April 13, 1937. R. L. DORT 2,077,098

WASHING MACHINE

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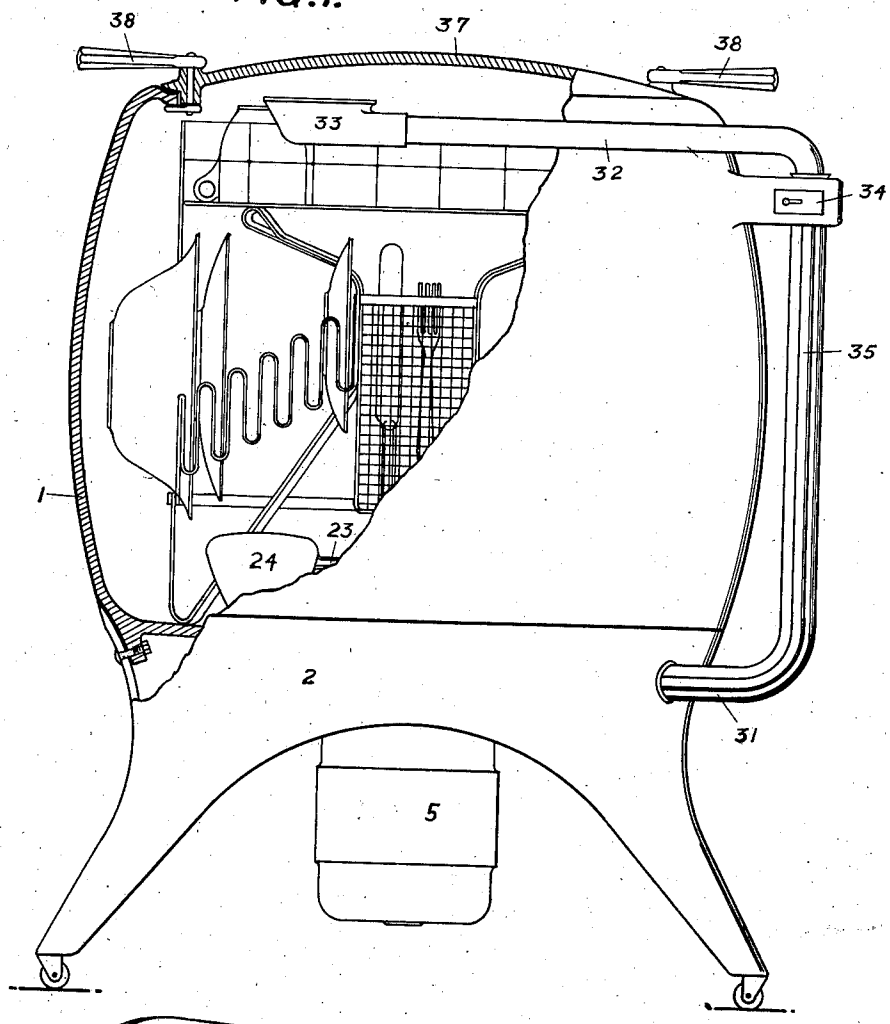
FIG. 1.



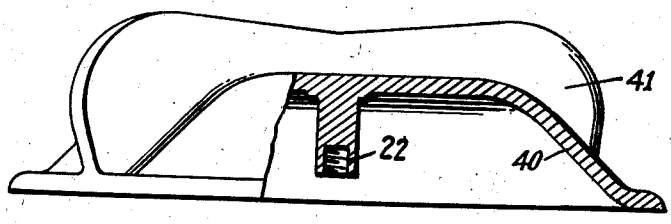


FIG. 7.

