Nov. 8, 1932. E. PEDRAZZO 1,886,578

WASHING MACHINE

Filed April 10, 1930 2 Sheets-Sheet 1

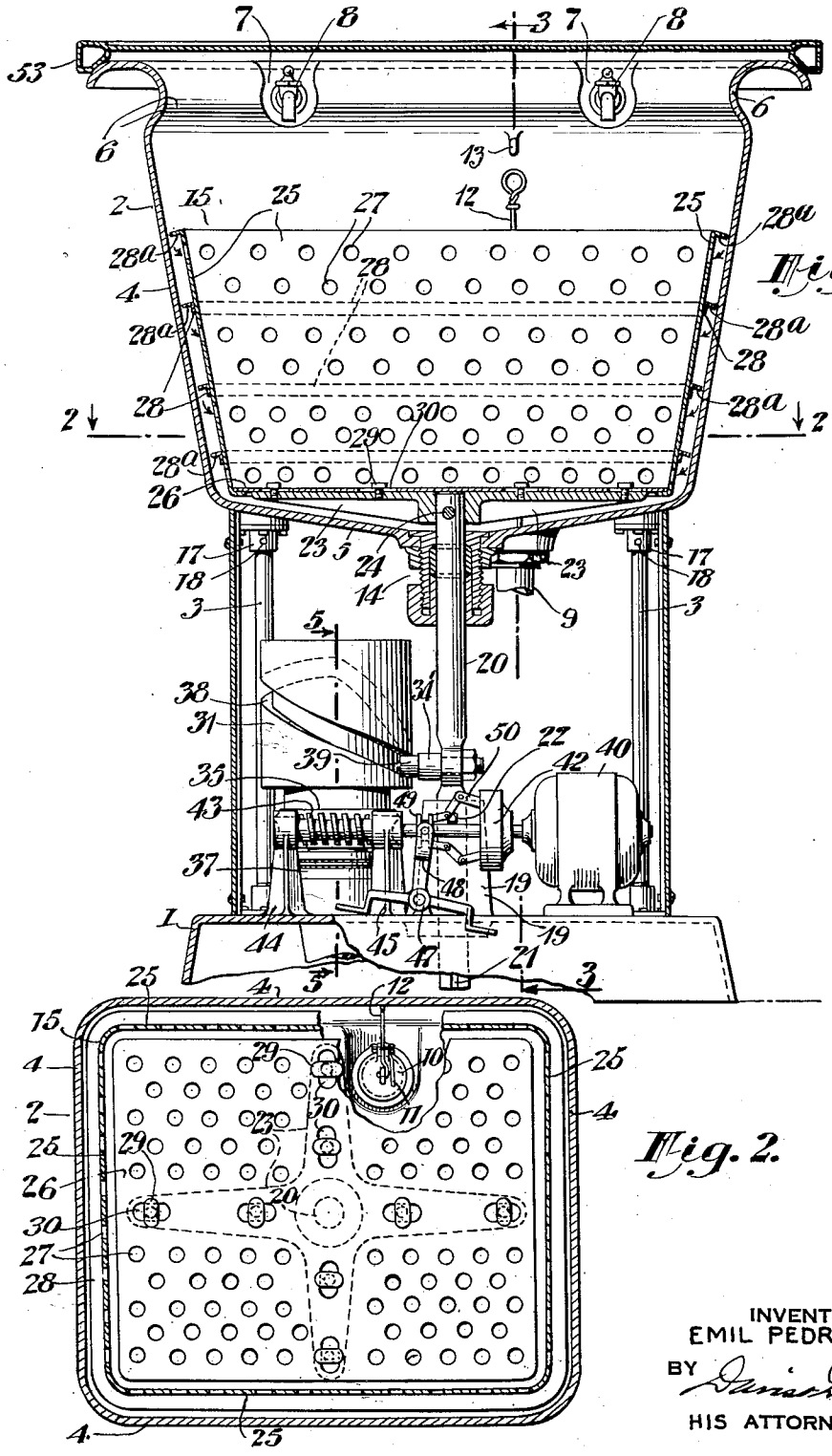


Fig. 1.

