Aug. 29, 1961 J. DUARRY SERRA 2,997,870

WASHING MACHINES

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Fig. 1

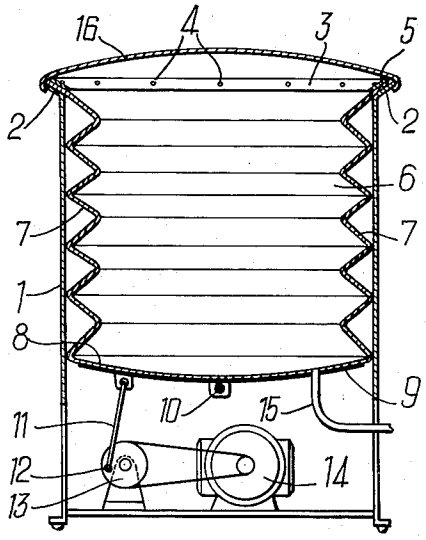


Fig. 2

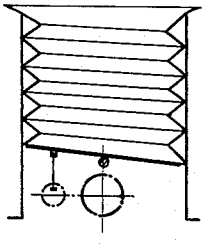
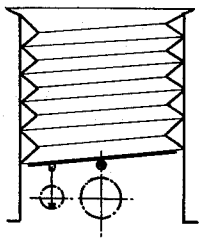


Fig. 3



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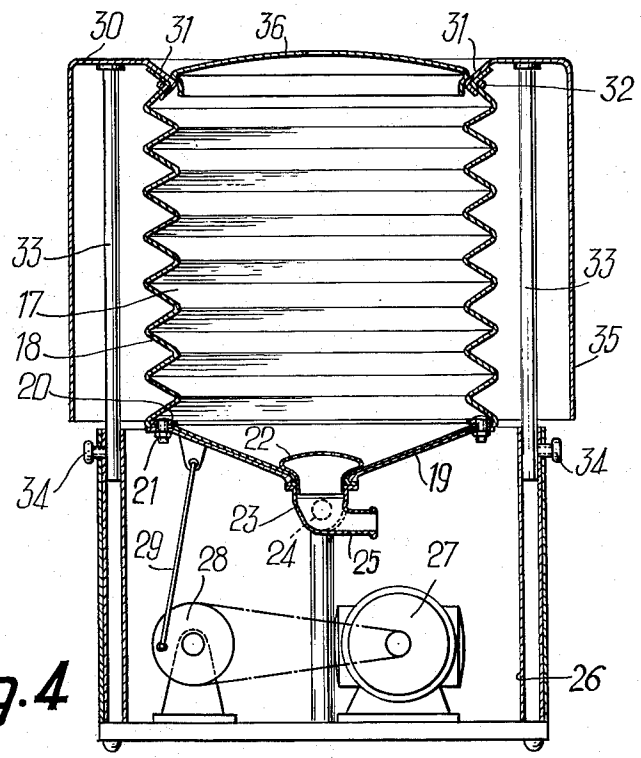

