

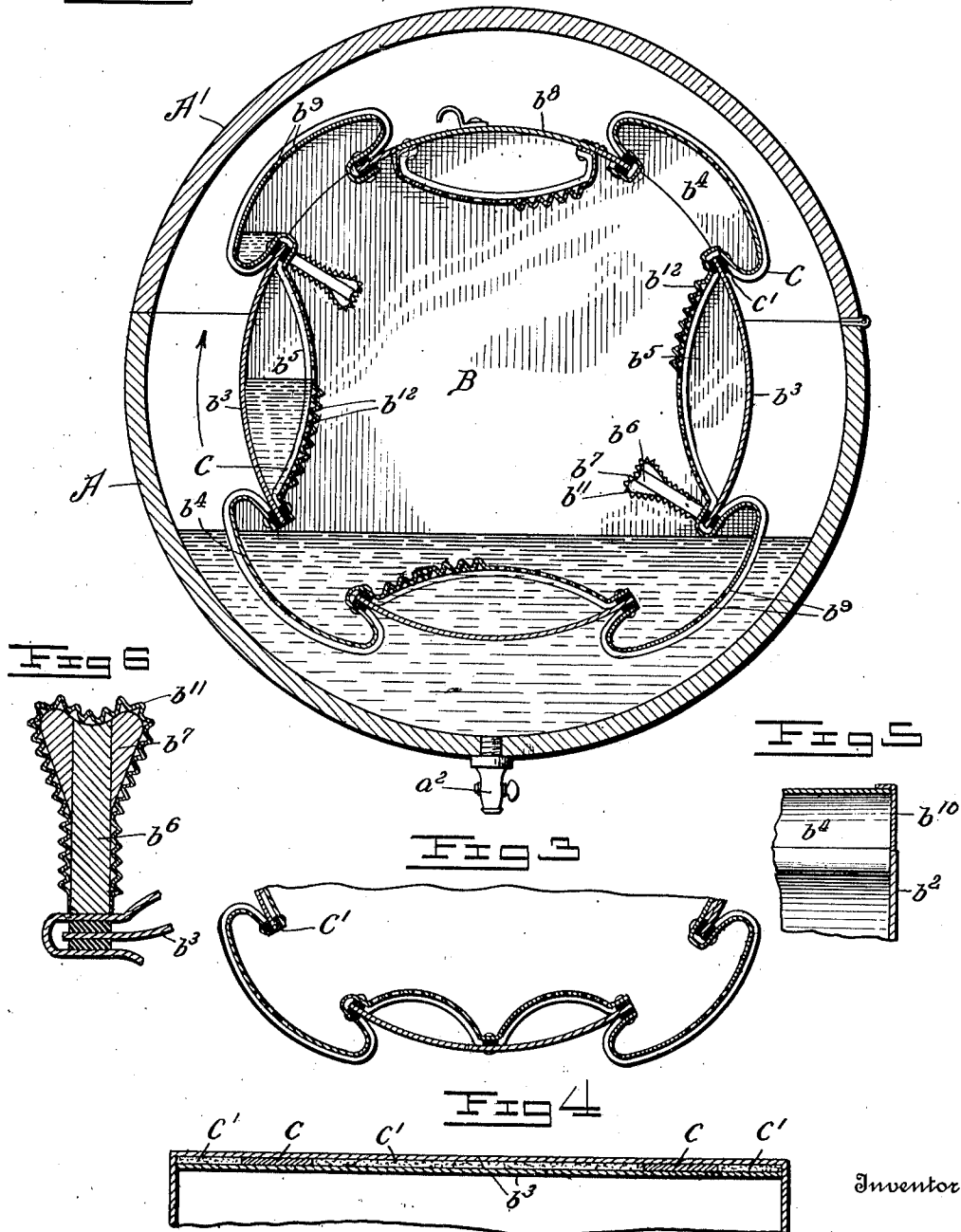
E. J. MILLER.
 WASHING MACHINE.
 APPLICATION FILED JULY 12, 1911.

1,020,618.

Patented Mar. 19, 1912.

2 SHEETS—SHEET 2.

Fig 2



Witnesses
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UNITED STATES PATENT OFFICE.

