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H. J. RAND  
WASHING MACHINE  
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2,499,162

Fig. 1.

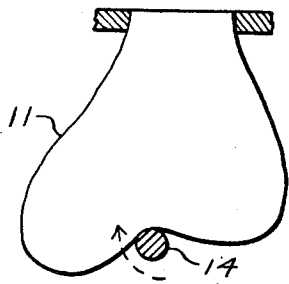
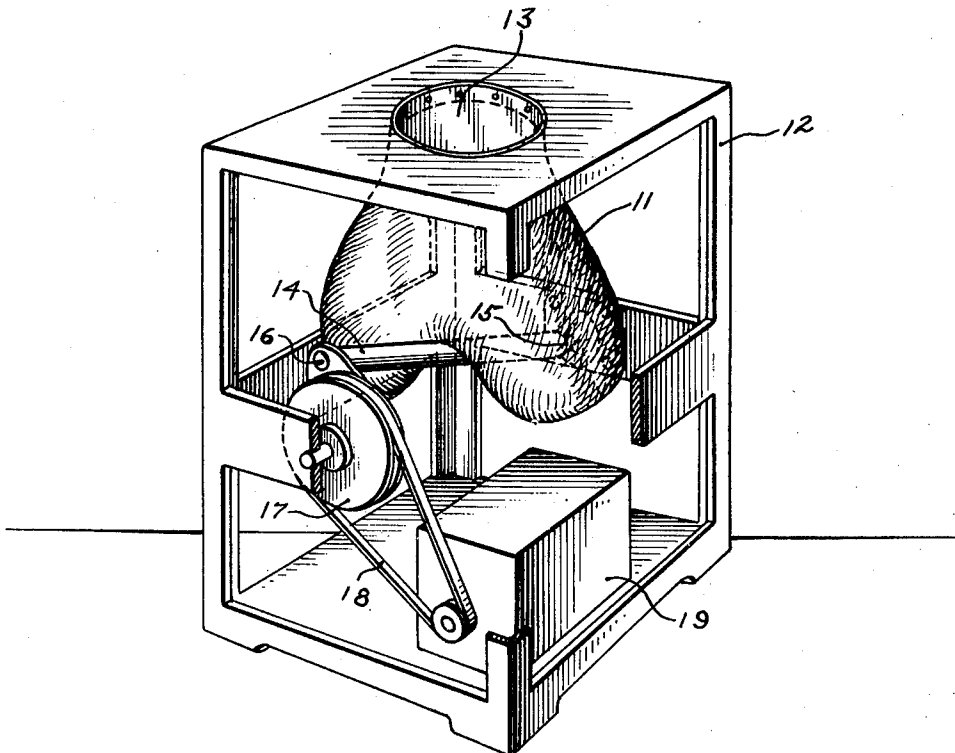


Fig. 2.

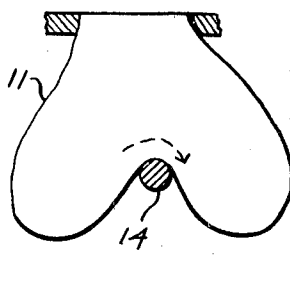


Fig. 3.

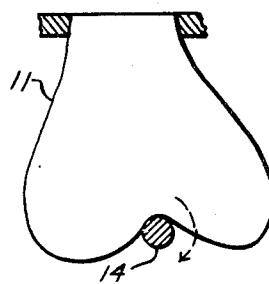


Fig. 4.

INVENTOR  
*Henry J. Rand*  
BY *Darby & Darby*  
ATTORNEYS

# UNITED STATES PATENT OFFICE

2,499,162

## WASHING MACHINE

Henry J. Rand, Westport, Conn., assignor to H. J. Rand Washing Machine Corp., Cleveland, Ohio, a corporation of Delaware

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2 Claims. (Cl. 68—96)

1

This invention relates to washing machines and particularly the type used in washing clothes and similar household goods.

Washing machines in most popular use today fundamentally depend for operation on the one principle of agitating a container of clothes and water. The agitation of the container produces sufficient movement of the water and clothing therein so as to remove the dirt. Many types of containers and methods of agitating the container have been disclosed and produced commercially. All of these types provide a rigid container usually of metal which is moved about in various fashions. Due to the fact that the container is rigid there is an unnecessary amount of power expended in moving the container alone even when empty. Also, with the rigid container, considerable irregular movement of the water and clothing therein, which might otherwise be available, is not to be had.

It is therefore an object of this invention to provide a washing machine operating on new and improved principles overcoming deficiencies of those known prior hereto.

It is another object of this invention to provide a washing machine in which the container is flexible.

It is a further object of this invention to provide a washing machine which will more effectively produce an agitated movement of the contents of the container, thereby increasing washing effectiveness.

Other objects will be apparent after a study of the following description, claims and drawing in which—

Figure 1 is a perspective view partially cut away illustrating the principle of operation of the washing machine; and

Figures 2, 3 and 4 are diagrammatical views showing the agitation and resultant distorted shape of the flexible container at different points of time.

Referring in more detail to Figure 1, there is illustrated a flexible bag 11 suspended within a suitable frame 12. The frame 12 may be of any desired construction and will vary considerably depending on the aesthetic lines desired and also may vary in the method of mechanically supporting the various elements of my washing machine. It is readily apparent that the particular construction of the frame 12 which is shown in Figure 1 is for illustrative purposes only.

Thus, it may be seen that the flexible bag 11 is suspended from the top of the frame 12 with

2

the opening in the bag suitably fastened about an opening 13 provided in the top of frame 12. Opening 13 provides the necessary outlet for inserting the material to be washed. Any suitable cover (not shown) may be provided to cover the opening 13.

