E. B. AND J. ADLER.

WASHING MACHINE.

APPLICATION FILED JULY 28, 1920.

1,401,026. Patented Dec. 20, 1921.

2 SHEETS—SHEET 1.

FIG. 1.

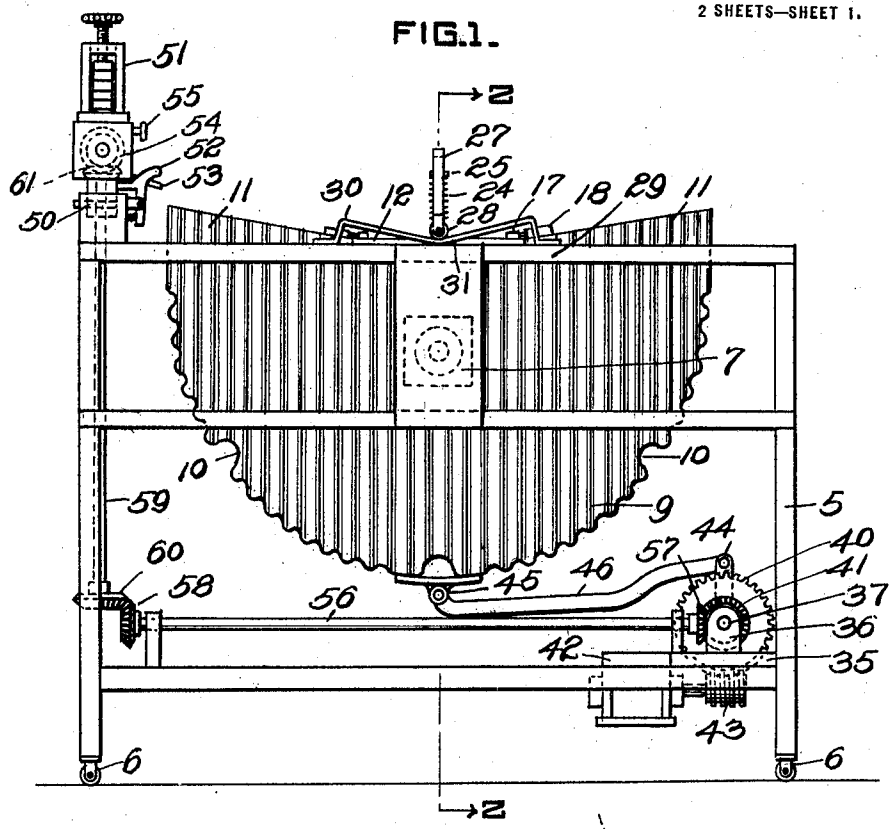
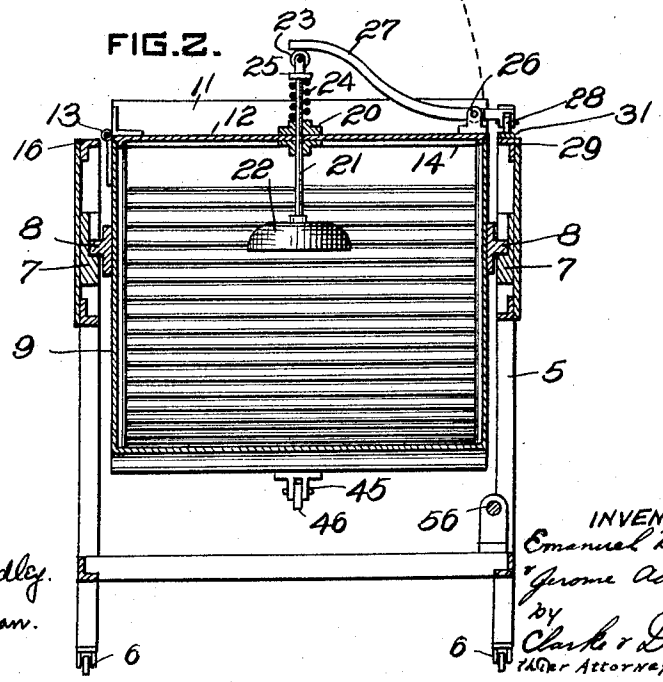


FIG. 2.



WITNESSES

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2 SHEETS—SHEET 2.

FIG. 3.