Fig.4

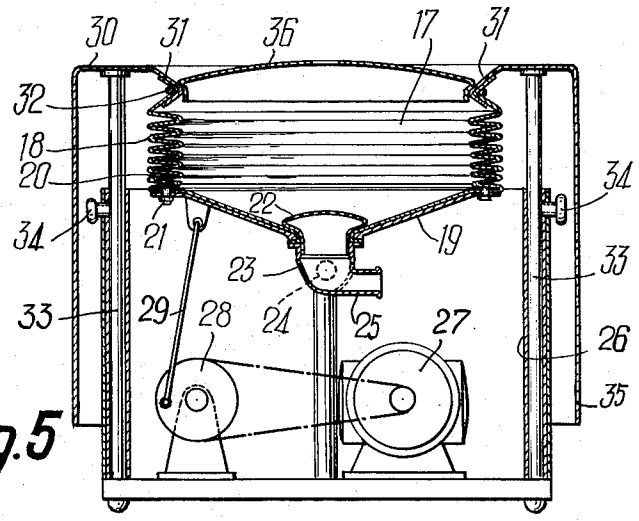

Fig.5

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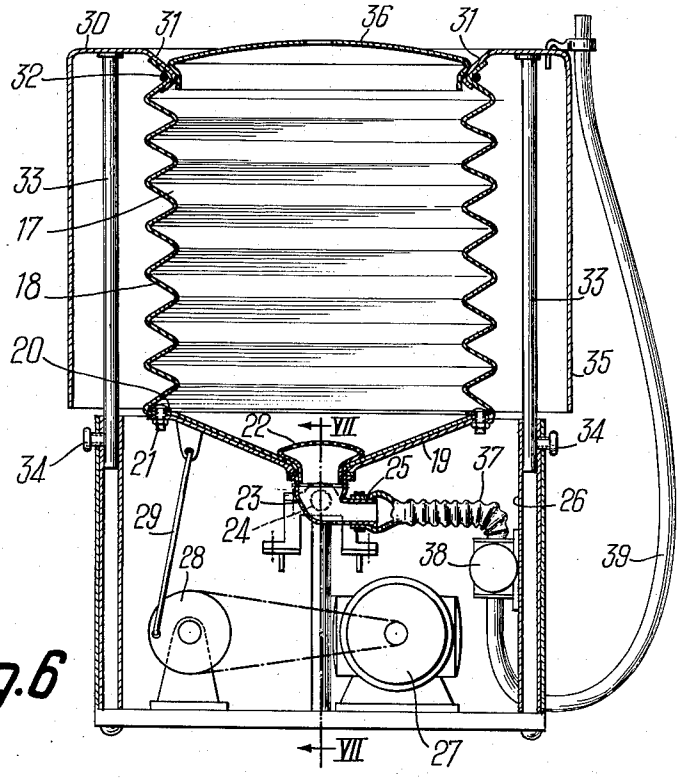

Fig.6

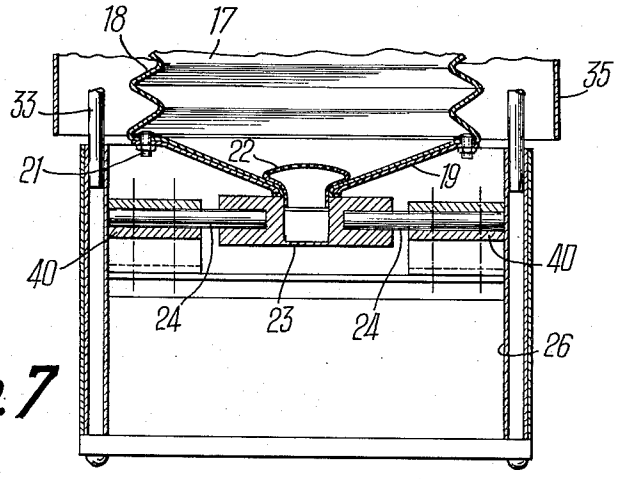

Fig.7

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WASHING MACHINES

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3 Claims. (Cl. 68—173)

In known washing machines the agitation of the water contained in the washing vessel is generally produced by means of blades, turbines or similar rotary members, mounted in the interior of the said vessel itself. These rotating members therefore come into direct contact with the garments or fabrics to be washed, which constitutes an obvious disadvantage, since although the configuration of such members has been designed in such a way that the garments or fabrics are not likely to remain entangled by them, this possibility has not been entirely precluded, and the risk of impairing the articles still subsists.

The washing machine to which the present invention relates obviates the said disadvantage, since there is no rotary member in the interior of the washing vessel.

This washing machine is essentially characterized by the feature that the vessel for containing the water and the garments or fabrics to be washed is constituted by a deformable hollow body of resilient material, vulcanized rubber for example, with which are associated external mechanical members by means of which it can be subjected to continual deformation.

The said hollow body is preferably provided with a side wall constructed in the manner of a bellows, and is suspended by its mouth in a rigid member, and is supported at the bottom on a movable platform, mounted for example on a horizontal shaft, and connected by means of a connecting-rod to an eccentric driven by an electric motor, which imparts to it a rocking motion.