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WASHING MACHINE

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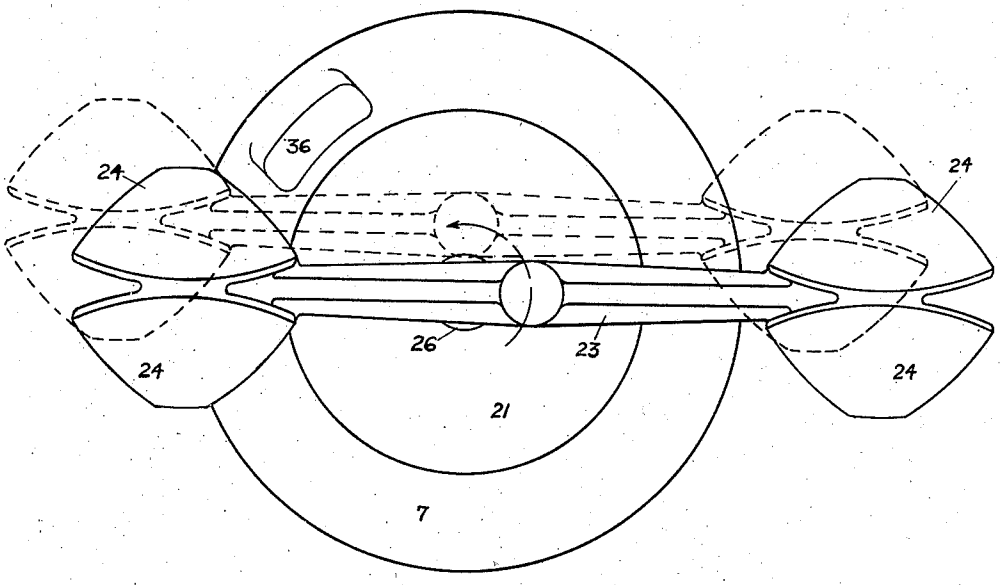

FIG. 2

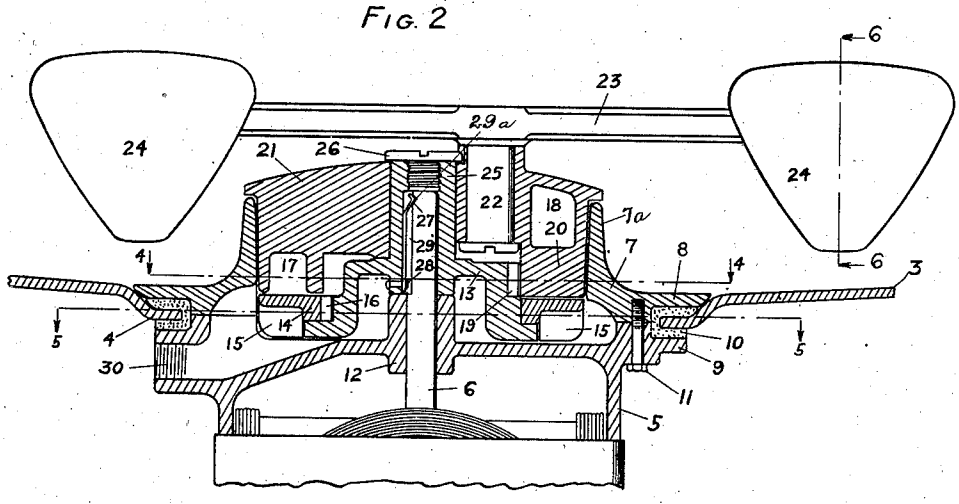

FIG. 3

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WASHING MACHINE

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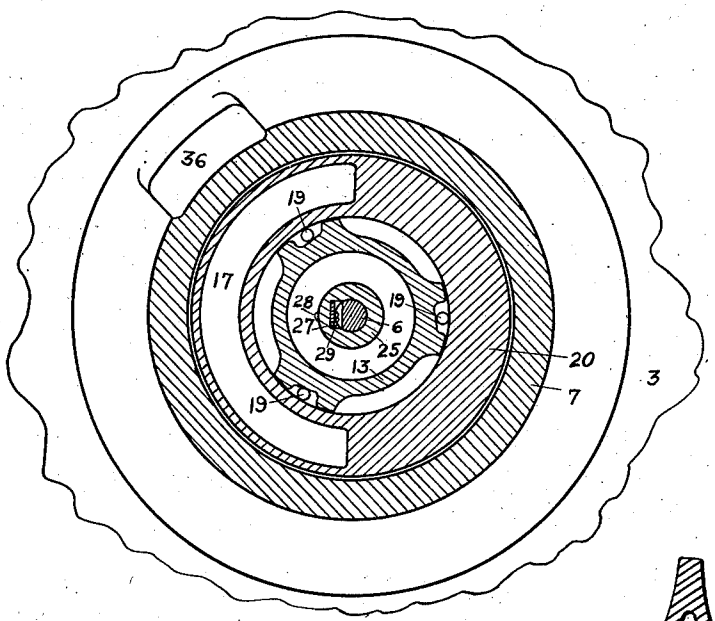

FIG. 4

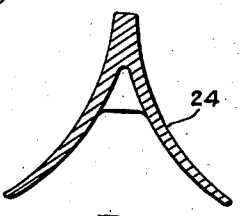

FIG. 6.

