it consists of the combinations, constructions and arrangements hereinafter described and claimed.

In one of the automatic dish washers now on the market, the racks containing the dishes and silverware are moved through the washer with an intermittent motion. The racks pass from the washing chamber, where the dish washing takes place, into the rinsing compartment, where the rinsing of the dishes, etc., is accomplished. In the rinsing compartment a stream of rinsing fluid in the shape of an apron that extends transversely across the compartment is directed upwardly against the racks for rinsing the dishes, etc. The intermittent motion of the racks through the rinsing compartment causes the portions of the dishes in line with the rinse spray apron during the interval when the rack is standing still to be effectively rinsed, but the portions of the dishes, etc., coming into contact with the spray during the movement of the rack and the dishes is not for a sufficient length of time to be rinsed effectively. The result is a streaky rinsing of the dishes, some parts being clean, other parts not clean.

The principal object of my invention is to provide a novel rinsing means in the rinsing compartment for continuously moving a curtain of water to and fro in the compartment and to change the angle of the plane formed by the curtain of water continuously so that all surfaces of the dishes, etc., will be efficiently rinsed even though the rack is moved intermittently through the rinsing compartment.

A further object of my invention is to provide a rinse which is actuated by the same mechanism that intermittently advances the racks, this mechanism continuously moving the arm for continuously changing the angle at which the rinse water strikes the dishes, etc., in the rack. This continuous changing angle of the rinse water upon the dishes, etc., effectively rinses all surfaces in spite of the intermittent motion of the racks through the rinse compartment.

Still a further object of my invention is to provide novel means in the rinse arm for screening the rinsing fluid before the fluid passes through the nozzles that direct the fluid against the dishes, and for retaining any foreign matter in a place where it may be readily removed. The rinse arm can be quickly substituted for the one in the machine and attached to the same water outlet normally connected to the standard arm. No alterations in the dish washer are necessary to effect the change.

Other objects and advantages will appear in the following specification, and the novel features of the device will be particularly pointed out in the appended claims.

My invention is illustrated in the accompanying drawing forming a part of this application, in which:

Figure 1 is a side elevation of an automatic dish washer, portions being shown in section to illustrate the connection of my rinse arm to the operating parts;

Figure 2 is a longitudinal section through the rinse arm;

Figure 3 is a section along the line 3—3 of Figure 2; and

Figure 4 is a section along the line 4—4 of Figure 2.

While I have shown only the preferred form of my invention, it should be understood that various changes or modifications may be made within the scope of the appended claims without departing from the spirit of the invention.

In carrying out my invention, I make use of an automatic dish washer indicated generally at A, and the dish washer is adapted to receive dish racks indicated generally at B, these racks being of two standard forms. One form of rack has rods for holding plates at a definite angle and in spaced relation so that they will be thoroughly washed and rinsed as they pass through the machine. The other type of rack has a screened bottom for supporting cups in inverted position and for carrying silverware. The trays are moved through a wash chamber, indicated generally at C, and a rinse compartment, indicated generally at D.

The means for moving the racks through the dish washer consists of a floating carriage, indicated generally at E, that is reciprocated by a link 1, see Figure 1, that is connected to a motor and a gear reducing mechanism (not shown), the link being reciprocated by the gear reduction mechanism during the operation of the motor. The link is connected to an automatic release, indicated generally at F, which in turn is pivoted to the dish washer casing at 2. A second link 3 connects the automatic release F with the floating carriage E. It will be seen that during the operation of the motor the carriage will be reciprocated.

The trays or racks ride on guide rails 4 disposed at the sides of the machine, and the racks have lugs 5 at their bottoms and arranged along the

rack side walls, these lugs being successively engaged by sets of driving pawls 6. The floating carriage E has side members to which the pawls 6 are pivotally mounted as at 7. The pawls are weighted so that they will cause their front ends 8 to engage with the lugs 5. The pawls are slotted, and pins 9 limit the upward movement of the front ends 8.

The pawls are reciprocated by the floating carriage and during their movement to the left in Figure 1 they will free themselves from one pair of lugs 5 and ride under the next pair of lugs. During the movement of the floating carriage to the right, the front ends 8 of the pawls will raise and engage with the pair of lugs they have just passed. In this way a reciprocating movement of the floating carriage will intermittently advance the dish racks. The parts thus far described form no part of my invention except insofar as they cooperate with the parts now to be described.