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WASHING-MACHINE.

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Specification of Letters Patent.

Patented Mar. 19, 1912.

Application filed July 12, 1911. Serial No. 638,165.

To all whom it may concern:

Be it known that I, ELI J. MILLER, a citizen of the United States, residing at York, in the county of York and State of Pennsylvania, have invented certain new and useful Improvements in Washing-Machines, of which the following is a specification.

My invention relates to improvements in washing machines and in particular to clothes washing machines.

The objects of my invention are to provide a construction, which while simple and economical, will cause a thorough agitation and rubbing of the clothes, and particularly will subject the clothes to the action of relatively large amounts of water dashed upon said clothes quickly and freely from the maximum height.

With these general objects in view and some others which will be apparent to those skilled in the art from the description hereinafter, my invention consists in the features, details of construction and combination of parts which will first be described in connection with the accompanying drawings and then more particularly pointed out in the claims.

In the drawings: Figure 1 is a perspective view of the machine with the lid of the tank open; Fig. 2 is a transverse section through the center of the tank and drum, the tank lid being closed; Fig. 3 is a detailed sectional view of a modification of the invention; and Figs. 4, 5, 6 and 7 are detailed views to be referred to hereinafter.

Referring to the drawings, A is an outer tank, mounted on any suitable support, such as the legs shown, and provided at each end with journal bearings, as indicated at *a*. The tank has a suitable hinged lid as shown at A'.

Within the tank A is mounted a rotatable drum B, which has trunnions or axles at each end, journaled in the bearings carried by the tank. One of these trunnions or axles is shown at *b*, and it is extended beyond its bearing and is provided with suitable means for rotating it, as for example the crank handle *b'*.

The drum B embraces the essential features of the present invention. Generally considered it comprises two heads, in the present case, circular, one being indicated at *b*², a peripheral portion *b*³ secured to the

heads, a series of external pockets, which project outside the peripheral portion as indicated at *b*⁴, a series of internal pockets, *b*⁵, within the peripheral portion, and one or more wings or lifting bars *b*⁶, two being shown in the present case, arranged radially and provided with operating heads, *b*⁷, which may be described as substantially heart-shaped in cross-section.

A suitable section of the drum is movable to form a door for the insertion and removal of the clothes. Such door portion in the present example, is indicated at *b*⁸, and is provided with hinges, catches and a lift or handle.

It will be observed that the internal pockets are arranged in alternation with the external pockets, the purpose of which will be pointed out hereinafter.

While the peripheral portion may be formed of a plurality of arc-shaped sections, made in any suitable way, as by casting, the most advantageous way of making it for a household machine is to form each section of the peripheral portion from sheet metal rolled to the desired arc-shaped form and arranged to fit snugly between the respective alternating exterior pockets.

Furthermore by my invention the inner walls of the internal pockets and the walls of the exterior pockets may be made from a continuous sheet of metal rolled or stamped to the desired configuration. In the example shown in Fig. 2 the wall of the upper left hand external pocket and the inner wall of the internal pocket just below it at the left of the figure are made from one sheet of metal. The wall of the lower left hand external pocket and the inner wall of the lowest internal pocket are made from another sheet, while at the right hand side of the figure, the walls of the upper and lower external pockets and the inner wall of the internal pocket between them are made from one continuous sheet.

The inner wall of the uppermost internal pocket is secured to the underside of the door.

The pockets are reinforced by hoops of suitable material such as metal, as indicated at C, these hoops extending on the exterior of the external pockets, in order to strengthen the same against bulging outward from the weight of the water therein, the hoops extending on the inside of the in-

ternal pockets, to strengthen the arch against blows due to the tumbling of the clothes.

The external pockets are perforated at the central portion as indicated at b^9 , the imperforate sides forming water-carrying pockets, one of which sides acts to carry up water when the drum is rotated in one direction, the other side carrying up water when the drum is rotated in the other direction, as will be clear from Fig. 2.

The ends of the external pockets are closed by flanged caps b^{10} , as shown in Figs. 1 and 5, these caps being advantageously made removable so as to allow access to the external pockets for cleaning the same, if necessary.

