May 5, 1953 G. B. FOX ET AL 2,637,595

RINSE ARM CONNECTION

Filed Oct. 3, 1946

Fig- 1

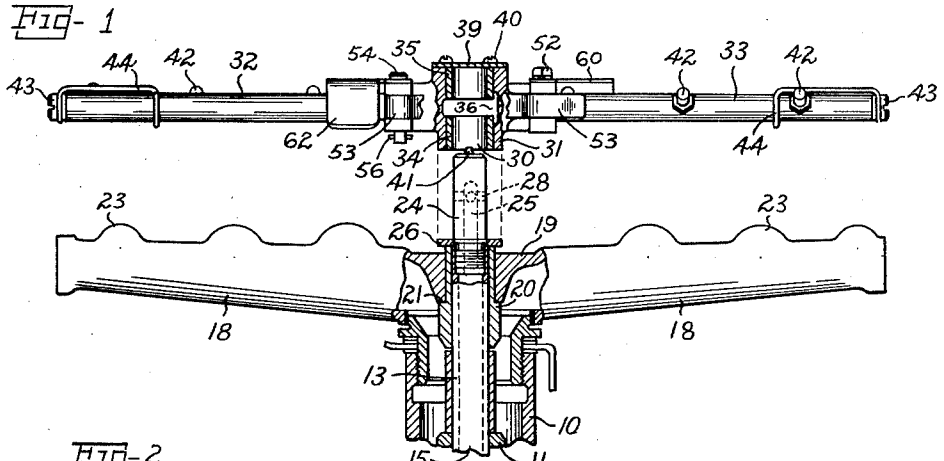


Fig-2

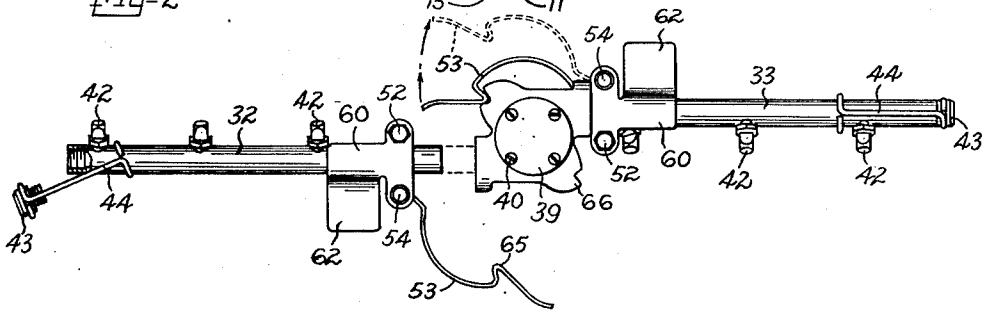


Fig-3

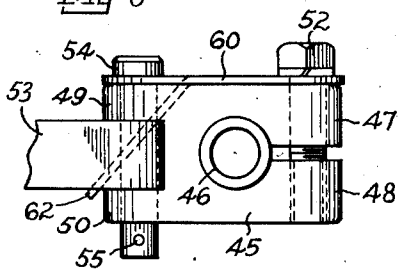


Fig-4

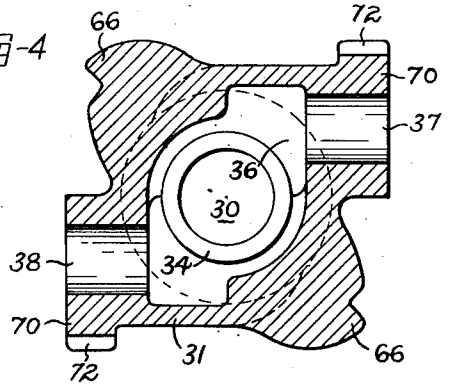
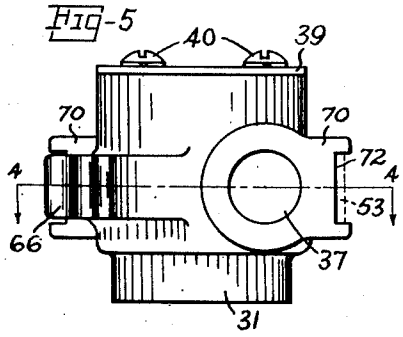


Fig-5



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Patented May 5, 1953

2,637,595

UNITED STATES PATENT OFFICE

2,637,595

RINSE ARM CONNECTION

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Application October 3, 1946, Serial No. 700,878

3 Claims. (Cl. 299—70)

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This invention relates to washing machines, and more particularly to machines for washing dishes and the like.