Fig. 2.

INVENTOR
EMIL PEDRAZZO
BY
HIS ATTORNEYS

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Fig. 3.

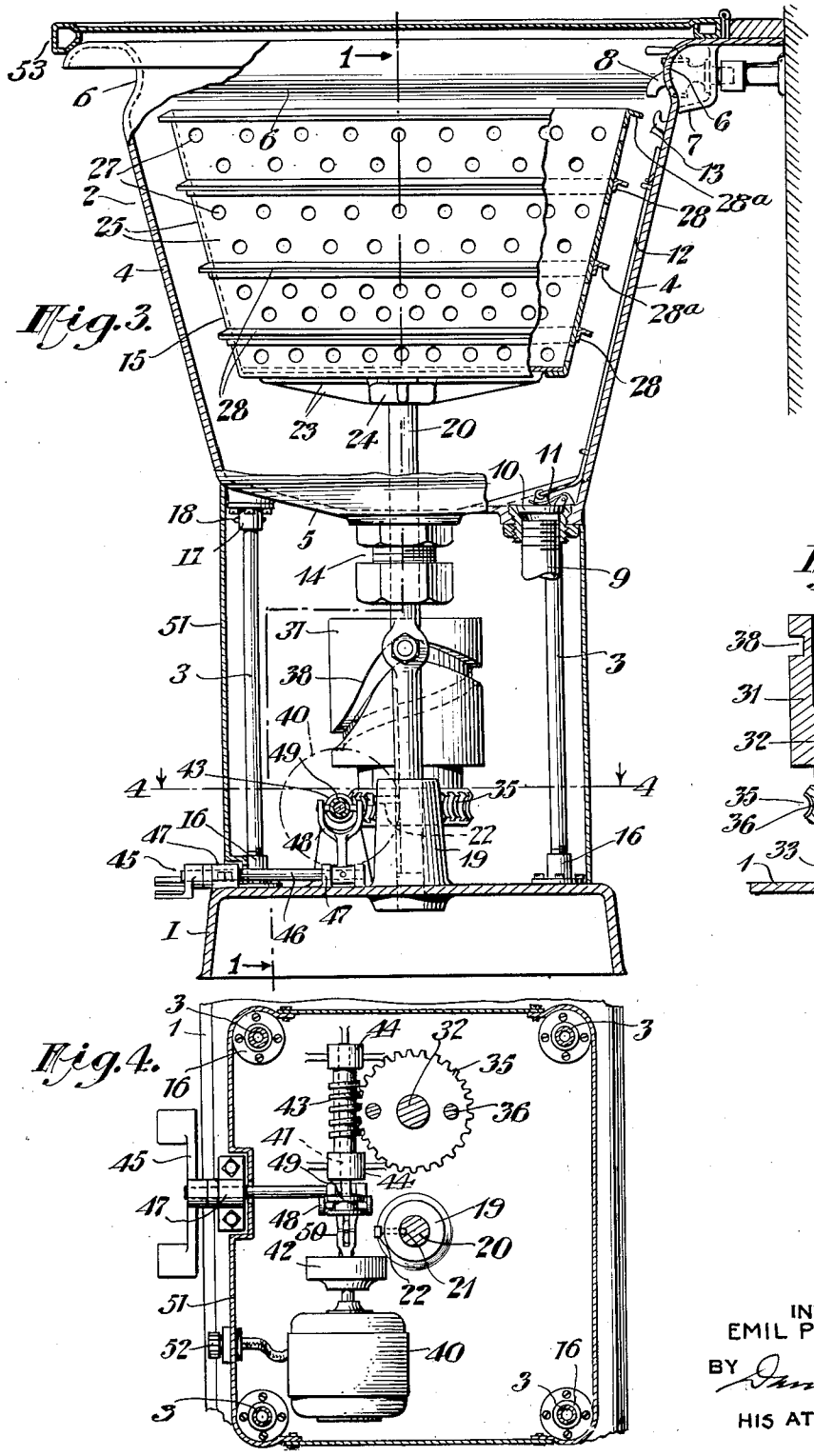


Fig. 5.

