

Aug. 20, 1946.

K. CLARK

2,406,198

DOMESTIC APPLIANCE

Filed Feb. 28, 1942

2 Sheets-Sheet 1

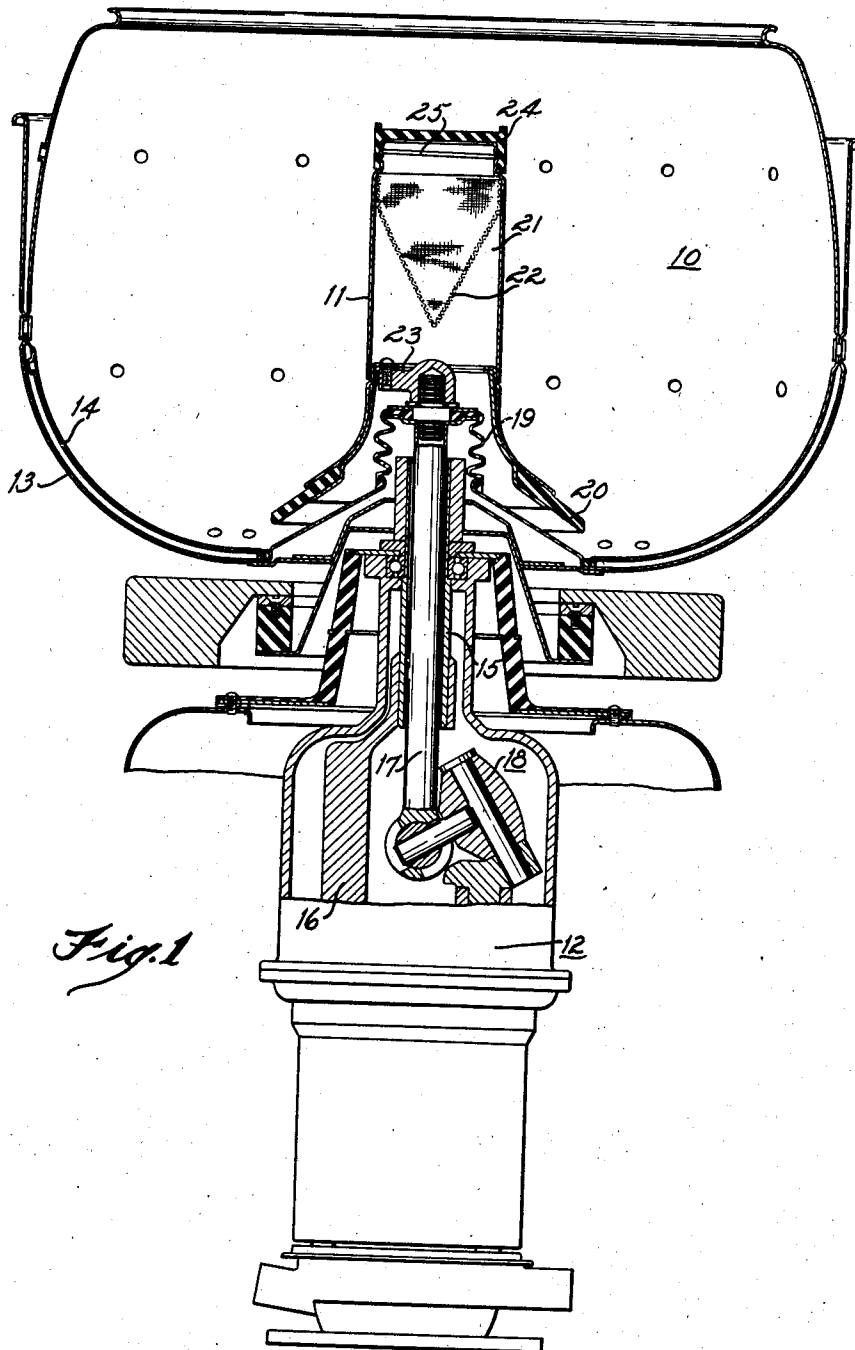


Fig. 1

Kendall Clark INVENTOR.
BY Spencer Hardman T. Elin

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K. CLARK

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2 Sheets-Sheet 2

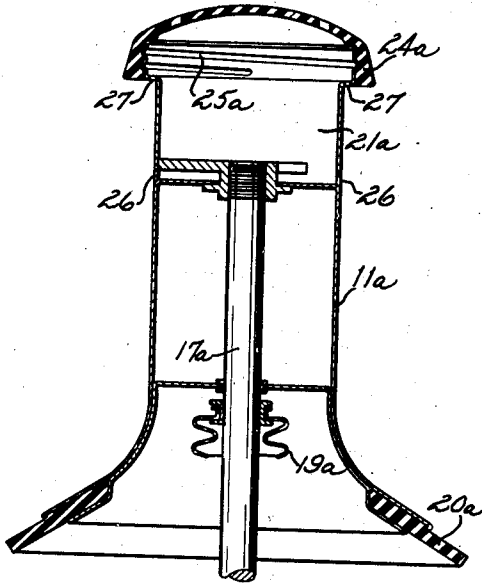


Fig. 2

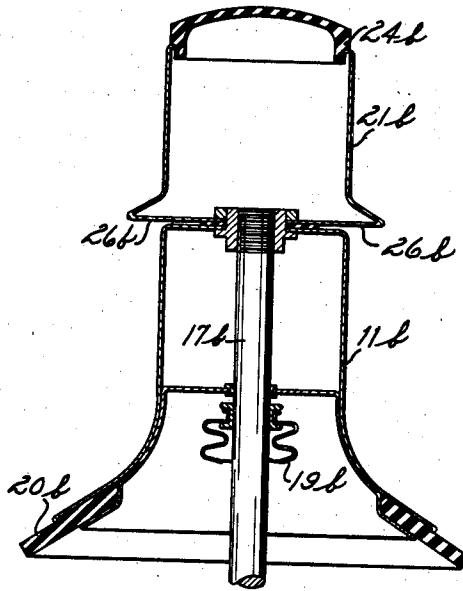


Fig. 3

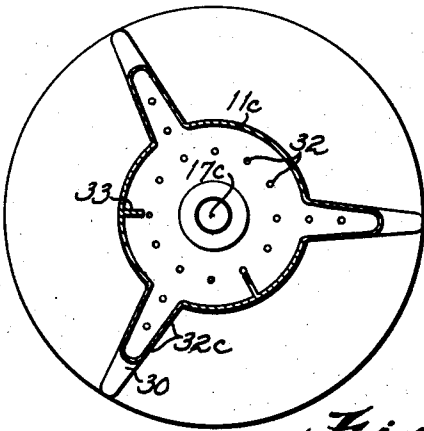


Fig. 5

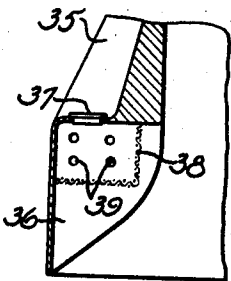


Fig. 6

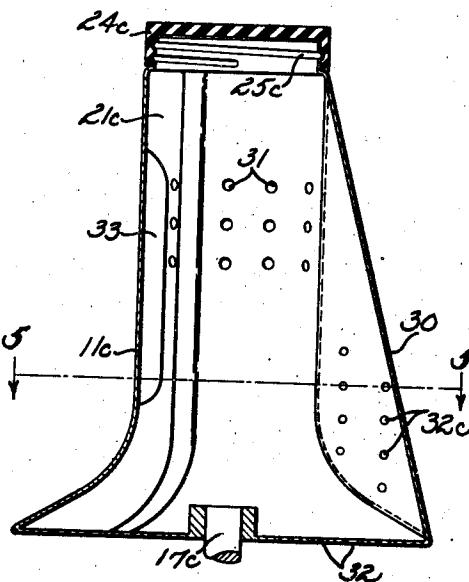


Fig. 4

INVENTOR
Kendall Clark
BY Spencer Hardman & Son

UNITED STATES PATENT OFFICE

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DOMESTIC APPLIANCE

Kendall Clark, Oakwood, Ohio, assignor to General Motors Corporation, Dayton, Ohio, a corporation of Delaware

Application February 28, 1942, Serial No. 432,861

5 Claims. (Cl. 68—17)

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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 washing machine with a device for automatically introducing soap or other detergent into the washing liquid.

Another object of this invention is to provide a washing machine with an agitator capable of agitating the clothes and of introducing soap or other detergent into the washing liquid.

Another object of this invention is to provide a washing machine with a power-driven movable holder for introducing soap or other detergent into the washing liquid.

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 a portion of a washing machine embodying features of my invention;

Fig. 2 is an enlarged view of a modified form of agitator;

Fig. 3 is a view similar to Fig. 2 showing a further modification;

Fig. 4 is a view showing a further modification;

Fig. 5 is a horizontal cross section of the modification shown in Fig. 4; and

Fig. 6 is a vertical cross section of a further modification.