One of the principal objects of the invention is to provide a washing machine having rotary wash and rinse arms operable by reaction from the fluid discharge therefrom and constructed so that the rinse arm is provided with a simple, effective and reliable securing means for connecting the rinse pipes in operable position, and arranged to provide for quick and easy removal of the rinse pipes separately of each other without the aid or use of tools thus affording a rapid and convenient method of inspecting and cleaning, as well as assuring access to the interior of the rinse pipes when necessary for the removal of mineral deposits or scale which may tend to collect and clog the interior thereof.

Another object resides in the provision of a machine of the character described having a rinse arm with separately removable rinse pipes provided with a removable plug received in the end of each rinse pipe, and so secured to the end of the pipe as to provide for easy removal thereof yet preventing the plug from being completely detached from the pipe so that it cannot be misplaced or lost and providing an unobstructed through passage for ready cleaning when removed.

It is a further object to provide such a dish washing machine having a rotary wash arm and a demountable rinse arm with a vane or deflector on each rinse pipe for utilizing fluid discharged from the wash arm to prevent it from coming to rest in a position where it could cause interference with the operation of the wash arm in its discharge of washing fluid, the deflector being conveniently secured in position through the same connections which provide the detachable mounting for the rinse pipe.

Other objects and advantages will be apparent from the following description, the accompanying drawing, and the appended claims.

In the drawing,

Fig. 1 is a side elevational view, partly in section, showing a combined wash and rinse arm assembly constructed in accordance with the present invention, the rinse arm being raised above its bearing pin;

Fig. 2 is a top plan view of the rinse arm, shown in Fig. 1, showing one of the retaining springs unlatched and one of the rinse pipes removed from the rinse arm hub;

Fig. 3 is a broken end elevational view of the rinse pipe shown removed in Fig. 2 as viewed from the hub or inner end thereof;

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Fig. 4 is a horizontal sectional view of the rinse arm hub taken along the line 4—4 of Fig. 5; and

Fig. 5 is a side elevational assembly view of the rinse arm hub as seen from the left side of Fig. 2.

In washing machines of the type as shown, for example, in the Wallace Patent No. 2,380,090 for the washing of dishes and the like, a pair of rotary arms are provided which are located in the washing chamber, one of these arms being supplied with wash fluid and the other being supplied with rinse fluid. Both arms are mounted for independent rotation, and adapted to be driven as a result of the reaction from the fluid streams or jets discharged therefrom.

It is preferred to mount the arms for separate rotation because the reaction force developed during operation of the rinse arm and available for causing rotation is adequate for rotating the relatively light weight rinse arm but may be insufficient to effect proper operation of that arm together with the heavier wash arm. However unless some provision is made for preventing interference of the rinse arm during the washing period, the rinse arm may be picked up on the rotation of the wash arm and caused to revolve in such a position as to intercept the sprays from the wash arm and prevent the proper and desired action thereof.

In addition to providing a rinse arm which is completely demountable without the use of tools, to avoid objectionable interference of the rinse arm with the operation of the wash arm in the discharge of the fluid sprays therefrom, a vane or deflector carried on each of the rinse pipes of the rinse arm is arranged to intercept a part of the discharge from the apertures on the wash arm which are nearest to the hub. This impinging of the wash spray upon the vanes imparts rotation to the rinse arm in a direction opposite to that of the wash arm so that the rinse arm is not allowed to remain in a fixed position relative to the wash sprays, which might interfere with their effectiveness, the passage of the rinse arm across the wash sprays not being objectionable in this respect.

Referring to the drawing which discloses a preferred embodiment of the invention, there is a wash supply housing shown at 10 arranged to receive a supply of wash fluid under pressure from a suitable source such as a pump operating to recirculate a body of wash fluid. This housing is formed with a central portion 11 in which there is mounted an upwardly extending hollow pin or stem 13 which serves as a bearing pin for rotatably mounting the wash arm and as a bearing support for rotatably mounting the rinse

arm. The pin has a rinse fluid supply passage 15 extending axially therethrough. The wash arm is indicated at 18 and has a hub portion 19 in which there is press-fitted a bronze or other suitable bearing member 20 having a shoulder 21 on which the hub portion is seated. The wash arm is provided with a series of discharge slots or apertures 23 one or more of which are suitably inclined to effect rotation of the wash arm by reaction when the fluid is supplied thereto.

The upper end of pin 13 is threaded on its interior. An upper bearing pin 24 also having a hollow axial passage 25 is threadedly received in the upper end of pin 13, and a hardened and ground stainless steel washer 26 is received between a shouldered portion of pin 24 and pin 13 and held in place thereby to provide a thrust surface for engagement with the upper end of the bearing member 20, providing for taking the upward thrust of the wash arm which occurs during use and under the supply of fluid pressure thereto. The central passage 25 of pin 24 connects with the passage 15 of pin 13 and with the horizontally extending passages 28 which in turn communicate with the hollow interior 30 of the rinse arm hub 31.