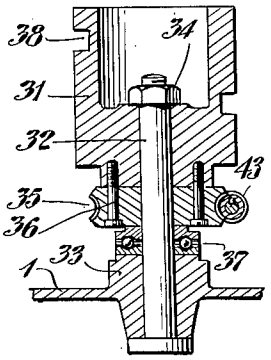


Fig. 4.

INVENTOR
EMIL PEDRAZZO
BY
HIS ATTORNEYS

Patented Nov. 8, 1932 1,886,578

UNITED STATES PATENT OFFICE

EMIL PEDRAZZO, OF WEST NEW YORK, NEW JERSEY

WASHING MACHINE

Application filed April 10, 1930. Serial No. 443,074.

Important objects of the present invention are, to provide an improved washing machine designed for washing fine and delicate fabrics without injury to them; to provide a safe and efficient washing machine designed to cleanse the laundry work by rapidly repeated sluicing and draining; to provide a simple, durable and easily operated washing machine of this character; to provide such a washing machine which is readily adaptable for washing of another character; to provide a washing machine designed to take the place of a standard house tub and serve all the purposes thereof in addition to its mechanical washing function; and to provide a washing machine embodying other improved features of design which will be described hereinafter.

In the drawings, Fig. 1 is a vertical section through the washing machine taken approximately on the line 1—1 of Fig. 3;

Fig. 2 a horizontal section taken on the line 2—2 of Fig. 1;

Fig. 3 a vertical section taken approximately on the line 3—3 of Fig. 1;

Fig. 4 a horizontal section taken on the line 4—4 of Fig. 3; and

Fig. 5 is a detail vertical section taken on the line 5—5 of Fig. 1.

In its present form the washing machine is designed primarily for household use and is formed to take the place of a standard type of wash tub usually mounted against a kitchen wall and provided with a flat cover serving as a table top. The machine may, however, be designed for use in laundries.

The machine structure includes a base 1 and a water receptacle or tub 2 supported upon the base by standards 3. In plan the tub is substantially rectangular and its front, side and rear walls 4 converge downwardly to the bottom 5 for a purpose which will appear hereinafter. The bottom is concave and formed to drain toward a drain opening near the rear wall. At its upper edge the tub is formed with a large bead 6 which extends around the interior thereof and forms a baffle for directing upwardly displaced water inwardly and downwardly during the operation of the machine. Outwardly of said bead the edge of the tub curls downward at the front and sides and at the rear extends straight rearward. The rear wall of the tub is formed with two recesses 7 interrupting said bead to accommodate hot and cold water faucets 8 which discharge into the tub. Mounted in the drain opening is a bushing which has a threaded connection with a drain pipe 9 and carries a hinged outlet valve 10 which is held normally closed by a spring 11. For opening the valve a flexible strand 12 is connected to it and trained upwardly along the rear wall of the tub to a point where it may be conveniently grasped. Upon the rear wall is a hook 13 with which a loop at the end of said strand may be engaged to hold the valve open. Centrally, the bottom of the tub is apertured and provided with a stuffing box 14. The latter forms part of the mounting for a laundry receptacle 15.

The base 1 is a flat casting forming a support for the driving mechanism of the washing machine and also for the tub standards 3. There are four of the latter and at their lower ends they are threaded into socket members 16 detachably secured to the upper surface of the base. At their upper ends the standards fit into socket members 17, secured to flat bosses formed at the under side of the tube, and are held by pins 18. The threaded connections of the standards with socket members 16 renders them independently adjustable for leveling the tub. Formed upon the base and projecting upward from it is a vertical bearing 19 which is centered with relation to the stuffing box 14. A shaft 20 extends through said bearing and stuffing box and is reciprocably mounted in them. At its lower end the shaft is slotted as at 21 and is engaged by a set screw 22 or other suitable means for keying it to the bearing against rotation. The upper end of the shaft extends into the tub and has a flat spider 23 detachably fixed to it as at 24 and forming a support for the laundry receptacle 15.

