

April 6, 1937.

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2,076,280

AGITATING MECHANISM

Original Filed Oct. 12, 1932 2 Sheets-Sheet 1

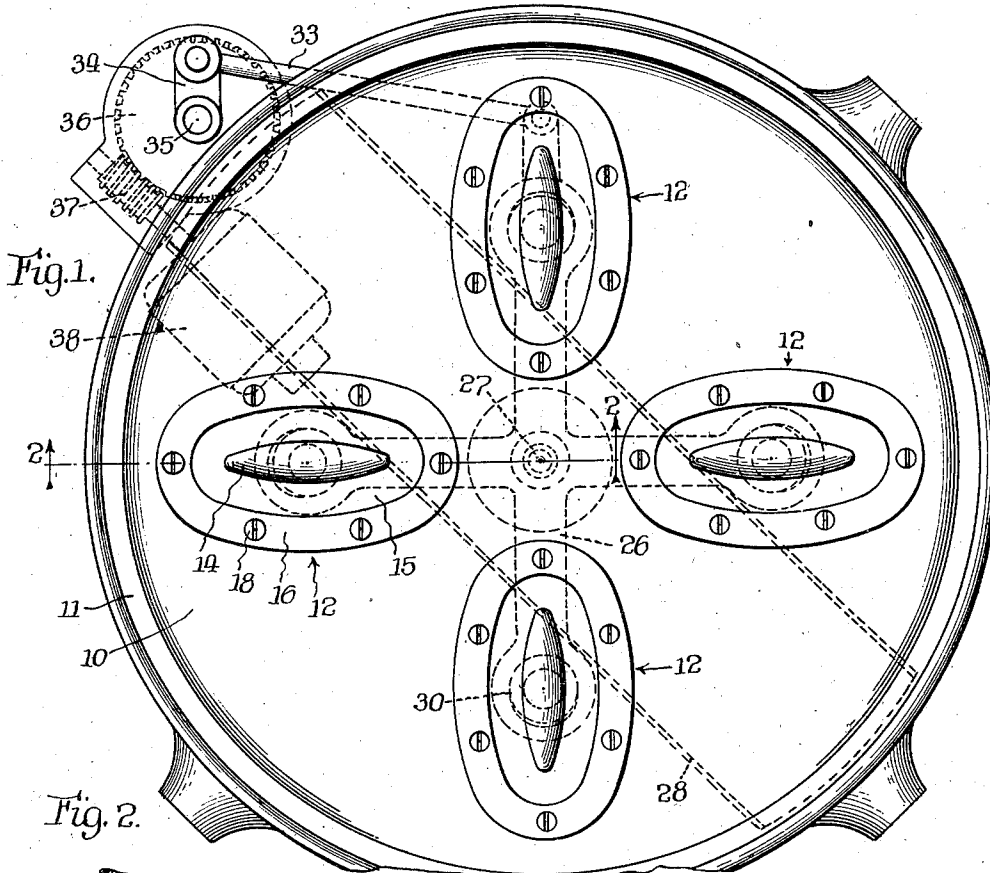


Fig. 2.

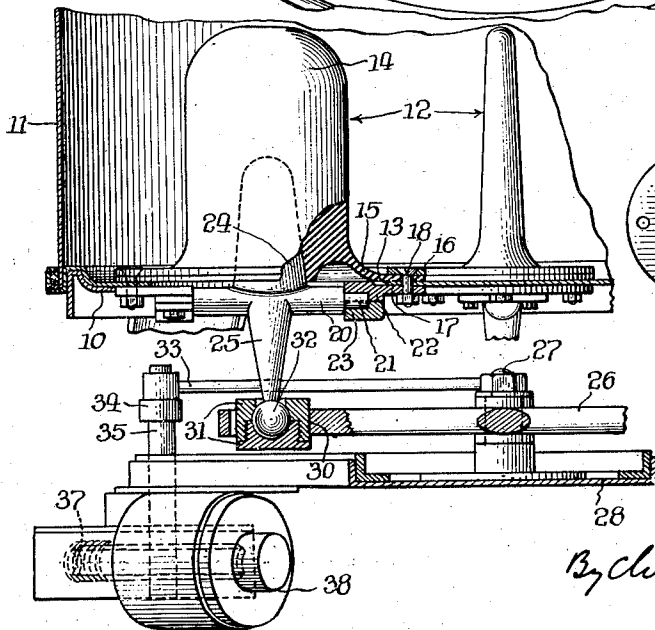
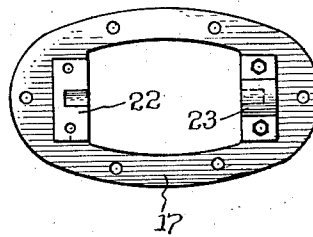


Fig. 3.