The rinse arm assembly comprises the hub or body portion 31 and rinse pipes 32 and 33 which are removably secured therein, the hub 31 being adapted to be slidably received over the end of the upper bearing pin 24.

This hub is formed as shown in Fig. 4 and has upper and lower bearing sleeves 34 and 35 secured therein in which the upper bearing pin 24 is received. These sleeves are separated from each other providing the annular passage 36 which communicates with the interior of the rinse pipes through passages 37 and 38 and is adapted to align with the passages 28 in pin 24 when the rinse arm is in operating position thereon. Closing the top of the hub is a pivot bearing plate 39 which is fastened thereto by means of the screws 40, the center thereof being adapted to engage over a truncated conical tip 41 formed on the upper end of bearing pin 24 to provide a thrust bearing for the rinse arm assembly. Such construction limits the downward travel of the hub 31 and maintains it in position for free rotation about pin 24 in spaced relation with the thrust washer 26, and completely out of contact with all portions of the wash arm.

Rinse pipes 32 and 33 are provided with discharge nozzles 42 through which the rinse water is discharged during use, the reaction causing the rinse arm to rotate in a direction opposite to the rotation of the wash arm. These pipes are constructed of brass tubing or other suitable metal and have the outer ends thereof threaded to receive a screw plug 43 which is removable, but which cannot be entirely separated from the rinse pipe since its movement is limited by the extent to which the retainer 44 attached thereto is limited in its movement.

This construction thus provides a quickly demountable rinse arm comprising a separate and easily removable rotatable hub adapted to receive a supply of rinse liquid and having a rinse pipe operably received by a sliding engagement with the hub, interfitting parts between the hub and each of the rinse pipes providing for a direct connection.

A retaining clamp 45 as shown in Fig. 3 is secured to the inner end of each rinse pipe.

This clamp is formed with a reamed center bore 46 adapted to slidably receive the rinse pipe, and with bifurcated ends 47, 48, and 49, 50.

The end 47, having a central bore extending therethrough, and end 48, similarly bored and threaded, are spaced slightly apart to receive a headed screw 52 which can be tightened down to lock the clamp in place on the rinse pipe. The clamp is mounted on the inner end of each rinse pipe so as to permit the end of the pipe to project therefrom as shown in Fig. 2. Pipes 32 and 33 each have their inner ends adapted to interfit with the passages 37 and 38 respectively to provide a direct connection between the hub and the pipes when the ends of the pipes are inserted therein so that the clamp abuts against the hub, the passages 37 and 38 thus forming sockets for receiving the end of the pipes. The ends 49 and 50 of the clamp are spaced apart sufficiently to receive the looped end of the retaining spring 53 therebetween, and are also bored so that a retaining pin 54 may be inserted through the looped end of the spring to hold it in position. The end of this pin is drilled as at 55 to receive a cotter pin 56 which prevents the pin from working out of position.

Attached to each retaining clamp is a deflector plate or vane 60 which is formed from a flat piece of stainless steel. At one side thereof a pair of holes are drilled so that each vane can be retained in position on the retaining clamp by inserting the headed screw 52 and the pin 54 therethrough. Each vane is also provided with an extended wing surface or portion 62 inclined as illustrated in Figs. 1 and 3, which has proper radial dimensions so that it is in position to intercept a portion of the wash liquid discharged from the innermost apertures in the wash arm.

To permit the rinse pipes 32 and 33 to be assembled in operating position quickly and easily, and to permit them to be readily removed independently of each other, if desired, for inspection and cleaning and without requiring the use of tools or skilled labor, the flat retaining spring 53 formed of bronze (spring stock) and shaped as shown in Fig. 2 is provided. This spring which has a loop formed in one end through which pin 54 is inserted, as previously described, has a hook portion 65 formed therein adapted to be latched over the shoulder 66 formed on the hub 31. Thus by snapping the hook over the shoulder the rinse pipes are securely held in operating position in the hub and can be removed by merely releasing the spring, as illustrated by the rinse pipe viewed on the left side of Fig. 2 which has thus been removed.

In order to provide that the rinse pipes cannot be reassembled, after having been removed for inspection or cleaning, except by replacing them in the proper position to operate correctly, that is, assembled in proper angular relationship assuring proper direction of discharge of fluid from the discharge means in the rinse pipes, on the exterior of the hub 31 adjacent the outer ends of passages 37 and 38 shoulders 70 are formed in which the grooves 72 are cut. These grooves are of sufficient width and depth to receive the retaining spring 53 when it is in the closed position and thus provide means for guiding the rinse pipes into proper operating alignment. This will be apparent when it is noted that the hook portion 65 of the spring 53 cannot be latched over the shoulder 66 on the hub to secure the rinse pipes to the hub unless the rinse pipes are so

positioned that the spring is seated within the groove 72.

