

June 23, 1953

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2,642,733

CLOTHES WASHING MACHINE AND AGITATOR THEREFOR

Original Filed July 26, 1943

2 Sheets-Sheet 1

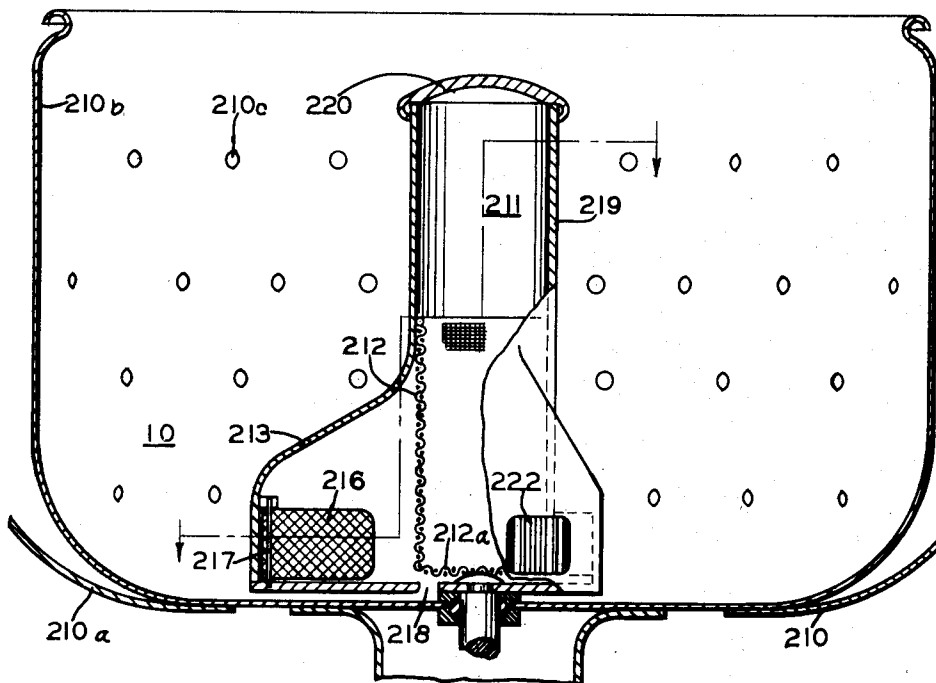


FIG. 1

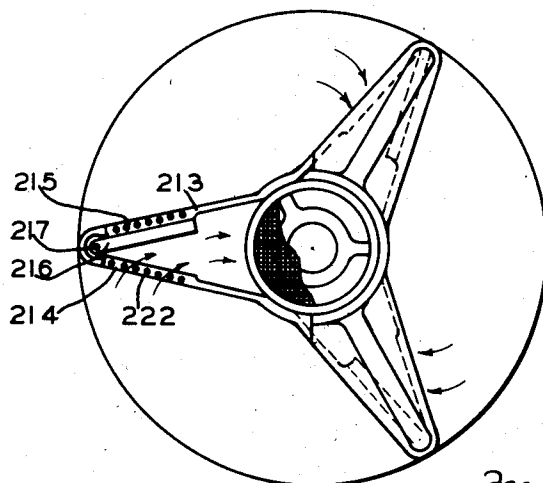


FIG. 2

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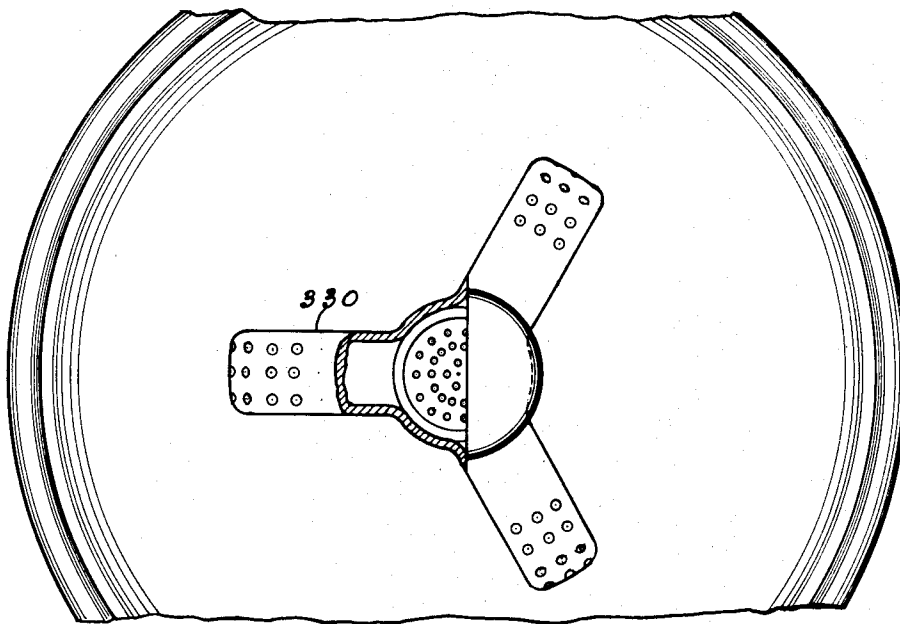


Fig. 4

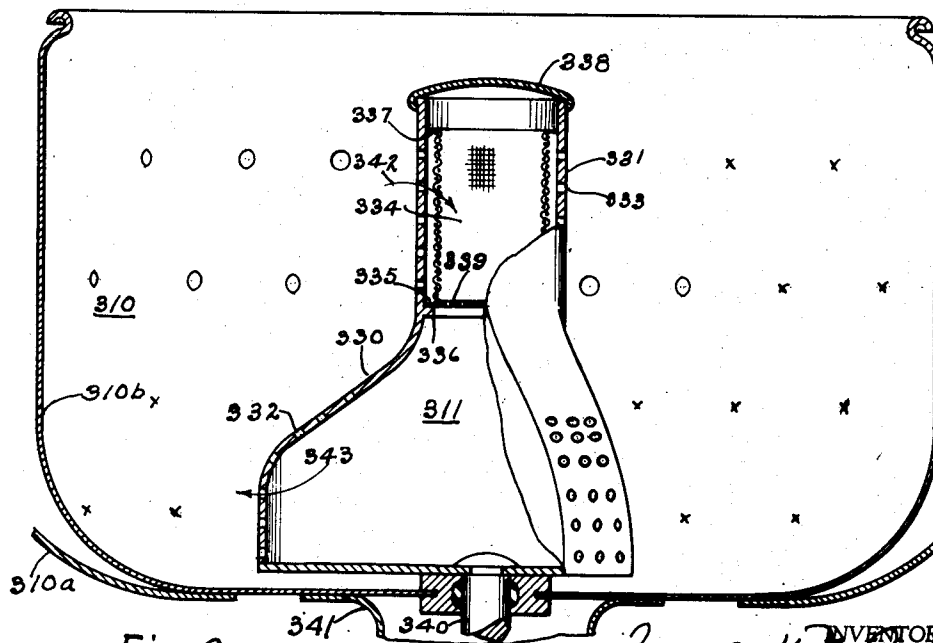


Fig. 3

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CLOTHES WASHING MACHINE AND
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496,102. Divided and this application June 16,
1949, Serial No. 99,484

2 Claims. (Cl. 68—134)

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This invention relates to domestic appliances, and more particularly to washing machines.

An object of this invention is to provide a clothes or fabric washing machine having a tub provided with agitating means which not only serves to circulate the contents of the tub and apply to the fabrics a scrubbing and flexing action, but simultaneously collects from the liquid on a readily cleanable screen such extraneous substances as the lint and soap scum formed during the washing process.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred form of the present invention is clearly shown.

In the drawings:

Fig. 1 is a vertical cross-section of the agitating means which may be used in a tub of a washing machine;

Fig. 2 is a horizontal cross-section of the agitator taken on the broken section line shown in Fig. 1;

Fig. 3 is a vertical cross-section of another modification; and

Fig. 4 is a plan view, partly in section, of Fig. 3.

