

No. 887,481.

PATENTED MAY 12, 1908.

F. W. KRANZ.
WASHING MACHINE.
APPLICATION FILED NOV. 25, 1907.

2 SHEETS—SHEET 1.

Fig. 2.

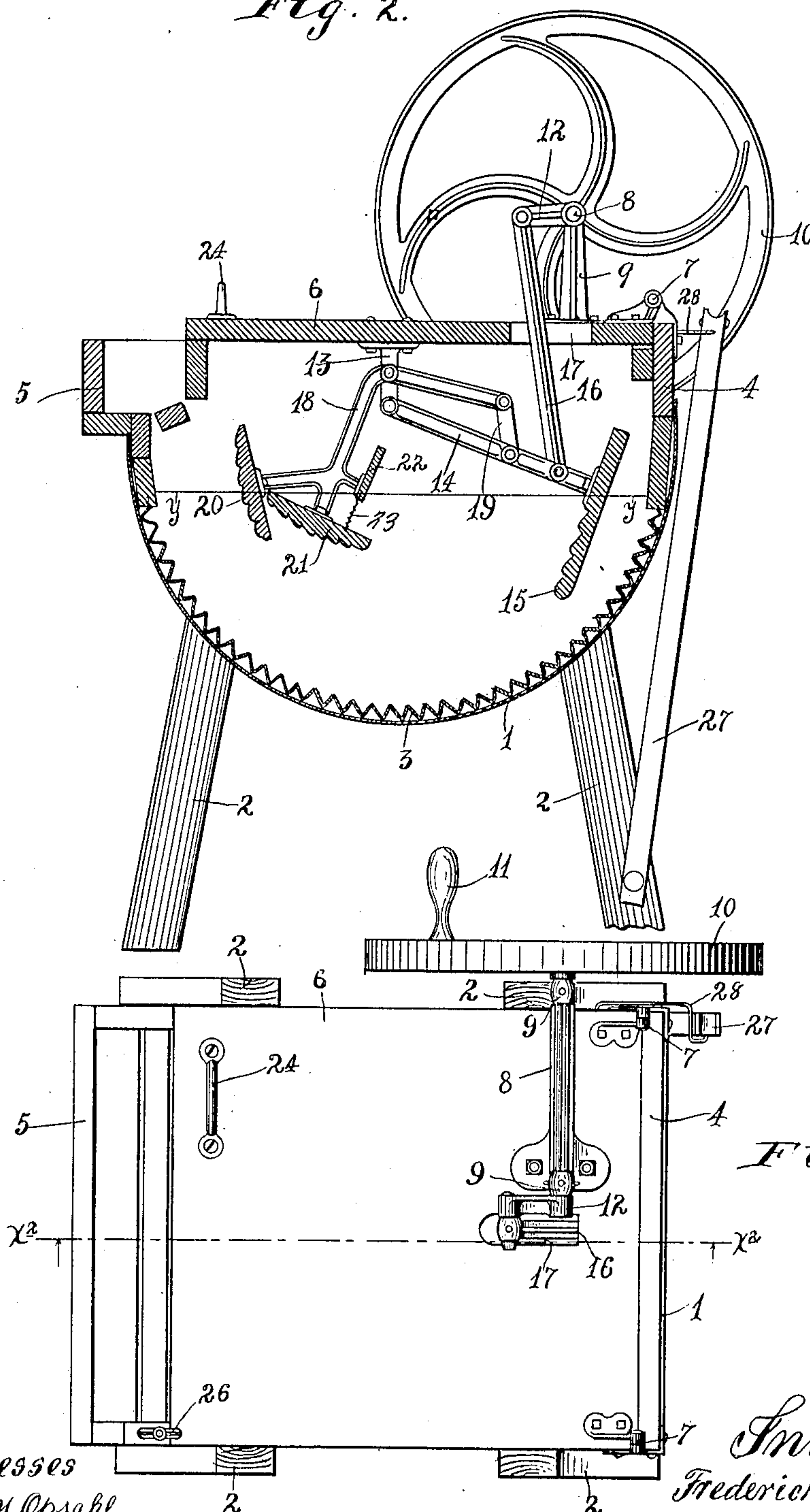


Fig. 1.

Witnesses
Harry Opsahl.
Mahi Huel.

