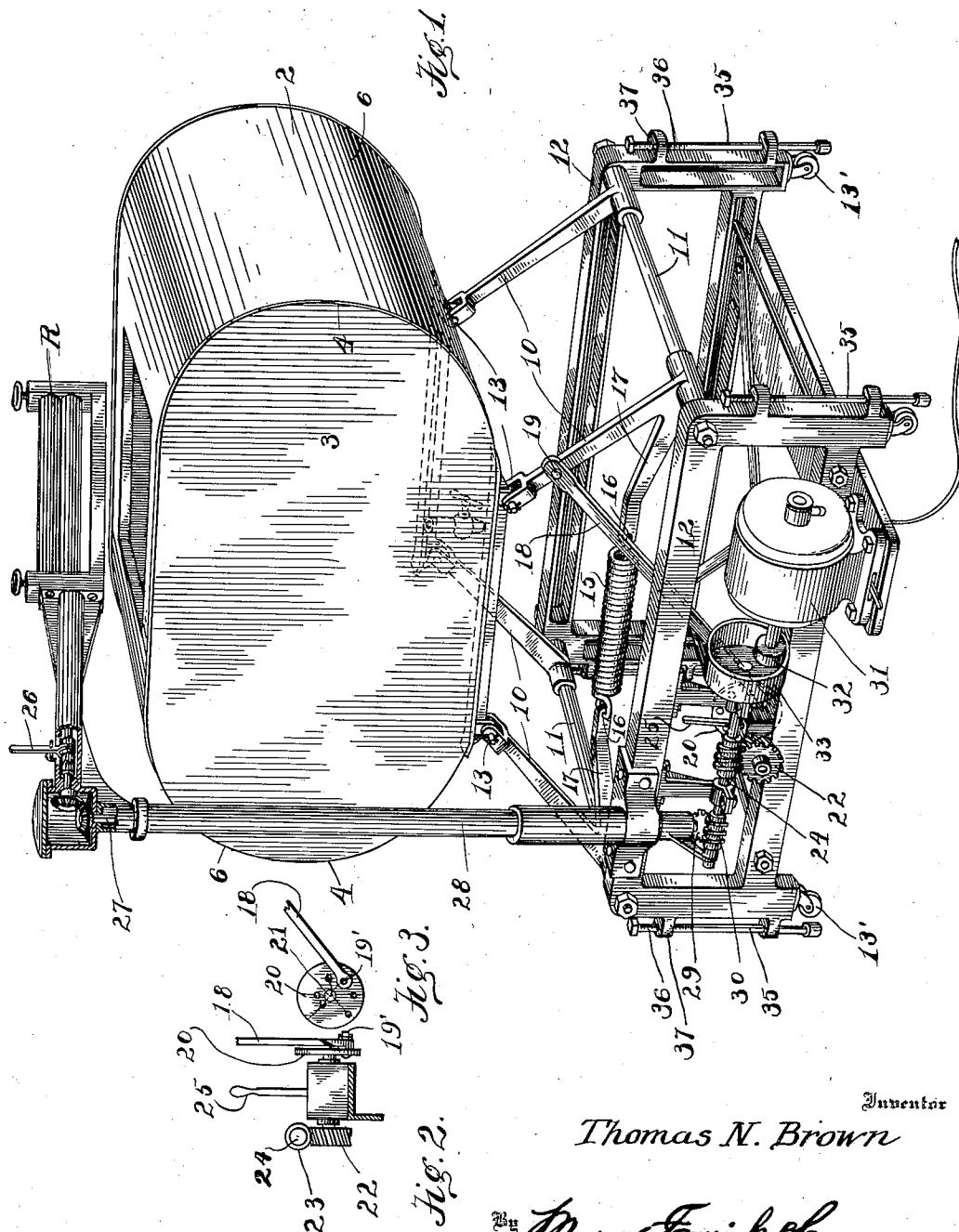


T. N. BROWN.  
 WASHING MACHINE.  
 APPLICATION FILED MAY 13, 1919.

1,330,679.

Patented Feb. 10, 1920.