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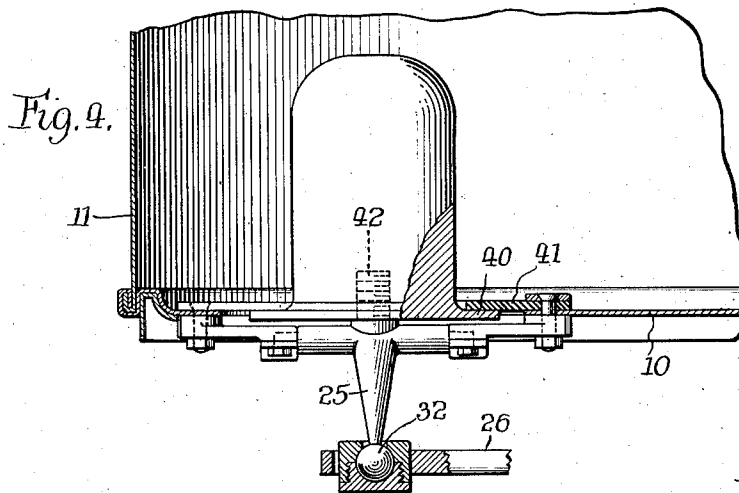
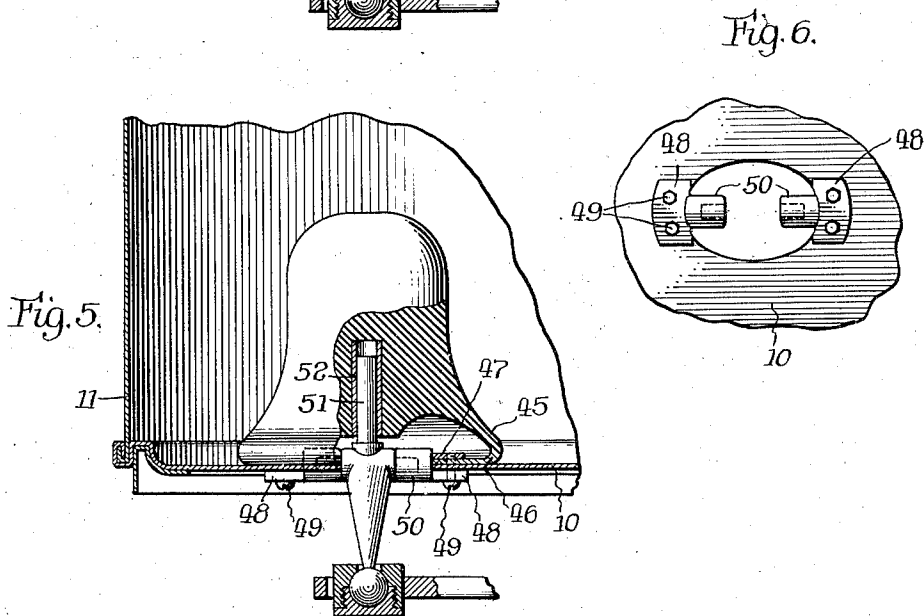
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AGITATING MECHANISM

Simon E. Schroeder, Chicago, Ill.

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20 Claims. (Cl. 259—100)

The invention relates generally to agitating mechanisms, and more particularly to agitating mechanisms for clothes-washing machines or the like.

The general object of the invention is to provide an agitating mechanism of a new and improved type.

Another object is to provide a washing machine comprising a tub and agitating means therein which produces a strong water action by movement of relatively small extent, thus avoiding danger of tearing the clothes which are being washed.

Another object is to provide an agitating mechanism which is simple and inexpensive to construct and efficient in operation.

A further object is to provide a novel agitating unit for a washing machine or the like.

Still another object is to provide a novel method of agitating clothes and liquid in the tub of a washing machine.

Other objects and advantages will become apparent from the following description taken in connection with the accompanying drawings, in which:

Figure 1 is a plan view of an agitating mechanism embodying the features of the invention.

Fig. 2 is a fragmentary vertical section taken along the line 2—2 of Fig. 1.

Fig. 3 is a view of the underside of one of the parts.

Fig. 4 is a view similar to Fig. 2 but of a modified form.