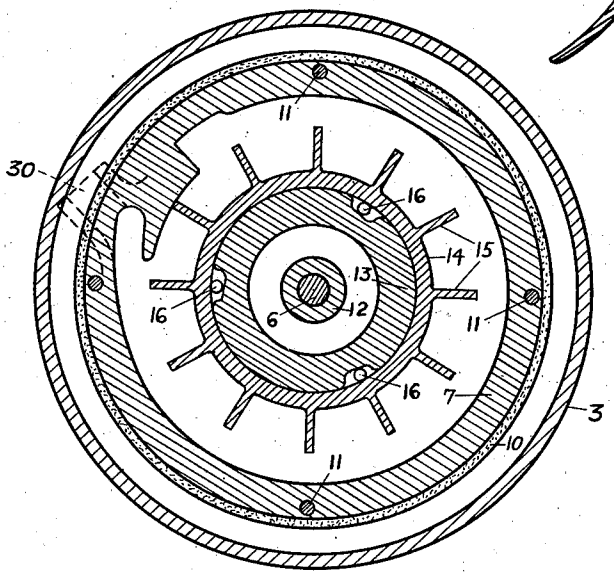

FIG. 5

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2,077,098

WASHING MACHINE

Russell L. Dort, Davenport, Iowa

Application October 21, 1933, Serial No. 694,636

16 Claims. (Cl. 259—102)

The present invention relates to the art of washing machines, this machine being particularly designed for the washing of dishes, although, as will be readily understood, it is not necessarily limited to that use. Among the objects of this invention are to provide a machine which will give to the washing fluid a maximum amount of agitation; to provide a machine in which the washing fluid will, during the operation of the machine, be driven with considerable force in all directions toward the articles being washed; to provide a machine of the character indicated which will be very efficient and thorough in its operation; and such further objects, advantages and capabilities as will hereafter appear and as are inherent in the construction disclosed herein. My invention further resides in the combination, construction and arrangement of parts illustrated in the accompanying drawings and, while I have shown therein what is now considered the preferred embodiment of this invention, I desire the same to be understood as illustrative only and not to be interpreted in a limiting sense.

In the drawings annexed hereto and forming a part hereof,

Fig. 1 is an elevation of a machine embodying my invention, a part thereof being broken away to show the internal arrangement;

Fig. 2 is a plan view of the agitator and a part of the bottom of the tub of a machine embodying my present invention;

Fig. 3 is a vertical substantially central section through the bottom of the tub and the agitating mechanism;

Fig. 4 is a horizontal section through the agitating mechanism substantially along the plane indicated by the line 4—4, Fig. 3;

Fig. 5 is a horizontal section similar to Fig. 4 but taken substantially along the plane indicated by the line 5—5, Fig. 3;

Fig. 6 is a transverse section taken through one of the fluid scoops of the agitator;

Fig. 7 is an elevation, partly in section, of an agitator to replace that shown in Figs. 2 and 3 when it is desired to use the machine for washing fabrics.

Reference will now be made in greater detail to the annexed drawings for a more complete description of this invention. The body 1 of the machine has a supporting base 2, preferably provided with suitable casters. The bottom 3 of the body or tub 1 has an approximately centrally located aperture around which the bottom of the tub is offset downwardly somewhat, as indicated at 4. A motor casing 5 contains a motor which has a shaft 6 extending upwardly through the end of the motor casing, this end being suitably secured to the bottom of the tub. A ring 7 has an outwardly extending flange 8 which cooperates with the corresponding flange 9 projecting from the end of the motor casing 5. Between the flanges 8 and 9 is a gasket 10 which is folded over the edge of the tub bottom and, when compressed between the flanges, serves to prevent leakage from the tub around the motor casing. A plurality of securing means, shown in the present drawings as bolts 11, fasten the flanges 8 and 9 together and compress the gasket 10.