The racks are open at their bottoms, and rinsing water is directed upwardly through the bottoms of the racks to rinse the dishes G carried by the racks. Figure 2 illustrates my improved rinse arm H connected to the rinse water conveying pipe 10 that forms a part of the automatic dish washer. I will first describe the construction of the rinse arm and then will set forth how it is operated during the functioning of the machine. The rinse arm is tubular in construction and consists of an outer pipe 11 and an inner pipe 12, the inner pipe being spaced inwardly from the outer pipe to form a fluid conveying channel or annular space 13 that is concentric to the inner pipe 12. The outer pipe 11 rotates on an enlarged portion 14 of the inner pipe 12.

A liquid tight seal is effected between the pipes 11 and 12 by a coupling composed of two parts 15 and 16. The part 15 is screwed upon a threaded portion 17 of the inner pipe 11, and the part 15 has an exteriorly threaded portion 18 for receiving the threaded portion of the part 16. The outer pipe 11 has an annular flange 19 received between the parts 15 and 16. The parts are adjusted for forming a liquid tight seal while still permitting the outer pipe 11 to rotate on the inner pipe 12.

The other end of the outer pipe 11 is enlarged as at 11*a* and is internally threaded at 19. The enlarged end receives a bearing 20 that has a central opening 21 in which the end of the pipe 12 is rotatably mounted. Figure 3 shows the bearing 20 as being spaced from portions of the inner wall of the enlarged member 11*a* so as to provide water passageways 22. A screen 23, see Figure 2, is placed over the bearing 20 and covers the water passages 22. The screen is removable from the enlarged end 11*a*. A cap 24 closes the enlarged end 11*a* and is screwed into the threads 19 and bears against the screen 23 for holding it in place. The cap 24 has a compartment 25 for permitting water passing through the inner tube 12 to enter the outer tube 11 by means of the passageways 22.

The inner pipe 12 has its threaded end 17 received in the rinse water outlet pipe 10, and the rinse arm H is supported in this manner. The pipe 12 does not rotate but is rigidly supported by the pipe 10. The outer pipe 11 is free to rock on the inner pipe 12. The outer pipe 11 has a plurality of nozzles 26 that communicate with openings 27 in the outer pipe. It will be seen from this construction that rinse water flowing through the inner pipe 12 will pass into the compartment 25 and then be screened before passing through the passages 22 and into the annular passageway 13. The cleaned rinsing fluid will then enter the openings 27 and be ejected through the spray nozzles 26. Any number of nozzles may be provided, and three will be sufficient for the washing machine illustrated in Figure 1. The nozzles form a spray that extends transversely across the washing machine.

The means for rocking the outer pipe 11 about the inner pipe 12 is illustrated in Figures 1 and 4. An arm 28 is clamped to the outer pipe 11 by a screw bolt 29 and the arm has a plurality of openings 30. An adjustable link 31 has a pin 32 passed through one of the openings 30 for pivoting the link to the arm. The other end of the link 31 has an opening 33 for receiving the pin 7 that pivotally carries the driving pawl 6. A reciprocation of the driving pawl 6 will cause the link 31 to rock the arm 28 and cause the outer pipe 11 to rock on the inner pipe 12.

From the foregoing description of the various parts of the device, the operation thereof may be readily understood.

The rinse arm H is used in conjunction with an upper spray head J, see Figure 1. The openings 34 and 35 in the rinse compartment D are closed by curtains 36 and 37 respectively. The spray from the nozzles 26 is ejected upwardly through the bottom of the rack B that is passing through the rinse compartment, and the reciprocation of the floating carriage E will cause the outer pipe 11 to rock on the stationary inner pipe 12 and thus to direct a curtain of water radially from the rinse arm H and transversely of the dish washer. The rocking of the rinse arm will continuously change the angle of the apron spray so that all the dishes will be contacted. The continuous rocking movement of the rinse arm will effectively clean the dishes even though the rack is intermittently moved through the rinse compartment. This will prevent any uneven rinsing of the dishes.

In the usual dish washer, the spray openings are small because a good many spray nozzles have to be used in order to deliver a sufficient quantity of water to rinse the dishes. Even this added number of nozzles does not rinse the dishes properly. By rocking the spray arm to contact with different surfaces of the dishes, I am able to reduce the number of nozzle outlets and therefore increase their size so as to permit a greater quantity of rinse water to issue from each nozzle. This larger quantity of water will have the effect of thoroughly rinsing the dishes. The amount of water passing from the rinse arm will not be in excess of that normally permitted and therefore the water will not fill the tank, indicated generally at K, see Figure 1, to a point where it will pass out through the overflow pipe (not shown). The larger openings will not become clogged so readily as the small spray openings, and the screening of the rinse water before it reaches the nozzles further reduces any chances of the nozzles becoming clogged. My rinse arm will swing the apron of water throughout the length of the compartment rather than confine the water to a given vertical plane. The dishes are stacked at an angle and the continuously changing angle of the rinse water will clean all dish surfaces.