Fig. 5 is a view similar to Figs. 2 and 4 but of another modified form.

Fig. 6 is a fragmentary view of the underside of the form shown in Fig. 5.

The preferred embodiment comprises generally a container in which agitating means is mounted, said means comprising one or more agitating devices. Each device comprises broadly a vane extending inwardly of the container from one wall thereof and having a flexible portion attached to said wall in a water-tight manner. Each device also includes an operating member extending through said wall and actuated by means mounted externally of the container.

Herein, the invention is shown as embodied in a washing machine. The container is in the form of a tub having a bottom wall 10 and a side wall 11. Mounted within the tub is agitating means which preferably comprises a plurality of independent agitating devices, each indicated generally at 12. The devices are preferably mounted on the bottom wall 10 adjacent the side wall 11 and are symmetrically spaced relative to the center of the tub whereby each may influence the greatest volume of fluid independently of the others and be positioned substantially centrally of the volume of fluid influenced thereby.

Each device is mounted over an aperture 13 in the wall and comprises an oscillatable vane portion 14 extending inwardly from the aperture 13 preferably with its breadth radially of the tub and connected to the wall in a water-tight manner to seal the aperture, the connection being flexible to permit oscillation of the vane 14. As shown in Figs. 1 and 2, the vane 14 is made of rubber, fabric, or other flexible water-proof material and has an integral surrounding skirt or flange 15 extending from its end adjacent the wall, which skirt is secured to the wall around the edge of the aperture in a water-tight manner. In the present instance, the skirt 15 is clamped against the wall 10 by means of an inner ring 16 mounted within the tub and an outer ring 17 mounted externally of the tub, the rings 16 and 17 being drawn together as by screws 18 to clamp the skirt 15 and wall 10 therebetween.

Each device also includes a member for operating the vane 14, which member, in the present instance, is a lever pivotally supported with its axis parallel to the wall of the container. The preferred form of lever comprises a shaft portion 20 which is pivotally supported adjacent the wall. Preferably the shaft portion 20 is provided with reduced ends 21, each journaled in a bearing one-half of which, as shown at 22, may be formed integrally with the outer ring 17 and the other half by a cap 23 secured thereto.

Extending inwardly through the aperture 13 from the shaft portion 20 of the lever is a portion 24 rigidly connected to the vane 14 as by being moulded therein or cemented thereto, the edge of the aperture being spaced from the portion 24 a substantial distance to permit the skirt 15 to flex freely. Extending outwardly from the shaft portion 20 is an arm 25 connected at its free end with a means for rocking the lever, thus oscillating the vane 14.

The lever-rocking means preferably is common to all the agitating devices thus actuating them all in unison. As shown herein, the lever-rocking means comprises a spider 26 mounted centrally of the tub under the bottom thereof and rotatably supported by a fixed pivot 27 carried by a cross-brace 28 extending under the tub. The spider 26 has a plurality of arms, one for each agitating device, each arm being apertured at its end, as at 30, to receive a pair of complementary bearing blocks 31 having a spherical socket to receive a ball 32 formed on the end of the lever arm 25.

To oscillate the spider 26, a driving means is provided such as a pitman 33 connected at one end to an arm of the spider and at its other end to a crank 34 mounted on a shaft 35. The latter is driven by gearing carried by the cross-brace 28 and comprising a worm wheel 36 mesh-

ing with a worm 37 carried on the shaft of a motor 38.

In the modified form shown in Fig. 4, the vane portion of each agitating device is made of metal. To provide the flexible water-tight connection with the wall of the tub, the vane portion is provided with an integral flange 40 to which is attached, as by being moulded thereon or cemented thereto, a skirt or flange 41 made of flexible water-proof material such as rubber or fabric. The skirt 41 is clamped to the wall of the tub as heretofore described. The lever for operating the vane is secured thereto as by having its end threaded into the vane, as shown at 42.

In the modified form shown in Figs. 5 and 6, the vane is made of rubber, fabric or the like and is provided with an integral skirt or flange 45 which is turned inwardly as shown at 46 and there clamped to the wall 10 by an inner ring 47 and a pair of lugs 48 secured together as by screws 49. This form permits of a smaller aperture through the wall. The lugs 48 are placed diametrically opposite each other and each has a hub 50 pivotally supporting the shaft portion of the lever for operating the vane.

In this form, the end of the lever connected to the vane is in the form of a shaft 51 which is slidably received in a sleeve 52 rigidly secured in the vane. This construction permits a slight longitudinal shift of the vane relative to the lever to prevent danger of unnecessarily straining the skirt 45 adjacent its connection with the wall of the tub.