Figs. 1 to 4 of this application are modifications of the invention disclosed in Figs. 1 and 2 of our copending application S. N. 496,102, filed July 26, 1943, for Domestic Appliance (issued as Patent 2,498,894, February 28, 1950). This application is a divisional application of said S. N. 496,102. The agitators shown in Figs. 1 to 4 of this application are of the circularly oscillatable type and are provided with means for arresting extraneous substances, and include means for producing a forced circulation of liquid through such arresting means.

Thus the agitator 211 is to be mounted on a shaft which is circularly oscillatable in the well known manner. The agitator is to be mounted in a tub construction substantially similar to the tub construction 10 shown in Fig. 1 of said application S. N. 496,102. During the washing operation, the agitator 211 is to be circularly oscillated while the tub construction remains stationary. Thereafter, the tub construction and the agitator 211 are rotated in order to extract the liquid centrifugally from the clothes or fabrics. Mechanisms and constructions for circularly oscillating a shaft and centrifugally rotating such shaft and the tub construction are well known and are therefore not illustrated or further described.

The agitator 211 may be provided with extraneous substance arresting means in the form of a cylindrical screen 212, within the central portion of the agitator.

Means for producing a forced circulation of

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liquid through the screen are provided. Thus radial vanes 213 are made hollow and are provided with oppositely disposed openings 214 and 215. A valve construction 216 is provided, to be actuated by the oscillating movement of the agitator alternately to open and close each of the openings 214 and 215. For example, the valve 216 may be mounted on a fulcrum structure or pin 217, which allows the valve 216 to swing alternately against the inner edges of the openings 214 and 215. If desired, the valve 216 may be flexible and may be rigidly held at one edge and allowed to flex against the openings 214 and 215 instead of being swingably mounted on a fulcrum or pin.

The agitator 211 is also provided with one or more central openings 218 below the screen 212, these openings 218 being open to the main body of liquid in the tub construction.

If desired the upper portion of the agitator 211 may be provided with a cylindrical extension 219 and a removable cap 220, which cap, if desired, may be flexible and removable or it may be rigid and removable by being screw-threaded, as is obvious. The screen 212 may then be cleaned or replaced as desired.

In the operation of the modification shown in Figs. 1 and 2, the clothes or fabrics are placed within the tub construction corresponding to 10 of Fig. 1 of said application S. N. 496,102. Washing liquid and detergent may be placed in the tub and thereafter the agitator 211 may be circularly oscillated during a washing period. As the agitator oscillates counterclockwise (referring to Fig. 2) the valve 216 swings against the opening 215 and liquid is forced through the opening 218 back into the main body of liquid. The extraneous substances are arrested on the screen 212 as the liquid passes therethrough. When the agitator oscillates clockwise (referring to Fig. 2) the valve 216 swings against the opening 214, and liquid is forced through the screen 212 and opening 218, so that the extraneous substances continue to be arrested on the screen 212. When the washing operation has been completed, the tub construction and the agitator may be centrifugally rotated to extract the liquid from the clothes or fabrics. Thereafter one or more rinsing operations may be performed with clear liquid instead of with liquid detergent as heretofore described.

In the modification shown in Figs. 1 and 2, if desired, the bottom of screen 212 may be provided with a lower horizontal screen disc 212a, so that detergent may be placed within the screen 212 by the removal of cap 220, for the dissemination of detergent in the same manner as described with respect to Figs. 1 and 2 of said application S. N. 496,102.

The openings 214 and 215 may be provided with coarsely spaced bars or screen 222, which prevent the clothes from entering the interior of the agitator; but allow liquid and scum to pass therethrough.

In the modification shown in Figs. 3 and 4, the agitator is so shaped that centrifugal action causes the minor circulation through the agitator. The tub 310 may be substantially of the same construction as shown in Fig. 1 of said application S. N. 496,102, although the tub is only diagrammatically indicated. It includes the inner perforated receptacle 310b and the outer imperforate receptacle 310a. The agitator 311 is provided with radial vanes 330 in the lower portion, and a perforate cylindrical extension 331 in the upper portion. Perforations 332 are provided near the outer radial extremities of the vanes, and perforations 333 are provided in the upper cylindrical extension 331. Screen 334 is placed inside of the cylindrical extension 331, and has a flange 335 resting on a circumferential shelf 336. The upper end of the screen is provided with a flange 337 which bears against the inner surface of the extension 331. A removable cap 338 is provided at the upper end of the agitator, while the lower end of the screen 334 may be provided with a perforate disc 339.