The laundry receptacle 15 is an upwardly opening metal basket-like member, substantially rectangular in plan and having side walls 25 which converge downwardly paral-

lel to the tub walls 4, and a flat bottom 26 resting upon the spider 23. Said side walls and bottom are perforated as at 27. Upon their exterior surfaces the side walls bear baffle means in the form of angular metal strips 28 each extending horizontally entirely around the laundry receptacle and rigidly secured to it in any suitable manner. The uppermost baffle strip is formed upon the upper edge of the laundry receptacle and the others are equally spaced down the side walls thereof. There are several horizontal rows of the perforations 27 between each pair of adjacent strips and a row between the lowermost strip and the bottom of the receptacle. Each strip forms a baffle surface 28^a extending entirely around the exterior of the laundry receptacle and directed obliquely downward. When the receptacle is in its lowermost position within the tub the opposed walls 4 and 25 are spaced apart and the baffle surfaces 28^a reach almost to walls 4.

The laundry receptacle is detachably held to the spider by fastening elements 29. The latter have threaded shanks which are passed through elongated apertures 30 in the bottom of the receptacle and screwed into the arms of the spider. Elongated heads upon the fastening elements, slightly smaller than apertures 30, are adapted to be disposed transversely of the apertures to clamp the bottom to the spider and to be turned into register with the apertures to free the bottom and permit the laundry receptacle to be lifted from the spider and removed from the tub.

At one side of the vertical shaft 20 is a cam 31 for reciprocating said shaft and the attached laundry receptacle. Said cam is rotatably mounted upon a vertical shaft 32 whose lower end is supported in a boss 33 formed upon the base. At one end the shaft 32 is headed and at its opposite end it is reduced and threaded and has a nut 34 screwed upon it to prevent endwise displacement and removably hold the cam in place. At its lower end the cam is reduced and has a worm wheel 35 fixed thereto by screws 36. The worm wheel bears upon a roller bearing 37 interposed between said wheel and the boss 33. Formed in the cylindrical surface of the cam is a continuous cam groove 38 which ascends through three quarters of the cam circumference and descends through the remaining quarter. Between this groove and the shaft 20 there is an operative connection formed by a short radial arm 34′ fixed to the shaft and bearing a roller 39 which projects into the cam groove.

For rotating the cam an electric motor 40 is mounted upon the base 1. In alinement with the motor there is a drive shaft 41 which is adapted to be operatively connected to the motor shaft by a friction clutch 42. Fixed to shaft 41 is a worm 43 which meshes with the worm wheel 35. The shaft is rotatably supported by bearing pedestals 44 formed upon the base. For operating the clutch 42 a treadle 45 is disposed at the front of the base and fixed to a rock shaft 46. The latter is supported in bearings 47 upon the base, extends rearward to a point beneath the drive shaft 41 and has an upwardly extending fork 48 fixed to it and engaging a grooved collar 49 slidably mounted upon the shaft. Links 50 operatively connect said collar to the clutch. The treadle extends in opposite directions from the rock shaft. When one end of the treadle is stepped on the clutch is thrown in and when the other end is stepped on the clutch is thrown out.

Between the tub and the base is a housing 51 which encloses the cam and its driving mechanism and also the tub-supporting standards 3. A switch 52 to control the motor is mounted in any convenient place as upon the housing 51. The tub is provided with a flat cover 53 which is hinged at its rear edge and adapted to fold down upon the tub and form a table top.