The inner wall of each internal pocket is perforated over the area extending from one side toward the center, the imperforate side serving as a water carrier when the direction of rotation is such as to keep such imperforate portion below its perforated portion as the pocket is elevated by the rotation of the drum. The arrangement of the perforations in the respective internal pockets is such that one pair of diametrically opposite internal pockets serves to elevate water during the rotation of the drum in one direction, while the other pair acts for this purpose only during the opposite direction of rotation of the drum. For example, in the clockwise rotation of the drum, indicated by the arrow in Fig. 2, the left hand internal pocket is carrying up the water, because its imperforate portion is downward. The internal pocket shown at the bottom is filled with water because it is submerged, but as it rises, moving in the direction of the arrow, the water will not be carried up to any appreciable extent, as the imperforated portion of said pocket will be downward, and the water will escape from the pocket. Because of the inability of the water to escape immediately from the said pocket through the perforations, the water is carried up to a slight extent above the water level of the tank, and thus sprays the clothes below and adjacent to it. The imperforate portion of the inner walls of the internal pockets are corrugated as indicated at b^{12} .

Owing to the fact that the hoops C which reinforce the pockets, pass between the peripheral portions and the walls of the pockets, as shown in Fig. 4, spaces are left between the hoops, and outside of them, through which the water would run from the internal pockets on ascending. Therefore, to prevent this, these spaces are filled with packing strips of india rubber, or other suitable material as indicated at C' .

In order to assist in the agitation of the clothes and add to the rubbing effect on the same, I provide the radial wings b^8 , which

are most advantageously of wood and are secured at each end to the heads as well as to the periphery of the drum to strengthen the same.

The operating edges b^{11} of the heads b^7 of said wings, b^8 , are grooved on top and enlarged laterally so that the said edges are heart-shaped in cross-section as shown in Fig. 6, for a purpose more fully explained hereinafter. In addition to this configuration of the edge b^{11} , I cover this portion of the wing with sheet metal as indicated in Fig. 6, the said sheet metal extending down each side of the respective wing to which it is secured. The said sheet metal is advantageously corrugated as shown in Fig. 6 to form a wash board surface.

The bottom of the tank, A, is provided with a faucet a^2 whereby it may be emptied.

The operation of my device is as follows: The tank being supplied to the desired height with soapy water, the clothes are inserted into the drum through the door, b^8 , which is then closed and locked, and the lid of the tank shut. Upon rotating the drum by means of the crank, b' , the water is lifted by the alternate internal water pockets, which it is to be noted at first discharge about half the water by the time the said pockets have carried the water above the horizontal plane through the axis of the drum, the remainder of the water being discharged as the pockets are carried upward and dumped. The rows of perforations in said internal pockets only come into action one row at a time as the pocket is dumping in being carried up. All the water is not discharged at once, so that an appreciable part of the water is carried up to the top of the drum and falls from this height upon the clothes. Furthermore, the supply of water to the rising internal pocket is kept up for a short time by the water from the rising external pocket flowing over the perforated face of the internal pocket just below it, until such external pocket reaches a point where the water discharged from it falls clear of such perforated face, whereupon it commences to discharge directly onto the clothes, this discharge continuing until the said external pocket has reached the top. It is to be noted that the amount of discharge of water from the internal pockets and the height to which they can carry the water depends upon the speed of rotation and the size of the perforations, but this is not so with the external water pockets which can only be emptied by arriving at the requisite height, as they have a free discharge. Hence the present invention insures the carrying of the desired amount of water to the requisite height by such external pockets no matter whether the drum be rotated rapidly or slowly. As the external pockets are freely open to the interior of the