The constructing of the washing vessel as a bellows-like resiliently deformable body enables the vessel to be mounted in a frame the height of which is adjustable, for instance by means of telescopic supports, in order that the washing machine, when it is not required for use, may be considerably reduced in height, so that it can be stored under a kitchen table for example, thus facilitating its use in modern dwellings of limited dimensions.

Another feature of the invention consists in the detail that the resiliently deformable vessel designed to contain the water and the articles to be washed is supported by its bottom in a stationary frame, which encloses the motor and the members necessary for impressing upon the said bottom a continuous rocking motion, whereas by its upper part it is suspended in a rigid member supported by the frame of adjustable height and provided with a central aperture.

Preferably the said rigid member, which secures the upper part of the resiliently deformable vessel, is coupled to the aforementioned stationary frame by means of telescopic connecting elements capable of being raised and lowered for the purpose of maintaining the said vessel in an extended operative position or in a folded inoperative position.

Another feature of the invention consists in providing the aforesaid rigid member that secures the upper part of the resiliently deformable vessel, in the zone that bounds its central aperture, with a portion bent downwards and provided with an external groove, in which the portion of the vessel itself adjacent to the mouth is inserted, and is secured by means of a clasp.

In accordance with a further feature of the invention, the movable platform on which the bottom of the resiliently deformable vessel is supported is contituted by a rigid base member, which has in the middle a depression,

in which is mounted the oscillation bearing, combined with an outlet for the water.

Other features and advantages of the invention will be gathered from the following description, which is formulated in relation to the accompanying drawings, in which two forms of construction are illustrated by way of example, but not of limitation. In these drawings:

FIGURE 1 shows diagrammatically in sectional elevation a washing machine made in accordance with the invention;

FIGURES 2 and 3 are diagrammatic vertical sections on a smaller scale analogous to that of FIGURE 1, but showing the washing vessel in two different positions;

FIGURE 4 represents in sectional elevation a second form of construction of the washing machine in question, showing it in the operative position;

FIGURE 5 represents the same washing machine as FIGURE 4, likewise in sectional elevation, but in its inoperative position;

FIG. 6 is a sectional elevation similar to FIG. 4 illustrating the drain means, and FIG. 7 is a vertical view taken on line VII—VII of FIG. 6.

Referring in the first place to FIGURES 1 to 3, the washing machine illustrated comprises a frame **1**, which may be of any suitable type, and may be supported on feet or on wheels as desired in each case. The upper edge of this frame is bent outwards, as will be seen at **2**, there being fixed in this bent portion, by means of a rigid hoop **3** and screws **4**, the mouth **5** of a hollow body of resilient material, denoted as a whole by **6**. The side wall **7** of this hollow body is constructed in the manner of a bellows, and the same is supported by its bottom **8** on a rockable platform **9**. This platform is mounted on a horizontal shaft **10**, supported by the actual frame **1**, and receives its rocking motion by means of a connecting-rod **11** coupled at **12** to an eccentric **13**, actuated by an electric motor **14**. By the reference **15** is denoted the draining tube for water, and by **16** the cover of the washing machine.

This machine operates in the manner hereinafter set forth: The water, and the garments or fabrics to be washed, are introduced into the vessel of resilient material **6**, **7**, **8**, the cover **16** is closed as shown in FIGURE 1, and the motor **14** is started. This sets in rotation the eccentric **13**, and since this eccentric is coupled to the rockable platform **9** by means of the connecting-rod **11**, this platform is constrained to effect a continuous rocking movement between the extreme inclined positions illustrated in FIGURES 2 and 3, this movement being transmitted to the bottom **8** of the hollow body **6**, whereby the lateral wall **7** of the latter, being of bellows-like construction, bends and unbends alternately on one side and the other. This continual rocking movement of the bottom **8**, and the bending and unbending of the side wall **7**, gives rise to a violent agitation of the water and of the articles contained in the vessel **6**, and therefore to an energetic washing action. It has been found possible to confirm that this action is promoted by the release of ozone, which occurs upon the water in contact with the air becoming charged with static electricity by the continual friction of the india rubber of the said vessel in motion, which greatly contributes to the whitening and disinfecting of the articles, and in consequence results in less soap and lye being required for washing them. Since the articles are in contact only with the vessel **6** of resilient material, all risk of injury to them is completely obviated. The vessel **6**, in case of need, can be readily exchanged, thanks to it being mounted in the frame **1** in a readily releasable manner.