The end of the motor casing has a sleeve 12 which serves as a bearing for the motor shaft 6 and as a support for the agitator. Surrounding the upper end of the shaft 6 and resting on the sleeve 12 is a power transmission unit 13 which is connectible to and disconnectible from a ring 14, bearing vanes 15, by means of roller clutch elements 16. The purpose of this pump will be set forth more fully hereinafter.

The openings 17 and 18 are utilized in securing dynamic balance of the rotating heads so as to eliminate or reduce to a minimum the whipping action which might otherwise be present. A plurality of cylindrical clutch elements 19 are interposed between the outer face of element 13 and the inner face of the downward projection 20 of the head 21 which carries the shaft 22 upon which is mounted the arm 23 carrying the agitator scoops 24. The shape of these scoops is shown in Figs. 2, 3 and 6. A sleeve 25 forms a part of member 13 and serves as an axis about which the body member 21 may rotate, or rather, which may rotate within the body member 21 when it is desired to operate the pump and permit the agitator to remain quiet. The head 21 is held against coming off from the sleeve 25 by means of the screw 26 which is screwed tightly into the sleeve 25. A spring catch 27 is secured to the sleeve 25, as indicated at 28, and engages a notch 29a in the shaft 6 so as to cause transmission of rotation from the shaft to the sleeve and from this to member 13, and also to prevent the assembly from accidental removal from the shaft. The shaft is flattened at 29 to accommodate the spring 27 and fastening means 28.

Connected with the opening 30 (see Fig. 3) is a pipe 31 which rises along the side of the tub and is provided at its upper end with a horizontal arm 32, carrying at its free end a head 33 which

may be turned about the end of the pipe **32**. A switch **34** controls the supply of current to the motor in the casing **5**, the wires leading from the switch through the pipe **35** to the motor. When the switch is actuated from neutral position, or off position, in one direction, the motor will be actuated in one direction, whereas, if the switch is actuated in the opposite direction, the motor will be reversed. If the head **21** rotates in the direction indicated by the arrow in Fig. 2, it is due to the connection of this head to the body **13** and shaft **6** by means of the rollers **19**. On the other hand, if shaft **6** is rotated in the opposite direction, the rollers **19** will not cause clutching of member **13** and projection **20** of body **21**. However, when shaft **6** rotates in the opposite direction from that indicated by the arrow in Fig. 2, sleeve **25** and member **13** are also rotated in such opposite direction and the clutch elements **16** then engage the ring **14** and cause rotation thereof, correspondingly. As indicated heretofore, rotation of this ring causes the vanes **15** to be carried about and they force the water out of opening **30**, through pipe **31** and head **33**. The pipe **31** and head **33** are shown in Fig. 1 in position to receive water and carry same into the interior of the tub **1**. If it is desired to empty the tub, the head **33** is preferably turned to face downwardly and the arm **32** is swung around so as to bring the head **33** over the opening to which the water is to be delivered. Now, when the pump is actuated, the water will be forced thereby through the pipes **31** and **32** and out of the head. An opening **36** leads through the ring **7** and into the chamber above the motor casing head, with which chamber the opening **30** connects. This permits the flow of water from the tub into the pump chamber when the pump is being actuated. One of the important objects to be attained in having the agitator disconnected from the drive shaft when the pump is operating is to avoid throwing the grease and dirt, accumulated on top of the water, over the dishes. It will be understood that the reversing switch may be dispensed with, a non-reversing motor used and one or both of the clutches replaced by manually actuated clutches.

When shaft **6** rotates the head **21** in the direction indicated by the arrow in Fig. 2, the spindle **22** is carried about the shaft as an axis and carries the arm **23** with it. This arm carries the scoops **24** and their lower ends dip into the water in the tub and cause same to be thrown violently upward, first by one pair of scoops and then by the pair on the opposite side of the arm **23**. The spindle **22** is free to rotate in its bearing in the head **21** and the arm **23** may therefore shift its angular position with relation to a fixed line in the tub. Thus, the direction in which the water is thrown by the scoops **24** will vary with the changes in direction of the arm **23**. From this it follows that the dishes will be thoroughly washed on both sides. On account of the violence with which the water is agitated, it is necessary to have a cover **37** to close the opening in the top of the tub. This is secured in place by any suitable fastening means **38**. Within the tub and above the agitator are suitable racks for the holding of the dishes during the washing thereof. These racks are designed to be removed when desired, as, for example, when it is desired to wipe out the inside of the tub. It will be apparent that the entire agitator head may be removed by taking hold of the arm **23** and lifting directly upwardly. This causes removal of everything above the motor casing head and within the ring **7**, with the exception of the shaft **6**. If it is desired to separate the parts **13** and **21**, it is necessary to remove the bolt **26**.