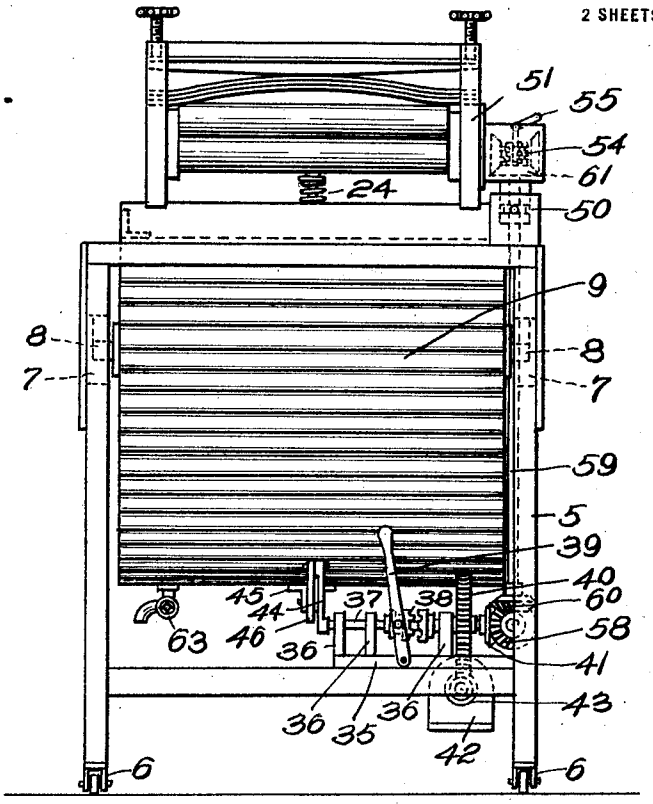
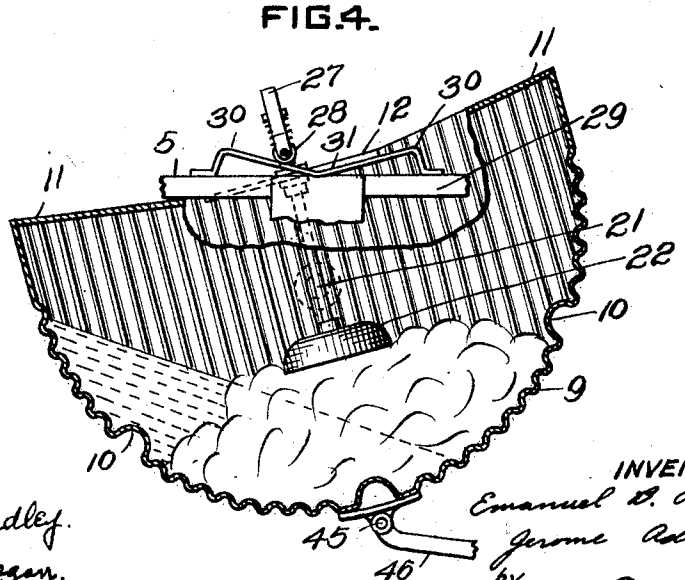


FIG. 4.



WITNESSES

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WASHING-MACHINE.

1,401,026. Specification of Letters Patent. Patented Dec. 20, 1921.

Application filed July 23, 1920. Serial No. 399,509.

To all whom it may concern:

Be it known that we, EMANUEL B. ADLER and JEROME ADLER, citizens of the United States, and residents of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Washing-Machines; and we do hereby declare the following to be a full, clear, and exact description thereof.

Our invention relates to automatic domestic washing machines, and more particularly to that class of machines in which the tub or receptacle for the clothes is rocked or oscillated on suitable trunnions pivoted in the machine frame.

Commercially, there are two types of machines in common use at this time which have been generally recognized as efficient machines, the one type having an oscillating tub and the other type having a tub in which a "suction cup" or inverted cone is reciprocated in the tub through the top thereof. Each type of machine has points of merit not found in the other. It is the object of the present invention to combine both types in a single machine, and to provide a machine of the oscillating tub type within which is a reciprocable suction device.

A further object of the invention is to combine the two types of machines into a single machine which will be compact and simple and have a comparatively simple operating mechanism.

A still further object of our invention is to provide a washing machine of this type having a tub adapted to effect a more violent agitation of the water without increasing the liability of injuring the clothes.

These and other objects will be apparent from the following description in connection with the accompanying drawings, in which,

Figure 1 is a side elevation of a machine embodying our invention;

Fig. 2 is a section on line 2—2 of Fig. 1;

Fig. 3 is an elevation of the end of the machine on which the wringer is mounted; and

Fig. 4 illustrates a section through the tub when it has been oscillated in one direction to the limit of its movement.

In the drawings, 5 indicates a frame, preferably made of structural metal, supported on casters 6. Supported on each side of the frame at a point approximately midway between the ends, are bearings 7. Suspended within the frame by means of trunnions 8 secured thereto, which are supported in bearings 7, is a substantially semi-circular tub 9, preferably having a corrugated bottom and corrugated sides. The trunnions 8 are preferably positioned eccentrically on the tub, being below the center of curvature thereof. Spaced apart from each other in the bottom of the tub are a plurality, preferably three, deeper corrugations 10 which form relatively high ribs or ridges inside the tub. These ridges 10 serve to effect a more violent agitation of the water and to move the clothes in the tub around more efficiently.