In the operation of the mechanism when the motor is running, the pitman 33 oscillates the spider 26 about its pivot 27. Each arm of the spider, being connected at its end to the ball 32 on the end of the arm 25 of the lever, causes the latter to oscillate the vane 14, the vanes for all the agitating devices being oscillated in unison.

Each vane 24 being positioned adjacent the side wall 11 of the tub with its breadth extending radially of the tub and being oscillated about an axis lying parallel to the bottom of the tub, a plurality of violent upwardly moving columns of fluid are created at fixed spaced points in the tub, inducing a flow downwardly along the side walls of the tub from top to bottom of the fluid and upwardly at the center of the tub. Thus, a continuous flow of the fluid is effected in circuitous paths throughout the tub. The vanes extend into these paths and oscillate transversely thereof whereby the articles carried by the currents are momentarily caught by the vanes and rapidly drawn through the fluid. Thus, the combined effect of producing currents in the fluid and moving the clothes through the fluid is attained. Each vane moves through a relatively small angle but the aggregate effect of all the vanes is to produce a strong water action. Thus, there is little danger, in the case of a washing machine, of the clothes being torn.

As each vane is oscillated, the skirt 15 flexes but maintains a water-tight seal over the aperture 13 in the wall of the tub.

In the modified form shown in Fig. 4, the skirt 41, which is secured to the flange 40 on the vane, is flexed as the vane is oscillated. In the form shown in Figs. 5 and 6, where the skirt 45 is inwardly turned, a sliding connection between the vane and the lever is effected by the shaft 51 and sleeve 52, so that the vane may shift relative to the lever to prevent any unnecessary straining of the skirt 45.

From the above, it is apparent that I have pro-

vided a new and improved type of agitating mechanism which produces the flow of liquid as described and which produces a strong action of the water, in the case of the washing machine, without danger of tearing the clothes. It is also apparent that the agitating mechanism here described is simple and inexpensive to construct and efficient in operation. It is also apparent that I have provided a novel agitating unit for a washing machine or the like.

I claim as my invention:

1. A washing machine comprising, in combination, a tub having a wall with an aperture therethrough, an oscillatable vane having its end adjacent said wall flexibly connected in a water-tight manner to the portion of said wall surrounding said aperture, said vane extending inwardly of the tub from said end, and means for oscillating said vane extending through said aperture to connect with said vane.

2. A washing machine comprising, in combination, a tub having an aperture through one wall thereof, an oscillatable vane mounted in said tub over said aperture and having a flexible water-tight portion extending over and sealing said aperture, and means for oscillating said vane extending through said aperture to connect with said vane.

3. A washing machine comprising, in combination, a tub, a vane in said tub having a flexible water-tight connection with one wall of the tub and oscillatable about an axis parallel with said wall, and means for oscillating said vane extending through said wall to connect with said vane.

4. A washing machine comprising, in combination, a tub having a wall with a plurality of spaced apertures therethrough, a plurality of agitators mounted in said tub over the respective apertures, each agitator comprising a vane and a flexible skirt secured to said wall in a water-tight manner to close said aperture, a plurality of operating members extending through the respective apertures to the respective vanes, and a common means mounted externally of the tub for actuating said operating members.

5. A washing machine comprising, in combination, a tub having an apertured wall, an oscillatable vane mounted in said tub over said aperture, a lever pivotally supported adjacent said wall and having its free end extending through said aperture to connect with said vane, means for rocking said lever, and a skirt of flexible material extending from said vane to said wall surrounding said aperture and forming a water-tight seal over said aperture.

6. A machine of the character described comprising, in combination, a container having a plurality of spaced apertures in the wall thereof, a plurality of independent agitating devices mounted over the respective apertures, each device comprising a vane extending inwardly from the wall, a flexible skirt connected to said wall in a water-tight manner to seal said aperture, and an operating lever extending through said aperture, and means for actuating said levers.

7. A machine of the character described comprising, in combination, a container having a plurality of spaced apertures in the wall thereof, a plurality of independent agitating devices mounted over the respective apertures within said container, each device having a flexible water-tight connection with the wall and including a lever extending through said aperture, and an oscillatory spider mounted externally of the con-

tainer and connected to said levers to actuate said devices.

8. A machine of the character described comprising, in combination, a container having an apertured wall, an agitating device mounted therein comprising a vane of flexible material having an integral portion thereof attached to said wall in a water-tight manner and sealing said aperture, and means for oscillating said vane extending through said aperture.