A washing machine embodying my invention may include in general a receptacle 10 for holding washing liquid and the articles to be washed. Also, it may include a clothes agitator 11 adapted to perform the washing operations on the clothes or similar articles. It may also include an electric power driving mechanism 12 for imparting proper movement to the agitator 11.

If desired, the receptacle 10 may also be a centrifugal basket capable of containing the liquid while stationary, as by means of the imperforate tub 13 surrounding the perforate tub 14. These tubs may be secured on a rotatable sleeve 15 drivingly connected to the rotatable cage 16 of the electric power driving mechanism 12. The sleeve 15 may surround a to and fro or reciprocable shaft 17 which is secured to the agitator 11, so that the agitator 11 may be given a to and fro or vertical movement by means of the wobble mechanism 18. A flexible bellows seal 19 is secured to the shaft 17 and receptacle 10 to prevent flow of liquid along the shaft. The details of the container, and its combination with

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the reciprocable agitator 11, form no part of this invention, except in combination with the soap or detergent distributing means hereinafter to be described. These parts are more fully described and claimed in my copending application Serial No. 358,871, filed September 28, 1940 (Patent 2,366,236, January 2, 1945), to which reference is made, if necessary, for further disclosure thereof.

Preferably the agitator 11 is provided with a flexible disc 20 of rubber or the like at its lower rim, so that when the agitator 11 is quickly reciprocated, it imparts a toroidal circulation to the liquid, and at the same time effectively agitates the clothes or other articles to be washed. The agitator 11 is provided with a cylindrical chamber 21 in its upper portion, which communicates with the liquid in the receptacle 10. A screen 22 forms a detergent chamber in the upper part of chamber 21. The agitator 11 is secured to the reciprocable shaft 17 through the medium of a spider 23, so that liquid from the receptacle 10 may pass freely through the screen 22 and spider 23 to the upper part of chamber 21 while the agitator is being reciprocated. A removable cover 24 is secured to the top of the agitator 11, for example, by a threaded engagement at 25.

When it is desired to wash clothes or the like, the clothes and liquid are placed in the receptacle 10. The removable cover 24 is removed and soap or other detergent is placed therein in the form of a powder or as one or more solid bodies, and the cover 24 is replaced. Thereafter, the mechanism 12 is energized to produce a vigorous to and fro or reciprocating agitator action, so that the soap in the chamber 21 is quickly dissolved and disseminated into the liquid in receptacle 10 by the action of the liquid which flows back and forth between the receptacle 10 and the chamber 21 through the screen 22 and spider 23. This construction prevents the soap from clinging to the clothes, and insures proper solution of the soap in the liquid.

By this construction it is to be seen that the agitator 11 is capable of simultaneously agitating the clothes in the receptacle 10 and of introducing the soap or detergent into the liquid.

In the modification shown in Fig. 2, the agitator 11a may be placed in a container such as 10 shown in Fig. 1, and may be vertically reciprocated substantially in the same manner as agitator 11 in Fig. 1. A cylindrical chamber 21a is placed in the upper portion of the agitator immediately below the removable cover 24a. The

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chamber 21a is provided with openings at 26 and 27 to communicate with the tub 10. The remainder of the agitator 11a may be substantially the same in construction and operation as the agitator 11 previously described. In operation, the cover 24a is removed and soap or other detergent is placed in the cylindrical chamber 21a, after which the cover 24a is replaced on the agitator. Thereafter, the agitator is reciprocated in the liquid receptacle, together with liquid and clothes, to agitate the clothes and disseminate the soap into the liquid through openings 26 and 27.

In the modification shown in Fig. 3, the agitator 11b is substantially the same as agitator 11a, but the rubber cylindrical chamber 21b is made separate from the main body of the agitator. It is provided with openings at 26b. Soap is introduced by removing cover 24b, after which the cover is replaced and the operation then is the same as in Figs. 1 and 2.

In the modification shown in Figs. 4 and 5, the agitator 11c may be placed in any suitable liquid receptacle, such as 10, shown in Fig. 1. However, the agitator 11c is of the type which is moved to and fro or oscillated about a vertical axis, coaxially with the drive shaft 17a. Preferably, this is of the type in which no vertical reciprocation takes place, the movement being limited to oscillation about the vertical axis. However, it is to be understood that a combined vertical movement and oscillation about an axis may be provided, if desired. The agitator 11c is provided with a plurality of generally radial hollow vanes 30 which aid in agitating the clothes during the washing operation. The upper portion of the agitator forms a chamber 21c into which the soap or other detergent may be introduced by unscrewing the cover 24c. Openings 31 are placed in the upper part of the agitator, and other openings 32 are placed along the bottom of the agitator. Other openings 32c are placed along the side walls of the vanes 30. If desired, one or more inward radial or spiral vanes 33 are placed inside of the chamber 21b. In operation, the liquid from the receptacle 10 surrounding the agitator circulates through the chamber 21c through the openings 31, 32 and 32c, and this liquid is kept in agitation by the vane or vanes 33, so that the soap is dissolved and disseminated into the washing liquid while the clothes are being agitated.