2 SHEETS—SHEET 1.



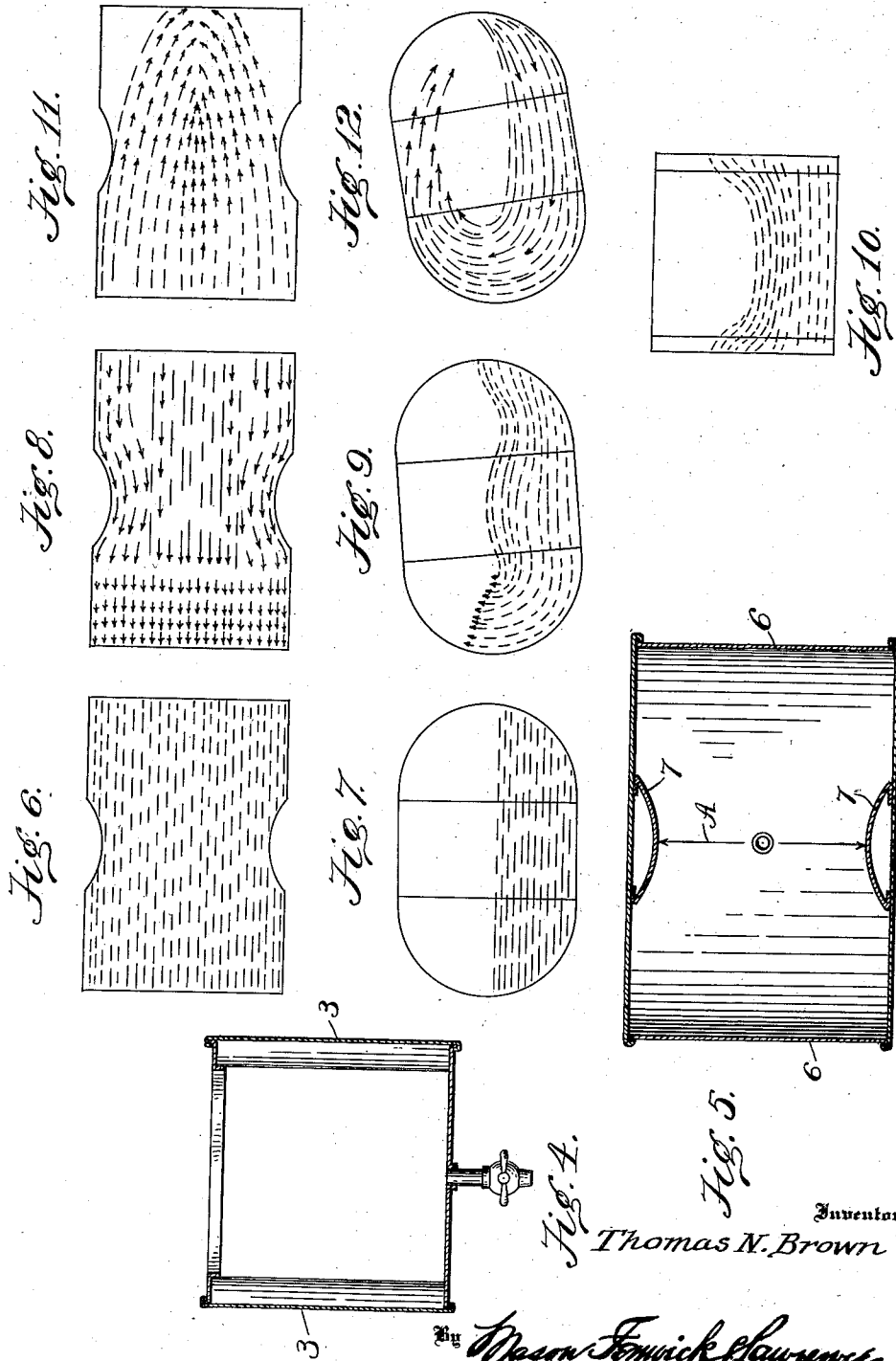
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*Fig. 4.*  
*Fig. 5.*  
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*Fig.*  
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# UNITED STATES PATENT OFFICE.

THOMAS N. BROWN, OF SIDNEY, OHIO.

WASHING-MACHINE.

1,330,679.

Specification of Letters Patent. Patented Feb. 10, 1920.

Application filed May 13, 1919. Serial No. 296,828.