Each end 11 of the top of the tub preferably slopes toward a door 12 in the middle thereof, which is hinged at 13, the sloping portions forming draining surfaces back into the tub. The door or cover 12 is formed with an inwardly projecting flange 14 adapted to form a substantially water tight contact with the tub. On the back of the cover is a foot or lug 15 for engaging the top of the frame 5 at 16, to permit the cover to be held substantially vertical when it is swung upwardly on hinge 13 to a vertical position. This foot 15 also serves to prevent the tub from rocking when the cover is open. On each side of the cover 12, near the free end thereof, are shackles 17 adapted to be engaged by sliding bolts 18 secured to the sloping top portions of the tub. These bolts serve to hold the door tightly closed when the machine is in operation.

Passing through a bushing 20 in the center of the cover 12 is a rod 21 on the lower end of which is a "suction cup" 22, or other suitable agitating device, which is preferably an inverted hollow element. The upper end of the rod is provided with a roller 23 and surrounding the upper portion of this rod is a compression spring 24 held in position by a large washer 25. Pivoted in a pair of ears or lugs 26 secured to the cover is a curved lever or rock arm 27, the upper end of which is held in engagement with the roller 23 on the reciprocable rod 21, and the other end of which is provided with a roller 28. Fixed to the frame 5 at 29 is a cam 30 preferably having inclined faces which slope toward each other to form the lowest point 31 between the ends thereof and in vertical alinement with the trunnions 8.

Supported on the frame 5 is a casting 35 on which are formed a plurality of bearings 36. Mounted in these bearings is a divided shaft 37 having a sliding clutch 38 and an

operating lever 39. On one part of the shaft there is a large worm gear 40 and a bevel gear 41. An electric motor 42 with a worm gear 43 which engages worm wheel 40 serves to drive the shaft. The end of the divided shaft driven through the clutch 38 carries a crank 34. Obviously, other forms of driving means than an electric motor could be employed for driving the crank 44.

Secured to the bottom of the tub 9 is a pair of lugs 45 to which is pivoted a connecting rod 46 having its opposite end pivoted to the crank 44. It will thereby be seen that by operating motor 42 and throwing clutch 38 into driving position, the crank 44 will be rotated to oscillate the tub 9.

Supported on a swivel joint at 50 is a wringer 51. A detent 52 engages the wringer support to hold it in any of its adjusted positions. The wringer is provided with the usual guide and drip board 53. Housed at the supported side of the wringer 51 there is a reversing clutch and driving gear 54 controlled by an operating handle 55. For driving the wringer, we provide a shaft 56 extending substantially the length of the frame and provided at one end with a bevel gear 57 engaging bevel wheel 44 on the divided shaft 37, and on the other end with a bevel wheel 58. A vertical shaft 59 passes through the swivel support for the wringer, and the lower end of this shaft is provided with a bevel wheel 60 engaging the bevel wheel 58. The upper end of the shaft is provided with a gear wheel 61 which forms part of the reversing clutch mechanism, the construction of which is known, and can be understood by reference to the drawings.

A drain cock 63 is provided in the bottom of the tub for draining the water therefrom.

In operation, the lid 12 is opened to vertical position, and the clothes or articles to be washed are placed in the tub, together with a suitable amount of water. The lid is then closed and bolted shut, after which the motor 42 is started. By operating the lever 39 to shift the clutch 38 into driving position, the crank 44 may be rotated to oscillate the tub. Such oscillation of the tub will cause the water to move through and over the clothes and rub the clothes on the corrugated bottom and sides of the tub. By reason of the ridges 10 in the bottom of the tub, this action will be more effective, the ridges serving to move the water more violently.

The oscillation of the tub will also cause the roller 28 on rock arm 27 to travel up and down the inclined surfaces of the cam 30, rocking the lever 27 and forcing rod 21 with the suction cup 22 downward against the compression of spring 24, thereby effecting the concomitant movement of the tub and the reciprocable means. By reason of the shape of the cam 30, it will be seen, by reference to Fig. 4, that the cup 22 descends to engage the clothes at a time when the water beneath it is most shallow by reason of the tub being tilted to the limit of its movement. When the tub is horizontal, the cup is at its highest position, being returned thereto by the action of the compression spring 24. This mechanism also provides means for overcoming dead centers and avoiding unnecessary vibration when the tub reverses its motion.