In the operation of the washing machine the perforated receptacle 15 is charged with laundry and the tub is charged with water to the proper depth through the faucets 8. The motor is then started by operation of the switch 52 and the treadle 45 is stepped on to throw in the clutch. Thereby the cam 31 is rotated and, through its operative connection with the shaft 20 and the laundry receptacle, the latter is vertically reciprocated. Due to the form of the cam groove 38 three quarters of a reciprocation period is consumed in the rise of the receptacle 15 and only one quarter in the descent of the receptacle. During the relatively long rise the water drains from the receptacle through the perforations 27. The draining is assisted by suction created by upward displacement of the receptacle from the bottom of the tub. As the receptacle rises its walls 25 recede from the opposed parallel walls 4 of the tub due to the downward convergence of said opposed walls. In the quick descent of the laundry receptacle its walls 25 and the downwardly directed baffles 28 approach the tub walls 4 and cooperate with them to force the water laterally inward through the perforations in the side walls of the receptacle. It will also be forced into the receptacle through the perforations in the bottom thereof. Consequently in the reciprocation of the receptacle its contents are subjected to repeated forcible sluicing and draining, acting to thoroughly cleanse them. The reciprocations will preferably be made to occur rapidly. A rate of forty reciprocations per minute has been found very satisfactory. Water which is upwardly displaced by the rapid movement of the laundry receptacle is directed by the baffle bead 6, downwardly and inwardly into

the open top of the receptacle. Said bead is located above the limit of lift of the upper edge of the receptacle.

The washing is accomplished by the rapidly alternating pressure and suction of the washing fluid forced through and around the articles washed and there is no rubbing, twisting or distorting action to injure them. Consequently the machine may be safely used for washing fine and delicate fabrics.

The machine combines the washing mechanism with the washing tub and thereby permits the use of the machine where space is limited. It connects with the same water inlets and drain as the house tub which it replaces and thereby makes it unnecessary to carry water to and from it; neither is it necessary to dismount and put away any parts when through using the machine. Its design permits hand washing of articles in the tub either with or without removing the receptacle 15, and also permits dishes and similar articles to be mechanically washed by placing them in a suitable holding frame. Its driving and operating mechanism is permanently set directly beneath the tub where it is inconspicuous and when the machine is not in use the tub is covered and resembles the ordinary combined tub and table. It will also be observed that the laundry receptacle may be readily removed when necessary to clean the tub or drain.

While I have shown and described a very satisfactory form of my invention I do not wish to be limited strictly to this disclosure but reserve the right to make such changes as will lie within the scope of the claims.

What I claim is:

1. A washing machine comprising a water receptacle having downwardly converging inner side walls making a materially smaller angle with the verticle than with the horizontal; and a laundry receptacle mounted for vertical reciprocation within said water receptacle and having downwardly converging foraminous outer side walls of material depth opposed to said converging walls of the water receptacle and inclined similarly to them, whereby they will approach the opposed walls of the water receptacle upon the descent of the laundry receptacle, to force the water laterally inward through the foraminous walls and into the laundry receptacle, the bottom of said receptacle being foraminous also.

2. A washing machine comprising a water receptacle having downwardly converging inner side walls making a materially smaller angle with the vertical than with the horizontal; a laundry receptacle mounted for vertical reciprocation within said water receptacle and having downwardly converging foraminous outer side walls of material depth opposed to said converging walls of the water receptacle and inclined similarly to them, whereby they will approach the opposed walls of the water receptacle upon the descent of the laundry receptacle to force the water laterally inward through the foraminous walls and into the laundry receptacle; and outwardly extending and downwardly directed baffle means carried by the laundry receptacle and extending around the exterior thereof to assist in forcing the water inward through the foraminous walls when the laundry receptacle descends.

3. A washing machine comprising a water receptacle having downwardly converging inner side walls making a materially smaller angle with the vertical than with the horizontal; a laundry receptacle mounted for relative vertical reciprocation within said water receptacle and having downwardly converging foraminous outer side walls of material depth opposed to said converging walls of the water receptacle and inclined similarly to them, whereby they will approach the opposed walls of the water receptacle upon relative descent of the laundry receptacle to force the water laterally inward through the foraminous walls and into the laundry receptacle; and outwardly extending and downwardly directed baffles carried by the laundry receptacle and extending around the exterior thereof at different levels between and above the foramina to assist in forcing the water inward through the foraminous walls when the laundry receptacle descends.