The rinse arm cleans the water and retains any foreign matter at the end of the arm where it may be removed when the cap is removed from the arm. The screen may have struck up por-

tions (not shown) which act as handles for removing the screen from the arm for cleaning purposes and for placing the screen back in position. The bearing **20** performs the additional function of acting as a support for the screen **23**.

I claim:

1. A rockable rinse arm having a central fluid conveying conduit and a spray pipe enclosing and being rockably mounted on the conduit, means disposed at one end of the arm for placing the conduit and spray pipe in communication with each other, screening means at the same arm end for screening the fluid before it enters the spray pipe, outlet nozzles for the spray pipe, a reservoir placed adjacent to the screening means for receiving and holding any foreign matter screened, and a cap normally closing the reservoir but being removable for permitting the reservoir to be cleaned.

2. In combination, an inner fluid conveying tube, an outer tube spaced from and rotatable about the inner tube, a bearing disposed near one end of the first tube for rotatably supporting an end of the outer tube on the inner tube, said bearing having openings placing both tubes in communication with each other, outlet nozzles carried by the outer tube and communicating with the space between the tubes, and a bearing disposed near the other end of the first tube for rotatably supporting the other end of the outer tube.

3. Means for swingably supporting longitudinally spaced jets of fluid that are free to swing about an axis common to all of the jets, comprising the combination of a hollow fluid supply member, a spray pipe spaced from and surrounding the supply member and having longitudinally spaced jets communicating with the supply member, bearings for supporting the ends of the spray pipe, and a screened openable compartment receiving the fluid from the supply member and screening the fluid before it enters the spray line whereby foreign matter will be trapped in the compartment and removable when the compartment is opened.

4. A rockable rinse arm comprising a pipe adapted to communicate with a fluid conveying pipe and be supported thereby, a spray pipe rotatably mounted on the inner pipe, a bearing placed at the free end of the inner pipe and acting as a spacer between the inner pipe and spray pipe, said bearing having openings for permitting fluid to flow from the inner pipe into the spray pipe, a cap closing the spray pipe, a screen closing the openings and held in place against the bearing by the cap, said cap having a chamber placing the inner pipe in communication with the spray pipe, said chamber also retaining foreign material caught by the screen, and nozzles carried by the spray pipe and receiving the fluid received by the spray pipe.

5. In combination, a stationary fluid-conveying pipe, an elongated spray pipe enclosing the first pipe, bearings rotatably supporting the ends of the spray pipe on the first pipe so that the intermediate spray pipe portion will be spaced from the first pipe, and fluid outlet nozzles disposed along the length of the spray pipe and communicating with one end of the stationary pipe for receiving fluid therefrom.

6. A rockable rinse arm having a central fluid-conveying conduit, a spray pipe enclosing the conduit and being spaced therefrom, bearings rotatably supporting the ends of the spray pipe on the conduit, means disposed at one end of the arm for placing the conduit and spray pipe in communication with each other, the bearing disposed adjacent to the same end of the arm having openings therein for the passage of fluid therethrough, screening means at the same arm end for screening the fluid before it enters the spray pipe, and outlet nozzles disposed along the length of the spray pipe.

7. A rinse arm comprising an inner fluid conveying tube, a spray tube spaced from and rotatable about the inner tube, a bearing disposed near one end of the arm for rotatably supporting an end of the spray tube on the inner tube, said bearing having openings placing both tubes in communication with each other, and a screen in the spray tube and extending across the openings in the bearing, said screen having an opening registering with the inner tube.

8. A rinse arm comprising an inner fluid-conveying tube, a spray tube spaced from and rotatable about the inner tube, a bearing disposed near one end of the arm for rotatably supporting an end of the spray tube on the inner tube, said bearing having openings placing both tubes in communication with each other, a screen in the spray tube and extending across the openings in the bearing, said screen having an opening registering with the inner tube, the spray tube and screen defining a refuse receiving compartment, and a cap for closing the compartment and being removably carried by the spray tube.

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