The upwardly projecting portion of ring **7**, indicated by numeral **7a**, closely surrounds the head **21** but fits loosely enough to permit free rotation thereof. Rotation of the head will cause the water between head **21** and part **7a** to be thrown out and will prevent accumulation of other water therein while the head is rotating. This prevents lateral pressure against the head and also increase of the power consumption due to the friction of water.

When the structure shown in Fig. 7 for the washing of fabrics is substituted for that shown at **22**, **23** and **24**, the body **40** acts as a scoop to throw the water upwardly while the vane **41** gives part of it a lateral component of motion so that there is a thorough agitation of the water and the fabrics.

It will of course be understood that the specific description of structure set forth above may be departed from without departing from the spirit of this invention as set forth in this specification and the appended claims.

Having now described my invention, I claim:

1. In a machine of the character indicated, a tub having an opening in the bottom thereof, a reversible motor having a casing closing the opening in the bottom of the tub, the shaft of the motor passing through the end of the casing and into the tub, a supporting and actuating member mounted on the shaft within the tub, a rotary pump element mounted on the last mentioned element and rotated thereby when the shaft rotates in one direction but released from driving connection therewith when the shaft rotates in the opposite direction.

2. A machine for the purpose indicated comprising a tub having an aperture in the bottom thereof for the reception of driving mechanism for an agitator, a motor having a casing closed at one end with the exception of an opening for a motor shaft, the closed end of the motor casing serving as a closure for the opening in the tub bottom, a power transmitting means mounted upon and secured to the shaft to rotate therewith, a body mounted upon and surrounding said last mentioned element and connected thereto in driving relation, to be driven thereby, when the shaft rotates in one direction, but being free from such connection when the shaft rotates in the opposite direction, and an agitator carried by said body and rotated around said shaft as a center when the body rotates with the shaft.

3. A structure of the character indicated comprising a tub having an opening in the bottom thereof, a motor having a casing one end of which serves as a closure for the opening in the bottom of the tub, the shaft of the motor extending through said end of the casing and into the interior of the tub, a supporting and power transmission means connected to the shaft in driving relation and extending into proximity to the end of the motor casing, a rotary pump element mounted upon said power transmission means and capable of rotation independently thereof, clutching means for connecting the pump element and the power transmission means in driving relation and capable of disconnecting the two so as to permit the power transmission means to rotate independently of the pump element, a head mounted on and supported by said power transmission means, the two being capable of independ-

ent rotation, and clutching means for connecting the two in driving relation, said head carrying an agitator for agitating water contained in said tub.

4. A structure as defined by claim 3 in which the agitator is eccentrically carried by the head.

5. In a washing machine, a tub having an opening in the bottom thereof, an electric motor casing having one end secured directly to the tub bottom and forming a closure for said opening, said end of the motor casing having an opening therethrough leading to the exterior of the tub, a pipe leading from said opening, said pipe being adapted to have water discharged therethrough from the bottom of the tub or to receive water and convey it to the tub, a motor shaft extending through the end of the motor casing and into the interior of the tub, a pump element connected in driving relation to said shaft whereby the water may be drawn from the tub and forced through the opening and pipe to be discharged, and an agitator mounted eccentrically with relation to the shaft to be carried around the shaft.

6. A washing machine comprising a tub having an opening in the bottom thereof, a motor casing serving to enclose a driving motor and to form a closure for the opening in the bottom of the tub, a ring cooperating with the motor casing in securing the latter to the tub bottom, said ring extending upwardly from the tub bottom and having an opening therein at the level of the tub bottom for permitting water to pass through the ring into contact with the motor casing, an agitator within the tub, and connecting means for connecting the agitator with the motor shaft in driving relation, said connecting means including clutching elements capable of connecting the agitator and the motor shaft in driving relation or, upon reversal of rotation of the motor shaft, of disconnecting the driving connection between the agitator and said shaft.