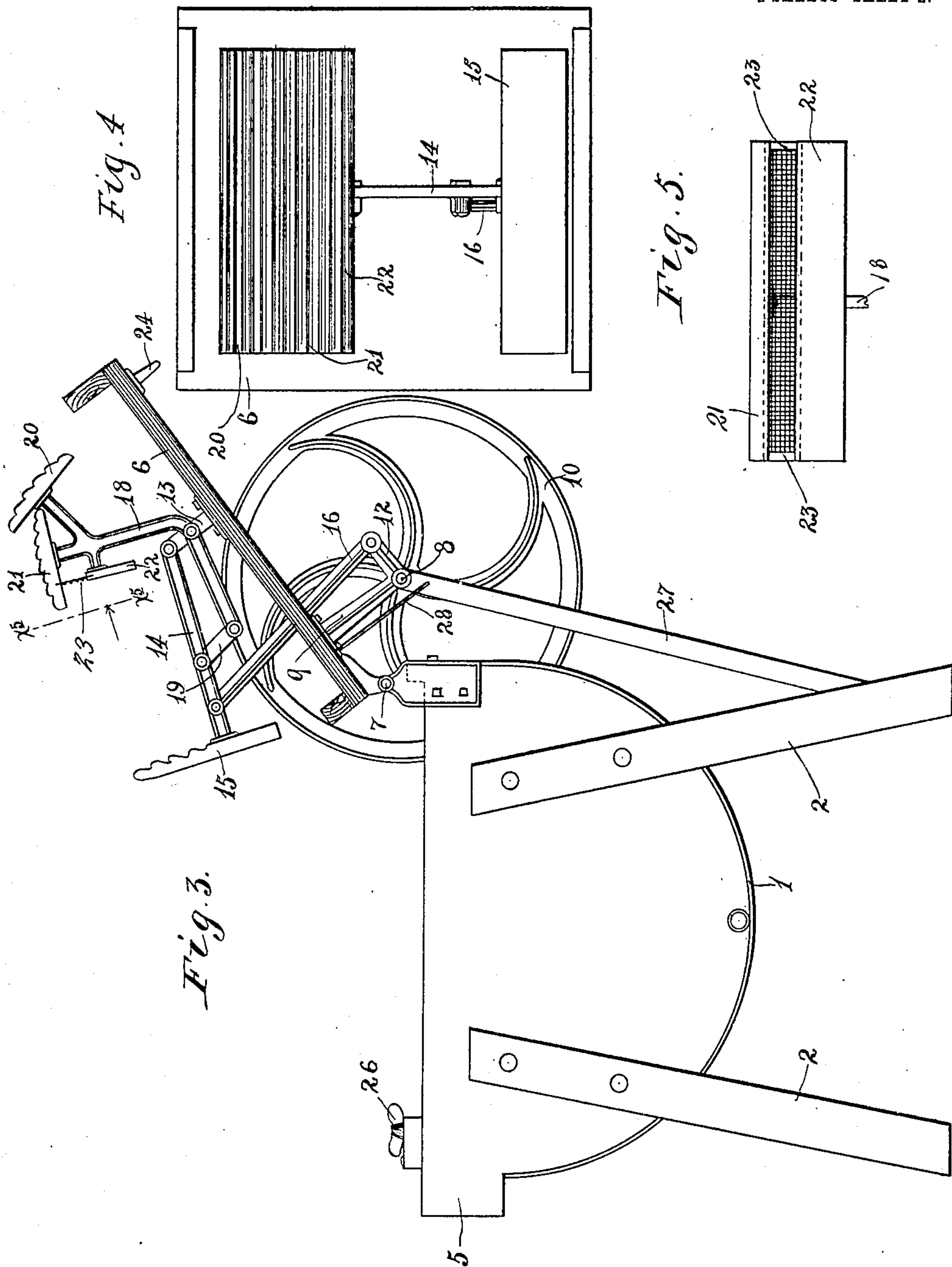
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UNITED STATES PATENT OFFICE.

FREDERICK W. KRANZ, OF MINNEAPOLIS, MINNESOTA.

WASHING-MACHINE.

No. 887,481.

Specification of Letters Patent.

Patented May 12, 1908.

Application filed November 25, 1907. Serial No. 403,603.

To all whom it may concern:

Be it known that I, FREDERICK W. KRANZ, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, 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.

My invention has for its object to provide an improved washing machine and to this end it consists of the novel devices and combinations of devices hereinafter described and defined in the claims.

In the accompanying drawings which illustrate the invention, like characters indicate like parts throughout the several views.