In the modification shown in Fig. 6, an agitator somewhat similar to that shown in Fig. 4 is used. That is, it is an agitator of the type which is submerged in a receptacle similar to receptacle 10, and is provided with radial vanes 35. In this case, however, the lower portion of the agitator is an open cone at the bottom and is provided with a hollow chamber 36 between the radial vanes 35. This chamber is provided with a movable cover 37, and may be open at the bottom to the liquid in the receptacle 10 (Fig. 1) through the open bottom of the cone. A screen 38 is placed under the cover 37 and is adapted to hold soap powder or other detergent, which is introduced through the opening at 37. If desired, radial openings 39 may also be provided in the side of chamber 36. In operation, after the soap has been introduced through 37, the agitator is oscillated and washes the clothes in the liquid and simultaneously disseminates the soap through the screen 38 as the liquid is agitated during the washing operation.

In all of the embodiments heretofore disclosed,

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the agitator and receptacle 10 may be used by themselves or in combination with any means for wringing the clothes. The wringer construction may be separate from the receptacle 10, or the receptacle 10 may itself be a combined washing receptacle and centrifugal basket, of the type described in my copending application above referred to.

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 apparatus comprising a tub adapted to contain washing liquid and articles to be washed, a vertically reciprocable shaft extending upwardly through the bottom of said tub, an agitator in said tub secured to said shaft, said agitator being outwardly flared at the bottom and having a detergent chamber in its upper part provided with a perforate wall at the bottom of said detergent chamber in open communication with said tub, and a removable cover in sealing engagement with the upper part of said agitator to permit insertion of detergent into said chamber while said agitator is in operative position in said tub.

2. A washing machine comprising a tub adapted to contain liquid and articles to be washed, a vertically reciprocable shaft extending upwardly through the bottom of said tub, an agitator in said tub mounted on said shaft, said agitator having an outwardly flared lower portion open to said tub and having an upper, narrow, substantially vertical walled chamber in open communication with said lower portion, a perforate wall defining a detergent container in the upper portion of said chamber, and a removable cover in sealing engagement with the top of said chamber to permit insertion of detergent into said chamber while said agitator is in operative position in said tub.

3. A washing machine comprising a tub adapted to contain liquid and articles to be washed, a vertically reciprocable shaft extending upwardly through the bottom of said tub, an agitator in said tub, said agitator having an outwardly flared lower portion open to said tub provided with a flexible rim and having an upper, narrow, substantially vertical walled chamber in open communication with said lower portion, a support between said agitator and shaft having a liquid passageway between said lower portion and chamber, a perforate wall defining a detergent container in said chamber accessible to liquid passing back and forth through said support, and a removable cover in sealing engagement with the top of said chamber to permit insertion of detergent into said chamber while said agitator is in operative position in said tub.

4. A washing agitator to be vertically reciprocated in a tub by a vertically reciprocable shaft extending below said agitator comprising: a tubular imperforate main body having an outwardly extending cone-shaped flange at its lower edge; a spider in said body for attachment to said downwardly extending reciprocable shaft, said spider permitting the passage of liquid back and forth into said main body; a screen in said main body below the top of said body for supporting powdered detergent; and a removable cover in sealing engagement with the top end of said main body for the introduction of powdered detergent into said body while in operating position, and

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for the gradual solution of said detergent by liquid passing back and forth through said screen during operation of said agitator by said reciprocable shaft.

5. A washing agitator to be vertically reciprocated in a tub by a vertically reciprocable shaft extending below said agitator comprising: a main body having an outwardly extending cone-shaped flange at its lower edge; means for attaching said shaft to said main body; means in said main body 10

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forming a chamber to contain powdered detergent, said chamber having an opening at the top for the introduction of said detergent; a removable cover in sealing engagement with said main body closing said opening; and means providing for the flow of liquid into and out of said chamber from and to said tub to dissolve said detergent upon reciprocation of said agitator.

KENDALL CLARK.