The agitator 311 is circularly oscillated by a shaft 340, and the tub 310 is rotated centrifugally by the collar 341.

In the operation of the modification in Figs. 3 and 4, the cap 338 is removed and detergent is introduced inside of the screen 334. Clothes and washing liquid are placed in the tub 310 and then the agitator 311 is circularly oscillated. A circulation of liquid is forced into the openings 333, as indicated by the arrow 342, and this circulation continues through the screen 334 and disc 339 and out through the openings 332 as indicated by the arrow 343. This circulation is induced by the centrifugal action of the liquid in the vanes 330. Scum and extraneous substances are arrested on the outside of the screen 334. The screen may be removed through the upper end of the agitator for cleaning, as is evident.

While the extraneous substance arresting constructions and detergent disturbing devices have been shown for use with centrifugally rotatable tubs, it is to be understood that many of the advantages may be obtained when used with stationary tubs and with roller wringer constructions, and, accordingly, such modifications are within the purview of the invention.

The term "screen" as used herein is intended to define any device capable of arresting extraneous substances, and may be any filter, or arrester, made of coarse fabric, wire mesh, closely spaced parallel wires or bars, perforated metal, or the like.

The screen may be of any suitable size fine mesh.

If it is to arrest namely lint, the perforations or openings may be one-eighth inch or less in size; but, if desired, the screen may be as fine as 100 mesh per lineal inch. The openings between the bars 222 and the openings 333 are larger than those of the screen and prevent the clothes from entering the interior of the agitator; but allow liquid and scum to pass therethrough.

While the form of embodiment of the invention, as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, as may come within the scope of the claims which follow.

What is claimed is as follows:

1. A washing machine comprising, a tub, an agitator in said tub, means for oscillating said agitator about a vertical axis, said agitator having an upper hollow portion and a lower portion including radially extending hollow vanes communicating with said upper hollow portion thereof, fluid flow restraining means in the upper portion of said agitator and having relatively small passageways for arresting scum and particles, a set of spaced apart liquid inlet openings in the upper portion of said agitator adjacent said restraining means and being larger than said passageways therein, said set of inlet openings being sufficiently small to prevent clothes in said tub from contacting said restraining means, said hollow vanes having a closed bottom wall, closed spaced apart upright side walls and an outer wall connecting said side walls, a set of spaced apart liquid outlet openings in the outer connecting wall of each of said vanes, the closed upright side walls of said vanes causing, when said agitator is oscillated, a major circulation of fluid in said tub outside the agitator, and said set of openings in the upper portion of said agitator being vertically spaced from the sets of openings in said vanes for creating a minor circulation of fluid through said agitator, during oscillations thereof, which is filtered by said restraining means.

2. A washing machine comprising, a tub, an agitator in said tub, means for oscillating said agitator about a vertical axis, said agitator having an open ended hollow upper cylindrical portion and a lower portion including radially extending hollow vanes communicating with said hollow upper cylindrical portion thereof, supporting means on said agitator immediate said upper and lower portions thereof for receiving a screen, a cylindrical screen within the upper cylindrical portion of said agitator mounted on said supporting means and having relatively small passageways for arresting scum and particles, a removable cap for closing the open upper end of said agitator, a set of spaced apart liquid inlet openings in the upper cylindrical portion of said agitator adjacent said screen and being larger being sufficiently small to prevent clothes in said tub from contacting said screen, said hollow vanes having a closed bottom wall, closed spaced apart upright side walls and an outer wall connecting said side walls, a set of spaced apart liquid outlet openings in the outer connecting wall of each of said vanes, the closed upright side walls of said vanes causing, when said agitator is oscillated, a major circulation of fluid in said tub outside the agitator, and said set of openings in the upper cylindrical portion of said agitator being vertically spaced from the sets of openings in said vanes for creating a minor circulation of fluid through said agitator, during oscillations thereof, which is filtered by said screen.

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