*To all whom it may concern:*

Be it known that I, THOMAS N. BROWN, a citizen of the United States, residing at Sidney, in the county of Shelby and State of Ohio, have invented certain new and useful Improvements in Washing-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to mechanically-driven washing machines and more particularly to domestic washing machines.

It is one of the objects of the present invention to provide a substantial, simple, efficient washing machine which may be operated from any suitable source at a minimum consumption of power.

Another object of the present invention is to improve the construction of the operating mechanism, and to provide a peculiarly shaped tub of efficient and rapid action for washing the clothes or other articles which may be placed in the tub.

A further object of the present invention is to provide, in combination with the washing machine, a driving mechanism including a motor and the mechanism driven thereby and combining it with a safety device in order to protect the driving motor, especially when the same is of the electric type, against injury in the event that for any cause there is an undue resistance to the power from the motor.

Another object of the present invention is to provide a washing machine in which all of the parts are readily accessible for cleanings, renewal or adjustment if need be.

With these and other objects in view as will be manifest to those versed in the art, the following specification describes one embodiment of the invention, which is illustrated in the accompanying drawing in which:

Figure 1 is a perspective view of a form of the machine with the gear casing omitted.

Fig. 2 is a fragmentary detailed view of the crank shaft including a clutch.

Fig. 3 is a face view of the crank disk and a portion of the connecting rod.

Fig. 4 is a cross, vertical section through the tub.

Fig. 5 is a horizontal section through the medial plane of the tub.

Figs. 6 and 7 are diagrammatic views in

plan and elevation respectively of the tub in its more near and horizontal position, the water being indicated as quiescent.

Figs. 8 and 9 are diagrammatic views in plan and elevation indicating the movements of the water when the tub is turned toward the left on its supports.

Fig. 10 is a diagrammatic view in a cross vertical plan showing the convergence of the water in motion.

Figs. 11 and 12 are diagrammatic views in plan and elevation showing further movement of the water as the tub is turned beyond the angle indicated in Figs. 8 and 9.

It is to be understood that the accompanying drawings illustrate but one improvement of a driving and gear mechanism which may be utilized to secure the operation of the washing tub which is indicated at 2 and is mounted in a manner to be more fully described hereafter, and which mounting and method of operation involves important features of the present invention.

I have found by practical demonstration that clothes may be washed rapidly and efficiently by the use of a tub approximating the construction and form here shown in which the tub has main parallel sides 3-3 of suitable length and height and which obviously may be made of any suitable material. The side walls 3-3 have parallel top and bottom edges and their ends are rounded in the form of half circles 4-4 so that the end walls of the tub form substantially half cylinders 6-6. This construction, I find, facilitates the washing action upon the clothes in the tub when the latter is oscillated longitudinally and with a tilting motion which creates strong longitudinal waves which are over-turned, as clearly shown in Figs. 11 and 12, by the rounded ends of the tub, with the result that there is alternately a strong compression of the clothes when at the lower position at the ends of the tub and conversely a release of pressure upon such parts of the clothes being washed as may be at the uppermost tub ends; further, to secure a squeezing or compressing action on the clothes during the movement of the same under their own momentum and also under the momentum of the water. I prefer to give the tub construction a contracted, transverse central dimension on the line A in Fig. 5, this being accomplished in any of various ways, such as for instance as by

applying nearer bulk heads 7 of curved surface to inner sides of the tub. The effect of the use of the deflecting surfaces 7—7 is graphically represented in Figs. 8, 9 and 10.