drum and relatively large, garments can fall into said external pockets and thus tend to block the discharge area of the same, so that in this way the water does not escape quite so freely and will for this reason be carried to a considerable height. The clothes also are thus carried up until the pocket has been elevated some distance above the level of the water in the tank. When the clothes finally drop from the external pockets, the fall is sufficient to drive out some of the water in their fibers, which is replaced with other water, thus causing a loosening of any dirt in the meshes of the fabric. This action is aided further by the showering of the elevated water onto the fabrics. Owing to the fact that two of the external pockets are adjacent to the wings, b^c , the clothes will not drop from these pockets until the said pockets are nearly at the top, or about in the position of the upper left hand pocket in Fig. 2. It will be noted that any garment carried up by such pocket will tend to slide over the corrugated side and the edge of the wing adjacent to the pocket, and as this edge is rounded and grooved, it acts somewhat like the common washboard as a means of rubbing the garment as it slides over the corrugations, while at the same time the water supplied from the said pocket, flowing over the corrugations of the wing and its edge, causes a rinsing action, which carries off any dirty water squeezed from the garment by its own weight as it slides over the heart-shaped edge of the wing. The groove in the edge of said wing forms a recess to receive dirty water from the garment thus allowing such dirty water to escape and mix with the water in the tank, instead of going directly back into the garment. The imperforated corrugated portions of the arched inner walls of the internal pockets serve also as washboard or rubbing surfaces and at the same time tend to direct the clothes into the external pockets so that the garments at the bottom are caught in said pockets, then lifted and dropped, thus continually interchanging positions, the lowermost garments at one time becoming the uppermost at another time. The perforated portions of said inner walls also serve as rubbing surfaces. It will be noted that the outer portion of the external pockets serve as agitators for the water in the tank, thus keeping the soapy water stirred up, and carrying air below the surface of the water in the tank, which aids in agitating and aerating the water and oxidizing any organic material therein.

In Fig. 3 I have illustrated a modification of the arrangement of internal pockets, in which instead of one internal pocket filling the span between two external pockets, two such internal pockets are provided. This adds somewhat to the number of contoured

surfaces for rubbing the clothes and leads to a stiffer and stronger construction for larger machines.

In Fig. 7 I have illustrated a modification of the invention in which the inner pockets are made somewhat narrower than in the construction shown in Fig. 1, so that the inner wall of the inner pocket runs in contact with the peripheral portion for a short distance, and the contacting portion is provided with a series of perforations as indicated at b^{14} , which register with an opening b^{15} in the peripheral portion immediately outside it. By this construction the water is given a freer access to the interior of the drum and sediment set free from the clothes can escape through these openings b^{14} , b^{15} , even if the perforations in the lower external pockets are clogged by garments therein.

Having thus fully described my invention, what I claim is:

1. In a washing machine the combination, with a tank, of a drum rotatably mounted in said tank, and having a plurality of external pockets whose outer walls are perforated at the center, said pockets having water compartments at each side, said drum having a plurality of internal pockets alternating with the external pockets, the outer walls of the internal pockets being closed and the inner wall of each such pocket perforated at one side only of the center of the pocket.

2. In a washing machine, the combination, with a tank, of a drum rotatably mounted therein, and having a plurality of external pockets open to the interior of the drum and having their outer walls provided with perforations, said pockets having water-carrying compartments at each side, said drum also having a plurality of internal pockets opening only to the interior of the drum and each having a water-carrying compartment at one side, each internal pocket being arranged adjacent to one external pocket.

3. In a washing machine, the combination, with a tank, of a drum rotatably mounted therein, said drum having a plurality of external pockets communicating freely with the interior of the drum and having centrally arranged perforations in the outer walls, said drum being provided also with a plurality of internal pockets each of which is arranged adjacent to an external pocket and provided with an arched inner wall, one portion of which is corrugated to form a wash-board surface and another portion perforated, said internal pockets being closed at the back.

4. In a washing machine, the combination, with a tank, of a drum rotatably mounted therein, said drum having a plurality of external pockets communicating freely with

the interior of the drum, to permit access of clothes to said pockets, said drum being provided also with a plurality of internal pockets, each of which is arranged adjacent
5 to an external pocket and provided with an inwardly arched perforated and corrugated inner wall.

5. In a washing machine, the combination, with a tank, of a drum rotatably
10 mounted therein, said drum comprising two heads, a plurality of concentric segmental peripheral portions spaced apart and secured to said heads, to form a drum with openings and a continuous sheet of metal

bent to form the wall of an external pocket 15 projecting through the space between a pair of segmental peripheral portions and also to form an inner arched wall located radially inward from one of said peripheral portions, and forming therewith a water-carrying 20 pocket.

In witness whereof I have hereunto affixed my hand.

ELI J. MILLER.

Witnesses:

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M. C. MASSIE.