7. In a machine of the nature indicated, a tub, a motor having a shaft extending into the tub, a supporting and actuating member mounted on the shaft within the tub and rotatable therewith, an agitator eccentrically carried by said member and having a plurality of arms extending away from its point of connection with said member, and means between the shaft and member for disconnecting the driving connection between the agitator and the shaft at will.

8. A structure of the character indicated comprising a tub having an opening in the bottom thereof, a motor having a casing one end of which serves as a closure for the opening in the bottom of the tub, the shaft of the motor extending through said end of the casing and into the interior of the tub, a supporting and power transmission means connected to the shaft in driving relation and extending into proximity to the end of the motor casing, a rotary pump element mounted upon said power transmission means and capable of rotation independently thereof, clutching means for connecting the pump element and the power transmission means in driving relation when the motor shaft is rotated in one direction and capable of disconnecting the two so as to permit the power transmission means to rotate independently of the pump element when the shaft is rotated in the opposite direction, a head mounted on and supported by said power transmission means, the two being capable of independent rotation, and clutching means for connecting the two in driving relation when the motor shaft is rotated in one direction, said head carrying an agitator for agitating water contained in said tub.

9. In a washing machine, a tub having an opening in the bottom thereof, a motor casing serving to support a driving motor and to form a closure for the opening in the bottom of the tub, a shaft extending through the casing and into the tub, an agitator rotatable on a vertical axis and a head connected to the shaft and rotatable therewith in close proximity to the bottom of the tub and forming a bearing for the agitator, said agitator being capable of independent rotation and adapted to project washing fluid.

10. A structure of the character indicated, comprising a tub having an opening in the bottom, a casing serving to enclose a driving motor and to close said opening in the bottom of the tub, a vertical shaft extending from the motor through said casing into the tub, a power transmission means connected to the shaft in driving relation, a pump element operatively connected to said power transmission means, a head mounted on said power transmission means, the two being capable of independent rotation, and clutching means for connecting the two in driving relation, said head carrying an agitator for agitating the water contained in said tub.

11. A washing machine comprising a tub having an aperture in the bottom thereof for the reception of driving mechanism for an agitator, a shaft passing through the opening in the tub bottom, a body connected to the shaft in driving relation, to be driven thereby, when the shaft rotates, said body having an eccentrically located bearing, and an agitator carried by said body and rotated around said shaft as an axis when the body rotates with the shaft, said agitator being free of driving connection with said shaft and being mounted in said eccentrically located bearing for independent rotation upon a substantially vertical axis.

12. A washing machine comprising a tub, driving means for an agitator, and an eccentrically mounted agitator in the bottom part of said tub and connected in operative relation to the driving means, said agitator comprising a body convex on its upper surface, and having an upwardly extending vane upon its upper surface.

13. In a washing machine, a tub, a pump and an agitator located in the bottom of the tub, and a vertically mounted drive shaft to be operatively connected to or disconnected from the agitator and pump, the pump being connectible to the drive shaft independently of the agitator.

14. In a washing machine, a tub having an opening in the bottom thereof, a motor external to the tub and having a casing whose external surface serves as a closure for the opening in the tub, the motor having a shaft extending through the casing and into the tub, a head connected to said shaft and rotatable therewith, and a single agitator mounted on said head eccentrically to the shaft and carried thereby about said shaft, said agitator being rotatable over the head.

15. In a structure of the character indicated, a washing tub, a power shaft extending through the bottom thereof, power transmission means surrounding said shaft and connected thereto in driving relation, a head operatively connected to the power transmission means and removable therewith from the shaft, a pump removable with the power transmission means, and an agitator connected to the head and removable therewith.

16. In a washing machine, a tub, a rotating

shaft extending vertically into the bottom part of the tub, an agitator capable of free rotation about a vertical axis located centrally with respect to the agitator, the agitator having its ends upon opposite sides of the shaft and spaced at varying distances therefrom as the agitator axis is carried about the shaft, the agitator being adapted to project washing fluid upon dishes, located above the agitator during the operation of the machine, and a head carried indirectly by the shaft and forming the bearing member in which the axis of the agitator rotates.

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