5 A preferred form of mounting for securing an efficient movement of the tub comprises supports here shown in the form of levers 10—10 mounted in pairs on parallel fulcrums as, for instance, on transverse  
10 shafts 11—11, these being shown as mounted in the upper corners of suitable size frames 12—12 which may be transversely connected to secure rigidity and are preferably provided with casters 13 enabling the  
15 ready transportation of the machine to different locations. The levers 10—10, in one pair, are so disposed that their outer ends may swing in similar paths about the axis of the supporting rods 11 and the two pairs  
20 of levers are directed convergently and upwardly from the frame structure 12—12 and are connected by pivots 13—13, which are respectively coaxial in each pair of levers and the axes of the pivots 13 are in the pairs  
25 of levers parallel so that in the normal position of the tub and levers, the tub is maintained with its bottom in a horizontal plane, and in order to automatically bring the tub to a normal horizontal position suitable  
30 means may be employed which act through the pairs of supporting levers 10—10 to stabilize the tub. A preferred form of this stabilizing means is illustrated as comprising a substantial contractile spring 15, the  
35 ends of which are connected at 16 to the adjacent ends of lever arms 17 which extend toward each other from the fulcrums or rods 11, and in the present form these stabilizing levers 17 are shown as integrally connected to the adjacent supporting levers  
40 10—10 on one side of the machine. It will be seen that since the levers 10—10 are connected through the stabilizing spring and its lever arms 16 and since there is a positive connection between the upper ends of  
45 the coplaner levers 10—10 through means of the tub bottom, that the remaining levers 10—10 will automatically be brought to the proper angular position and may swing on  
50 the rods.

From the above it will be seen that the tub 2 can be oscillated through a path consisting of the compound paths of the swinging upper arms or levers 10, one end of the  
55 tub 2 tilting down as the pivot 13 of one pair of levers swing downwardly and inwardly, while the other end of the tub will be turned upwardly and outwardly by a reverse action of the pair of levers at the opposite end of the tub, and this action will be reversed and made constantly alternate during the operation of the tub.

Any suitable means may be employed for rocking the rock arms or levers 10—10 to  
65 impart movement to the tub, and one form

of such mechanism is shown herewith as comprising a pitman rod 18, connected as at 19 to one of the levers 10, the lower end of the rod being here mounted on a crank or wrist pin 19' set in a crank disk 20 on a  
70 short shaft 21 extending transversely of the frame and having on its outer end a worm gear 22 engaging the worm 23 on a worm shaft 24 suitably mounted on the frame or in a gear box which latter has been omitted  
75 for the purpose of clearness in order that the worm shaft 24 may be driven constantly without driving the crank connections, any suitable clutch may be provided, the lever of which is indicated at 25 for disconnecting the crank shaft from the driven shaft 24. Thus this shaft may be driven to drive the rolls R of a wringer mechanism which may be provided with a clutch as 26 at any  
80 suitable location, the longer shaft being shown geared to an upper shaft 27 mounted to swing in a housing 28 on the frame 12, the lower end of the shaft 27 being provided with a worm wheel 29 engaging a worm 30 on the shaft 24.  
90

One of the features of my invention is to provide connections between the driven shaft 24 and a suitable source of power such as the electric motor 31, whereby, in the event of an undue resistance to the driving  
95 action of the motor then there will be a substantial disconnection or slippage of the inter-related parts so that the motor will be protected.

A simple, inter-relating safety connecting  
100 mechanism between the motor shaft and the driven shaft 24 involves a driving pinion 32 preferably constructed of a material of high friction efficiency and engaging in this case the interior surface of a flanged wheel  
105 33 secured on the adjacent end of the shaft 24. This not only achieves the desired purpose of a relatively simple drive means but further accomplishes a sufficient reduction in speed as between the motor shaft and the  
110 driven shaft. The motor preferably is mounted on the frame structure and, as above indicated, since the frame is provided with casters 13', it is possible to readily move the entire machine from place to place,  
115 but when the apparatus is to be utilized in the washing of clothes, in order to eliminate free movement of the organized structure owing to the momentum of the oscillating tub, I provide adjustable jack-legs 35 at the  
120 corner posts of the frames, these legs being shown in the present case as provided with threads 36 engaging threaded portions 37 on the frame.

Having thus described my invention, what I claim is:

1. In a washing machine, a tub, which is substantially oblong in plan, mounted upon the swinging ends of movable supports parallel to each other and having an axis dis-  
130

posed transverse to one axis of and below the tub and on opposite sides of a plane passing vertically through the tub.

2. In a washing machine, a tub, mounted upon oscillating supports parallel to each other and pivoted below the tub and disposed transverse to one axis of the tub and on opposite sides of a plane passing vertically through the tub.

3. In a washing machine, a tub, which is substantially oblong in plan, mounted upon the swinging ends of supports pivoted below the tub parallel to each other and disposed transverse to one axis of the tub and on opposite sides of a plane passing vertically through the center of the tub when it is in the normal position of rest.