4. A washing machine comprising a water receptacle having downwardly converging inner side walls making a materially smaller angle with the vertical than with the horizontal; a laundry receptacle mounted for vertical reciprocation within said water receptacle and having downwardly converging foraminous outer side walls of material depth opposed to said converging walls of the water receptacle and inclined similarly to the latter, whereby they will approach the opposed walls of the water receptacle upon the descent of the laundry receptacle to force the water laterally inward through the foraminous walls and into the laundry receptacle; outwardly extending and downwardly directed baffle means carried by the laundry receptacle and extending around the exterior thereof; a rotatably mounted driving cam having a gradual rise to a high point and a comparatively abrupt descent to a low point; and an operative connection between said cam and the laundry receptacle, for reciprocating the latter with relatively slow up strokes and quick down strokes.

5. A washing machine comprising a water receptacle; a laundry receptacle; a support for said laundry receptacle mounted to reciprocate the latter vertically; a driving cam mounted to rotate about a vertical axis and

having a continuous cam groove ascending gradually around the cam axis to a high point and descending comparatively abruptly to a low point; and a positive operating connection between said cam groove and said support for the laundry receptacle for forcibly reciprocating the latter.

6. A washing machine comprising a water receptacle; a laundry receptacle within said water receptacle; a vertical rod fixed to and supporting said laundry receptacle and mounted to reciprocate through the bottom of the water receptacle; a driving cam below the water receptacle mounted to rotate about a vertical axis and having a continuous cam groove gradually ascending around the cam axis to a high point and descending comparatively abruptly to a low point; and a direct, positive operating connection between said cam groove and said reciprocable rod for positively reciprocating the latter and the laundry receptacle with a relatively slow upward stroke and a quick downward stroke.

7. A washing machine comprising a water receptacle having a downwardly and inwardly inclined inner side wall making a smaller angle with the vertical than with the horizontal; a laundry receptacle within said water receptacle and having a foraminous outer side wall of material depth opposed to said inclined wall of the water receptacle and inclined similarly to it; and means supporting one of said receptacles for vertical reciprocation relatively to the other receptacle, whereby upon relative descent of the laundry receptacle within the water receptacle said opposed inclined walls will relatively approach each other to force the water laterally inward through said foraminous wall and into the laundry receptacle, the bottom of said receptacle being foraminous also.

8. A washing machine comprising a water receptacle having a downwardly and inwardly inclined inner side wall making a smaller angle with the vertical than with the horizontal; a laundry receptacle mounted for vertical reciprocation within said water receptacle and having a foraminous bottom wall and a foraminous outer side wall of material depth opposed to said inclined wall of the water receptacle and inclined similarly to it, to approach the opposed wall of the water receptacle upon descent of the laundry receptacle and force the water laterally inward through said foraminous side wall and bottom wall into the laundry receptacle; and mechanical driving means to vertically reciprocate the laundry receptacle and positively move it on its downward stroke against the resistance of the water.

9. A washing machine comprising a water receptacle having a downwardly and inwardly inclined inner side wall making a smaller angle with the vertical than with the horizontal; a laundry receptacle within said water receptacle and having a foraminous bottom wall and an outer side wall of material depth and made foraminous throughout practically its full depth, this receptacle wall being opposed to said inclined wall of the water receptacle and inclined similarly to it; and means supporting one of said receptacles for vertical reciprocation relatively to the other receptacle, whereby upon relative descent of the laundry receptacle within the water receptacle said opposed inclined walls will relatively approach each other to force the water laterally inward through said foraminous wall and into the laundry receptacle.

In testimony whereof I hereunto affix my signature.

EMIL PEDRAZZO.