The flexible bag 11 is preferably made of a fairly heavy material such as, for instance, heavy duck. Rubber is satisfactory as is any flexible material. However, I prefer a fairly heavy material such as duck in order that the bag will not readily be punctured by some foreign object such as a knife, for instance, inadvertently left in the clothing which is to be washed. Also, as will be apparent later, a comparatively heavy flexible material has been found to be somewhat more satisfactory in the washing operation than a fairly light flexible material such as rubber.

The bag should be air and water tight. However, the washing operation may be satisfactory even though the bag is not air and water tight.

The flexible bag 11 preferably has a teardrop shape. I have found this particular shape produces better results. This is not critical, however, and various other shapes may be found satisfactory such as, for instance, a cylindrical shape with a hemispherical end.

As seen in Figure 1, this flexible bag 11 is suspended from the top of the frame 12, hanging down inside the frame. Many types of agitation may be provided for the flexible bag 11. The particular type illustrated in the drawing is one type which I have found to be satisfactory.

The particular agitation which I prefer is provided by a suitable elongated cylindrical bar 14 which is supported so that the lower end of the bag 11 rests lightly on the bar 14. As may be seen, one end of the bar 14 is pivotally mounted at 15 by any suitable means which may be on one side of the frame 12. The other end of the bar 14 which extends beneath the container 11 to the other side of the frame 12 is eccentrically mounted at a point 16 on the circumference of a drive wheel 17. Wheel 17 is driven by any suitable means such as belt 18 and motor unit 19, also mounted within the frame 12.

The rotation of the drive wheel 17 will cause one end of the bar 14 to be driven up and down and also back and forth in an eccentric motion. Since the other end of the bar 14 is pivotally mounted at point 15 the resultant motion of the bar 14 will cause the flexible bag 11 to be agitated in an eccentric fashion. This provides the desired movement of the flexible bag 11 for the washing operation.

3

The movement of the flexible bag 11 is more clearly illustrated in Figures 2, 3 and 4 of the drawing. Thus, in Figure 2 the bar 14 is moving to the left and upwardly due to rotation of drive wheel 17. The side motion of the bar 14 causes the flexible bag 11 to be distorted and swerved to the left. At the same time bar 14 is moving upwardly so as to cause the lower end of the flexible bag 11 to push upwardly into the center of the bag. When the flexible bag 11 is filled with water and clothing, for instance, the contents are moved about in an aggravated fashion due to the distortion of the shape of the bag 11.

As the drive wheel 17 continues to rotate the bar 14 reaches the top of its movement but continues a sideways motion, this time in the opposite direction to that shown in Figure 2. This position is illustrated in Figure 3 which illustrates the distortion of the flexible bag 11.

The bar 14 then continues its downward path and then begins again to move to the left in a movement opposite to that shown in Figure 3. This position is illustrated in Figure 4 which may be seen to be the complementary relation of Figure 2 with the resultant distortion of the flexible bag 11 in another direction.

It readily will be apparent that when wheel 17 is driven rapidly so that the bar 14 agitates the flexible bag 11 rapidly in successive positions as illustrated in Figures 2, 3 and 4 the contents of the bag 11 will be considerably jounced about and the resultant aggravated movement of the water and the clothing therein has been found to be much greater than that provided by washing machines heretofore known. As a result a much improved washing action is obtained.

At the same time, there is no rigid mechanical framework against which the clothing or other material being washed is rubbed and as a result there is less wear and tear on the material which is being washed.

The drawing and the above description illustrate the fundamental working principle of the washing machine according to this invention. Various modifications, for instance, may be made in the method of filling the bag with the water, draining the water out at the end of the operation and drying the contents. Such improvements which I have made are the subject of an application copending herewith, Serial No. 718,650. Also, in copending application Serial No. 682,322, now Patent No. 2,472,682, there is disclosed and claimed a washing machine having a flexible diaphragm which, by vacuum, may be subjected to a squeezing action against a perforated agitator.

As pointed out previously, the method of agitating the flexible bag 11 which I have described and illustrated is merely one preferred form. Thus, a great many distorting actions will bring

4

about a washing action. Such means may be, for instance, a twisting action or squeezing action on the bag or by consecutive blows against the sides of the bag. Since the bag is flexible all of these will produce satisfactory washing action by distorting the bag in an irregular manner.

A great many modifications may be possible without departing from the scope of the invention.

What is claimed is:

1. In a washing machine, a vertically upstanding frame, a flexible air and watertight container attached to the upper portion of said frame, said container having an opening at its upper end for the insertion of clothes to be washed, and eccentric means to agitate said container comprising a drive wheel, and an agitator member adapted to contact the bottom portion of said container, said container being positioned to overhang said member on each side thereof, said member being pivoted at one end in said frame, the other end of said member being eccentrically mounted on said drive wheel.

2. In a washing machine, a vertical upstanding frame, a flexible air and watertight container having an opening at the upper end thereof to receive clothes to be washed, the upper end of said container being attached to said frame, and eccentric means transversely mounted in said frame to distort said container comprising a drive wheel and an agitator bar positioned transversely with respect to said container and adapted to continuously contact the lower portion of said container, said container overhanging said bar on each side thereof, said bar being mounted at one end for pivotal movement on one side of said frame, the other end of said bar being pivotally engaged with said drive wheel at an off-center position thereof, whereby said container may be continuously distorted to produce a washing action.

HENRY J. RAND.

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