Furthermore, by reason of the cam having its lowest position in alinement with the trunnions, the action of the spring 24 tends to cause the tub to stop in a horizontal position when the clutch is thrown out of driving position. After the clothes have been washed, the clutch is thrown out of driving position, the bolts released, and the lid or cover 12 opened. The wringer 51 may then be operated by proper movement of lever 55 and the clothes passed therethrough. The relation of the drip board 53 to the top 11 of the tub causes most of the water to be returned into the tub.

While we have shown and described a preferred embodiment of our invention, it will be apparent that modifications and changes may be made within the scope of the appended claims, and that means other than that described could be employed for reciprocating the suction cup.

What we claim is:

1. A washing machine comprising a frame, a tub pivotally supported in the frame, means for oscillating the tub, a reciprocable washing element within the tub and carried thereby, and means on the exterior of said tub and engaging means on the frame for transmitting reciprocating movement to said reciprocable means, whereby the tub and the reciprocable means may be operated concomitantly.

2. A washing machine comprising a supporting frame, a tub in said frame capable of being oscillated, means for oscillating the tub, a reciprocable washing means within the tub and carried thereby, means on the exterior of the tub connecting with the reciprocable means for operating it, and stationary means on said frame engaged by said means on the exterior of the tub to effect the operation of said reciprocable means when the tub is oscillated.

3. A washing machine comprising a supporting frame, a tub in said frame capable of being oscillated, means for oscillating the tub, a reciprocable washing means within the tub, a rock arm on the tub for moving said reciprocable washing means, and means on the frame for operating said rock arm upon oscillation of the tub.

4. A washing machine comprising a supporting frame, a tub in said frame capable of being oscillated, means for oscillating the tub, a reciprocable washing means in said tub and carried thereby, an arm connecting

with said reciprocable washing means, and a cam on said frame adapted to engage the arm to reciprocate it when said tub is oscillated.

5. A washing machine comprising a supporting frame, a tub pivoted in said frame and capable of being oscillated, means for oscillating the tub, vertically reciprocable washing means within the tub, a rock arm on the tub for moving said reciprocable means, and a stationary cam on said supporting frame having inclined surfaces sloping downwardly toward each other, and means on the rock arm for engaging said cam to move said rock arm when the tub is oscillated.

6. A washing machine comprising a supporting frame, a tub pivoted in said frame capable of being oscillated, means for oscillating the tub, a vertically reciprocable washing means in said tub, a spring means for holding said vertically reciprocable means in its raised position, a rock arm for moving said vertically reciprocable means downwardly against the action of said spring, and means on the frame for engagement with one end of said rock arm to effect the movement thereof upon the tub being oscillated.

7. A washing machine comprsing a supporting frame, a tub pivoted in said frame and capable of being oscillated, means for oscillating the tub, a cover hinged to said tub, means for securing the cover in closed position, a vertically reciprocable washing means carried by the cover which extends into the tub when the cover is closed, means on the cover for operating said vertically reciprocable means, and means on the frame with which said operating means on the cover engages, whereby the tub may be oscillated and the vertically reciprocable means operated concomitantly.

8. A washing machine comprsing a frame, a tub adapted to be oscillated supported in the frame, means for oscillating the tub, movable washing means within the tub and carried thereby for aiding in the washing of the clothes, and means independent of the operating means on the outside of the tub for moving said movable washing means concomitantly with the oscillation of the tub.

9. A washing machine comprising a frame, a tub adapted to be oscillated supported in the frame, means for oscillating the tub, movable washing means within the tub and carried thereby for aiding in the washing of the clothes, and means on the outside of the tub for moving said means concomitantly with the oscillation of the tub, said external means being provided with a spring adapted to assist in effecting the movement of the movable means and to prevent undue vibration of the tub.

10. A washing machine comprising a frame, a tub pivoted in the frame, means for oscillating the tub, a cover on said tub, a vertically reciprocable rod in said cover, a suction cup on the inner end of said rod, a roller on the outer end of said rod, a compression spring for holding the rod in its uppermost position, a rock arm pivoted to said cover and having one end engaging the roller on said rod, a roller on the opposite end of said rock arm, and means on the frame for engaging said roller to effect a movement of the rock arm whereby the suction cup may be reciprocated when the tub is oscillated.

11. A washing machine comprising a frame, a tub eccentrically supported in said frame adapted to be oscillated, means for oscillating the tub, reciprocable washing means within the tub and carried thereby having an upward and a downward movement, and means for moving the said washing means to the lowermost position when the tub is at the limits of its oscillation.

In testimony whereof, we, the said EMANUEL B. ADLER and JEROME ADLER, have hereunto set our hands.

EMANUEL B. ADLER.
JEROME ADLER.

Witnesses:
J. M. GEOGHEGAN,
WM. H. PARMELEE.