It is to be noted in connection with the assembly of the rinse pipes that the vanes 69, being mounted on the retaining clamps, are removed or carried as a part of the clamps and thus remain attached to the rinse pipes when such pipes are removed from the hub. This construction provides for ready inspection and cleaning of the vanes, as well as the rinse pipes, without the necessity of using tools to remove them from the machine and also prevents the loss or misplacement of such parts, the whole assembly being effected with only a few parts and a minimum of labor. It is also impossible because of this arrangement to reassemble vanes except in the proper position since they are mounted and carried as a part of the rinse arm assembly.

In operation the rinse liquid is supplied through the interior of stem 13, and through the communicating passages 25 and 26 in pin 24 to be discharged into annular space 36 and passages 37 and 38 in the hub 31, and from there into the respective rinse pipes for discharge therefrom.

During supply of wash fluid to the wash arm, and the consequent rotation of the wash arm, fluid will be projected from the wash arms and will periodically impinge upon the wing surfaces 62 of the vanes and keep the rinse arm from remaining in a fixed position relative to the wash arm where it would interfere with the wash sprays.

While the form of apparatus herein described constitutes a preferred embodiment of the invention, it is to be understood that the invention is not limited to this precise form of apparatus, and that changes may be made therein without departing from the scope of the invention which is defined in the appended claims.

What is claimed is:

1. In a dishwasher of the character described having a wash arm mounted for rotation therein and including a hollow hub mounted for rotation with respect to said wash arm and adapted to receive rinse fluid from a source thereof, said hub having an open socket in its side communicating with the interior thereof, and a rinse pipe adapted at one end thereof for connection with said socket and having discharge outlets along one side thereof, the combination of quickly demountable attaching means for said rinse pipe adapted to establish and maintain a predetermined angular relationship of said pipe in said socket wherein said pipe outlets discharge said rinse fluid in a predetermined direction providing a reaction causing rotation of said hub while at the same time impinging on the articles within said dishwasher at effective rinse angles, said means comprising an elongated resilient latch on said pipe adapted to extend a substantial distance exteriorly of said hub beyond the outer end of said socket, a shoulder on said hub forming a keeper adapted for latching engagement with said latch, and means on the exterior of said hub intermediate said shoulder and the outer end of said socket for preventing latching engagement of said latch with said shoulder except when said pipe is in said predetermined angular relationship in said socket assuring said predetermined direction of discharge of said rinse fluid from said pipe outlets.

2. In a dishwasher of the character described including a wash arm mounted for rotation therein, and a hub mounted for rotation with respect to said wash arm and having a passage therein for receiving rinse fluid from a source thereof, the combination of means on said hub defining a pair of sockets extending into said hub in laterally offset opposite directions, means connecting the inner ends of said sockets with said passage, a pair of rinse pipes each having one end thereof formed to be received in one of said sockets, said rinse pipes having discharge outlets along one side of each thereof for discharging said rinse fluid, a latch on each said pipe, a pair of shoulders on the exterior of said hub each associated with one of said sockets and spaced from the outer end of said associated socket to form a keeper for said latch on the associated said rinse pipe, and abutment means on said hub intermediate each said associated shoulder and socket for preventing engagement of said latch with said shoulder except when said pipe is in a predetermined angular position in said socket assuring discharge of said rinse fluid from said pipe outlets in a predetermined direction providing a reaction causing rotation of said hub while at the same time impinging on the articles in said dishwasher at effective rinse angles.

3. In a dishwasher of the character described including a wash arm mounted for rotation therein and a generally hollow hub mounted for rotation with respect to said wash arm and adapted to receive rinse fluid from a source thereof, the combination of means forming a socket extending into the interior of said hub, a rinse pipe having discharge outlets along one side thereof and adapted at one end thereof for insertion in said socket, a collar on said pipe adjacent said one end thereof and adapted to abut the outer end of said socket forming means to limit insertion of said pipe end in said socket, a latch member on said collar, means on said hub forming a keeper for said latch member spaced from said socket and adapted for cooperation with said latch member to retain said pipe in connected relation with said hub, and abutment means on said hub between said keeper and the outer end of said socket for guiding said latch into latching engagement with said keeper therefor only when said pipe is in a predetermined angular position in said socket assuring discharge of said rinse fluid from said pipe outlets in a predetermined angular direction providing a reaction causing rotation of said hub while at the same time impinging on the articles in said dishwasher at effective rinse angles.

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