Referring to the drawings, Figure 1 is a plan view of the improved washing machine. Fig. 2 is a vertical section taken on the line $x^2 x^2$ of Fig. 1. Fig. 3 is a view in side elevation, showing the improved washing machine with the tub cover and parts supported thereby turned into inoperative positions. Fig. 4 is a bottom plan view of the tub cover and so-called rubbing boards; and Fig. 5 is a detail showing parts that are immediately in the vicinity of the line marked $x^5 x^5$ of Fig. 3.

The tub or washing tank 1, which is preferably constructed of galvanized sheet metal, is approximately semi-cylindrical and is supported by legs 2 with its axis horizontally disposed. The semi-cylindrical bottom of this tub 1 is provided with a corrugated lining 3. At one edge of its semi-cylindrical bottom the tub is provided with a transversely extended rigidly secured tie bar 4 and at the other extremity of said cylindrical bottom it is provided with an offset wringer-box 5.

The tub is provided with a cover 6 that is connected by hinges 7 to the rear tie bar 4. A driving shaft 8 is journaled in a bearing bracket 9 rigidly secured on top of the cover 6. At its outer end the driving shaft 8 is provided with a fly wheel 10 having an eccentrically located hand-piece 11 by means of which it may be rotated. At its other end said shaft 8 is provided with a crank 12.

Rigidly secured to and depending from the central portion of the cover 6 is a bearing bracket 13 to the extreme lower end of which is pivoted an arm 14, which, at its free end,

is provided with a rigidly secured transversely extended rubbing board 15, the upper surface of which is preferably formed with ratchet-like corrugations. A pitman or connecting rod 16 that works through an opening 17 in the cover 6 connects the crank 12 to the outer end portion of the arm 14.

A bell crank lever is pivotally connected at its elbow to the depending bearing bracket 13 at a point above the pivotal connection between said bracket and the arm 14. The free end of the upper arm of the bell crank 18 is connected to the arm or lever 14, by a link 19, that is longer than the distance between the pivotal connections between the bracket 13 and the said two levers 14 and 18, the importance of which construction will appear later on.

The lower arm of the bell crank 18 is provided with three prongs, to each of which is secured one of three transversely extended boards 20, 21 and 22. The lower surfaces of the rubbing boards 20 and 21 are preferably provided with ratchet-like serrations that have a maximum driving force in a reverse direction to the corrugations of the rubbing board 15. The board 22 serves as sort of a dash board and presser and it is connected to the rubbing board 21, by a reticulate plate 23, preferably formed by sectional wire screen.

On the tub cover 6, near the free edge thereof, is a hand-piece 24, and at one end of the soap-box 5 is a turn button 26, by means of which the cover 6 is adapted to be locked in its down-turned operative position.

To support the tub cover and parts carried thereby in up-turned inoperative positions, as shown in Fig. 3, I provide a stop bar or leg 27 pivotally connected at its lower end to one of the legs 2, and connected at its upper end portion to the outer end of a short link 28, the inner end of which is pivotally connected to the cover 6 at a point eccentric to its hinges 7. This link 28 is so arranged that when the cover 6 is turned into the position shown in Fig. 3 it will throw the free upper end of the stop bar 27 into engagement with the shaft 8, and, through the said shaft and the bearing bracket 9, will support the cover and parts carried thereby, as shown in Fig. 3. When, however, the cover is turned down into an operative position, shown in Fig. 2, the upper end of the stop bar 27 will be moved inward close to the tub and, hence, out of the way.

The so-called rubbing boards 15, 20 and 21

and dash board 22 are preferably constructed of wood, but may be made of any suitable material. The term "board" is used for convenience and is not intended as a limitation as to material.

To obtain the best results, water should be placed in the tub approximately to the extent indicated by the line marked *y y* on Fig. 2, and clothes to be washed are, of course, submerged in this water, while the cover and the so-called rubbing boards are turned upward, as shown in Fig. 3. When the cover and rubbing boards are turned downward and the crank shaft 8 is rotated, oscillatory movements will, of course, be imparted to the rubbing boards 15, 20 and 21 and, furthermore, the said rubbing boards will be simultaneously oscillated first in one direction and then in the other direction. The rubbing board 15 works much closer to the corrugated tub bottom 3 than do the rubbing boards 20 and 21 and, hence, this board 15, under a movement from the right toward the left with respect to Fig. 2, will engage the under portions of the clothes and force the same toward the left over the corrugated bottom 3. Under movement of the levers 14 and 18 from the left toward the right, the rubbing boards 20 and 21 will engage portions of the clothes and force the same from the left toward the right. Under these alternate actions of the rubbing boards 15 on the bottom of the clothes and the rubbing boards 20 and 21 on the top of the clothes, the body of clothes will be pressed and slid to and fro and, furthermore, will be given a step by step rotary movement under which the upper portion of the clothes are gradually forced from left toward the right and the under portion of the clothes are forced from the right toward the left.