9. An agitating device for a washing machine adapted to be actuated by means outside of the tub, said device being made of flexible material and having an integral skirt constructed for attachment to the wall of the tub in a water-tight manner to form a seal around the connection between the device and the actuating means.

10. A washing machine comprising, in combination, a tub having a wall with an aperture therethrough, an agitator mounted in said tub over said aperture, said agitator comprising a vane and a flexible closure extending from a portion of said vane adjacent said wall to said wall and secured thereto in a water-tight manner to close said aperture, an operating member extending through said aperture to said vane, and means mounted externally of the tub for actuating said operating member.

11. A washing machine comprising, in combination, a tub, agitating means within the tub, actuating means outside of the tub, said tub having an aperture in one wall thereof, said two means being connected through said aperture and a flexible closure for sealing said aperture attached at its center to one of said means and at its periphery to the wall of said tub adjacent said aperture, the edge of said aperture being spaced from said means a substantial distance to permit the closure to flex freely.

12. A washing machine comprising, in combination, a tub, a plurality of independent agitating devices mounted within the tub in spaced relation to each other and symmetrically arranged relative to the center of the tub, and means for actuating said devices, each device comprising a vane having its facial plane normally positioned radially of the tub and oscillatable about an axis included in said plane and positioned parallel to and adjacent a wall of the tub.

13. A washing machine comprising, in combination, a tub, a plurality of independent agitating devices mounted within the tub in spaced relation to each other and spaced from the center of the tub, each device comprising a vane having its facial plane normally positioned radially of the tub and oscillatable about a horizontal axis included in said plane, and means for oscillating said vanes.

14. A washing machine comprising, in combination, a tub having a bottom wall, a plurality of independent agitating devices mounted within the tub in spaced relation to each other and spaced from the center of the tub, each device comprising a vane oscillatable about an axis extending radially of the tub and adjacent the bottom wall, and means for oscillating said vanes.

15. A washing machine comprising, in combination, a tub having a wall with an aperture therethrough, oscillatory agitating means with-

in the tub mounted adjacent said aperture, flexible sealing means attached to said agitating means and said wall to seal said aperture, and means outside of said tub for oscillating said agitating means, the axis of oscillation of said agitating means being located parallel and closely adjacent the plane of said wall whereby a minimum amount of flexing occurs in said sealing means.

16. A washing machine comprising, in combination, a sheet metal tub having a bottom wall with an aperture therethrough, agitating means comprising an upstanding vane mounted over said aperture, means mounted under the tub and extending up through said aperture for oscillating said vane about an axis parallel to or in the plane of said bottom wall, and a sheet of flexible rubber extending laterally from said vane and clamped at its periphery to said bottom wall to seal said aperture.

17. A washing machine comprising, in combination, a sheet metal tub having a bottom wall with an aperture therethrough, agitating means extending upwardly within the tub mounted over said aperture, means mounted under the tub and extending up through said aperture for oscillating said agitating means about an axis parallel to or in the plane of said bottom wall, and means associated with said agitating means and said bottom wall adjacent said aperture for sealing said aperture.

18. A washing machine comprising, in combination, a tub having a wall with an aperture therethrough, agitating means located within the tub adjacent said aperture and oscillatable about an axis parallel to or in the plane of said wall, means for oscillating said agitating means located outside of said tub, said agitating means and the oscillating means being connected through said aperture, and a seal associated with said wall and with one of said means for sealing said aperture.

19. A washing machine comprising, in combination, a tub, agitating means within the tub, actuating means outside of the tub, said tub having an aperture in one wall thereof, said two means being connected through said aperture, and a flexible closure attached at its center to one of said means and at its periphery to the wall of said tub adjacent said aperture, the edge of said aperture being spaced from said means a substantial distance to permit the closure to flex freely, said flexible closure constituting the sole means for closing the space between the edge of said aperture and said means and being exposed to the contents of the tub.

20. A washing machine comprising, in combination, a tub, agitating means within the tub, actuating means outside of the tub, said tub having an aperture in one wall thereof, said two means being mounted through said aperture, and a flexible closure for sealing said aperture attached at its center to one of said means and at its periphery to the wall of said tub adjacent said aperture, the edge of said aperture being spaced from said means a substantial distance to permit the closure to flex freely, said means having a tipping or tilting movement causing the flexible closure to be alternately depressed on one side and raised at the other side.

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