4. In a washing machine, a tub, which is substantially oblong in plan, mounted upon movable supports parallel to each other and disposed transverse to one axis of the tub and on opposite sides of a plane passing vertically through the center of the tub when it is in the normal position of rest, said supports comprising relatively movable members connected by the tub, and means independent of the tub connecting the members and normally stabilizing them to sustain the tub in a horizontal position when at rest.

5. In a washing machine, a tub, which is substantially oblong in plan, mounted upon movable supports parallel to each other and disposed transverse to one axis of the tub and on opposite sides of a plane passing vertically through the center of the tub when it is in the normal position of rest, said supports comprising relatively movable members connected by the tub, and other means connecting the members and normally stabilizing them to sustain the tub in a horizontal position when at rest, said means comprising devices yieldingly connecting the members and automatically acting to restore the tub to normal.

6. In a washing machine, a tub, and supporting means therefor operative to alternately tilt the tub about its transverse axis, said means including pairs of levers on parallel axes below the tub and on opposite sides of a transverse plane passing vertically and medially through the tub.

7. In a washing machine, a tub, and supporting means therefor operative to alternately tilt the tub about its transverse axis, said means including levers on parallel axis on opposite sides of a transverse plane passing vertically and medially through the tub and the ends of which connected to the tub swing in arcs converging toward the plane of the axis, and elastic means connecting the levers to actuate them concurrently.

8. In a washing machine, a tub, and supporting means therefor operative to alternately tilt the tub about its transverse axis, said means including levers on parallel axes

on opposite sides of a transverse plane passing vertically and medially through the tub and the ends of which connected to the tub swing across converging toward the plane of the axes, and elastic means connecting the levers to actuate them concurrently and to normally maintain the tub in a horizontal position of rest.

9. In a washing machine, a tub, and supporting means therefor operative to alternately tilt the tub about its transverse axis, said means including levers on parallel axes on opposite sides of a transverse plane passing vertically and medially through the tub and the ends of which connected to the tub swing across converging toward the plane of the axes, and means connecting the levers to actuate them concurrently.

10. In a washing machine, a tub, and supporting means therefor operative to alternately tilt the tub about its transverse axis, said means including levers on parallel axes on opposite sides of a transverse plane passing vertically and medially through the tub, elastic means connecting the levers to actuate them concurrently and to normally maintain the tub in horizontal position of rest, and driving mechanism for the said means and including a safety device designed to protect the apparatus in event of undue resistance to the driving agent.

11. In a washing machine, a tub, a set of levers arranged in upwardly convergent pairs and pivotally connected to the bottom of the tub on parallel axes, parallel bearings for the pairs of levers, connections between the levers for normally maintaining the tub horizontal, a driving shaft having a yielding safety device, and means connected to the shaft for oscillating the levers and tilting the tub in alternate motions.

12. In a washing machine, a tub, a set of levers arranged in upwardly convergent pairs and pivotally connected to the bottom of the tub on parallel axes, parallel bearings for the pairs of levers, connections between the levers for normally maintaining the tub horizontal, a driving shaft, and means connected to the shaft for oscillating the levers and tilting the tub in alternate motions.

13. In a washing machine, a tub, a set of levers arranged in upwardly convergent pairs or pivotally connected to the bottom of the tub on parallel axes, parallel bearings for the pairs of levers, connections between the levers for normally maintaining the tub horizontal, a driving shaft having a yielding safety device, means connected to the shaft for oscillating the levers and tilting the tub in alternate motions, said means including a crank and a link thereon attached to one of the levers.

14. In a washing machine, an oscillating tub of rectangular form in plan and hav-

ing opposite ends which are interiorly concaved outwardly from each other so that when the tub is tilted alternately the material being washed is alternately compressed  
5 in the lowered end of the tub and then released from pressure as it is raised.

15. In a power-driven washing machine, a tub supporting means comprising pairs of

levers arranged to swing on parallel axes below the bottom of the tub, said levers converging upwardly toward each other, and driving means actuating the tub through the said supporting levers. 10

In testimony whereof I affix my signature.

THOMAS N. BROWN.