The washing machine illustrated in FIGURES 4 to 7 comprises a deformable vessel **17** of resilient material, which, like the one marked **6** in the preceding example,

has a side wall **18** of bellows-like construction. This vessel **17** is supported by its bottom on a rigid base member **19**, to which is united by means of a hoop **20** and suitable screws **21**, as well as a central drainage piece **22**, which encloses the adjacent portion of the bottom of the deformable vessel **17** and of the base member **19** against an oscillation bearing **23**, supported by two horizontal half-shafts, as shown at **24** (FIG. 7). This bearing is combined with a pipe **25** for the passage of water, which may be supplemented in a known manner by a pipe **37**, water pump **38** and drain pipe **39**, for effecting the filling and the emptying of the vessel **17**. The half-shafts **24** are supported by means of bearings **40** on a stationary frame **26**, which likewise encloses the electric motor **27**, which, by means of an eccentric **28** and a connecting-rod **29**, enables a continuous rocking motion to be imparted to the base member **19**, and therefore to the bottom of the deformable vessel **17**.

The said vessel is suspended by its mouth in a rigid member **30**, provided with a central aperture, bounded by a downwardly bent portion **31** and provided with an external groove, in which the portion of the vessel **17** adjacent to the said mouth is inserted and secured by means of a clip **32**. The member **30** is coupled to the stationary frame **26** of the apparatus by means of telescopic connecting elements **33**, capable of being raised and lowered for the purpose of maintaining the deformable vessel **17** either in an extended or operative position, as in FIGURES 4 and 6 or in a folded or inoperative position as in FIGURE 5. The said connecting elements may be immobilized in their raised position by means of suitable set screws **34**, and in order that they may not be visible, the rigid securing member **30** may be combined with an external flap, as shown at **35**. The reference **36** denotes a cover adapted to be engaged by pressure in the aperture that is bounded by the downwardly bent portion **31** of the securing member **30**.

When use is not being made of the machine illustrated in FIGURES 4 to 7, it is stored with the vessel **17** collapsed as shown in FIGURE 5, in which position it occupies a greatly reduced space. To make use of it, the vessel **17** is extended by raising the securing member **30, 31** from the position shown in FIGURE 5 to that of FIGURE 4 or 6, securing the whole in this position by means of the set screws **34** or equivalent members with which the telescopic elements **33** are provided. Thereupon the water and the articles to be washed can be introduced into the vessel **17**, which, in a manner known in itself, may be combined with heating means

and a thermostat, for the purpose of maintaining the water at the desired temperature, and the electric motor **27** may then be set in motion. By this means, as already described in connection with FIGURE 1, the eccentric **28** is set in rotation, and this, by means of the connecting-rod **29**, imparts a continuous rocking movement to the base member **19** and to the bottom of the deformable vessel **17**, whereby the side wall **18** of the latter, constructed as a bellows, bends and unbends on one side and the other alternately, giving rise to a powerful agitation of the water and of the garments or fabrics contained in the said vessel, and therefore to an energetic washing action.

When the washing operation is completed, the water can be drawn out through the pipe **25**, the water pump **38** and the drain pipe **39** (FIG. 6), and, when the fixing screws **34** have been loosened, the whole can be folded up again as shown in FIGURE 5.

What I claim is:

1. A washing machine comprising a housing, an open-end container having foldable accordion walls and a rigid bottom, a movable platform arranged inside said housing and supporting the bottom of said container, a frame secured to the open end of the container, telescoping members secured to said housing and supporting said frame, said telescoping members maintaining said container in fully extended operative position when extended and in inoperative collapsed position when telescoped, means to fix the position of said telescopic members, and means for imparting to said platform a rocking motion.

2. A washing machine as claimed in claim 1 comprising a horizontal shaft supporting said platform.

3. A washing machine as claimed in claim 1 comprising a driven pulley, and a rod eccentrically mounted on said pulley and connecting said pulley with said platform.

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