The lever 14 is longer than the lower arm of the bell crank lever 18 and, hence, it will of course follow that if the two levers 14 and 18 are rigidly connected the rubbing board 15 would be given greater oscillatory travel than the two rubbing boards 20 and 21. It is, however, desirable that said rubbing boards 20 and 21 be given as much travel as the rubbing board 15, and this is accomplished in the machine illustrated in the drawings by the use of the link 19 which is longer than the distance between the pivotal supports of the two levers 14 and 18. It is also important that the link 19 be pivotally connected to the lever 14 at a greater distance from the pivotal support of said lever than the distance between the pivotal support of the bell crank 18 and the pivotal connection between the upper end of said link 19 and the upper arm of said bell crank. With this arrangement, when the arm or lever 14 is given an upward movement, the link 19 moves from an oblique position toward a perpendicular or right angle position in respect to

said arm 14, and this produces an accelerated movement of the bell crank lever 18 when it is moved from the left toward the right with respect to Fig. 2. In this way, by moving the bell crank 18 through a greater number of degrees than the relatively long arm or lever 14, the rubbing boards 20 and 21 are given approximately the amount of travel as the rubbing board 15. The so-called rubbing boards 20 and 21 are given such an amount of oscillatory movement that said board 21 will, when moved backward, engage with the same clothes that were forced forward by the last previous forward movement of the rubbing board 20. This in practice I have found to be highly important and to be necessary to prevent accumulation of the clothes at one extremity of the cylindrical bottom of the tub.

In actual practice the efficiency of the machine above described and illustrated in the drawings has been demonstrated.

What I claim is:

1. In a washing machine, the combination with a tub having an approximately cylindrical bottom, of a pair of arms mounted to oscillate within said tub and connected for simultaneous movements in the same direction, one of said arms being longer than the other, rubbing boards or heads applied to the ends of said arms, the rubbing head on the shorter arm being corrugated on its lower surface, and the rubbing head on the longer arm being corrugated on its upper surface, and means for oscillating the said arms, all of the said rubbing boards being arranged to work with clearance over the bottom of the tub substantially as described.

2. In a washing machine, the combination with a tub having an approximately semi-cylindrical bottom and a displaceable cover, of a bearing depending from said cover, an arm and a bell crank pivoted to said depending bearing at points one above the other, a link connecting said arm to one end of said bell crank lever and arranged to impart accelerated movement to the latter, rubbing boards or heads applied to the free end of said arm and to the depending end of said bell crank lever, and a crank connection to said arm, substantially as described.

3. In a washing machine, the combination with a tub having an approximately semi-cylindrical corrugated bottom and a displaceable cover, of a bearing bracket 13 depending from the central portion of said cover, an arm 14 and a bell crank lever 18 pivotally connected to said bracket 13, a link connecting said arm 14 to one end of said bell crank, a rubbing board 15 applied to the free end of said arm 14, rubbing boards 20 and 21 set at an angle and one ahead of the other, and both secured to the depending end of said bell crank, a crank shaft mounted on top of said tub cover, and a pitman connecting the

crank of said shaft to said arm 14, substantially as described.

4. In a washing machine, the combination with a tub having an approximately semi-cylindrical corrugated bottom and a displaceable cover, of a bearing bracket 13 depending from the central portion of said cover, a lever 14 and bell crank 18 pivotally connected to said bracket 13, a link 19 longer than the distance between the pivotal supports of said levers 14 and 18, connecting said levers, a corrugated rubbing board 15 applied to the free end of said lever 14, corrugated rubbing boards 20 and 21 set at an angle one ahead of the other and secured to the depending end of said bell crank, a reticulate strip 23 between said boards 21 and 22, and a crank connection to said lever 14 for oscillating the same, substantially as described.

5. In a washing machine, the combination

with a tub having a hinged cover, of a crank shaft mounted on top of said cover, oscillatory devices operative on the clothes contained within the tub having connections by means of which they are driven from said crank shaft, a stop bar pivotally supported at its lower end from the tub structure, and a link connecting the other end of said stop bar to said cover and arranged to project the upper end thereof into position for engagement with said crank shaft when said cover is turned into an open position, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

FREDERICK W. KRANZ.

Witnesses:

H. D. KILGORE,

F. D. MERCHANT.