July 29, 1924.

1,502,942

J. D. DOWNIE

WASHING MACHINE

Filed Feb. 27, 1922

2 Sheets-Sheet 1

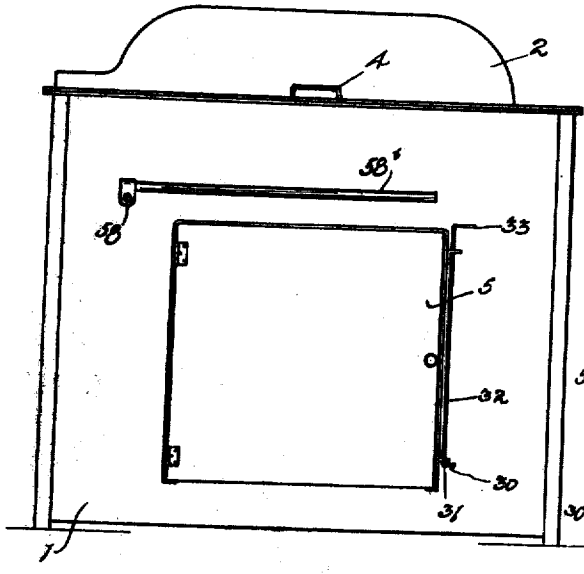


Fig 1

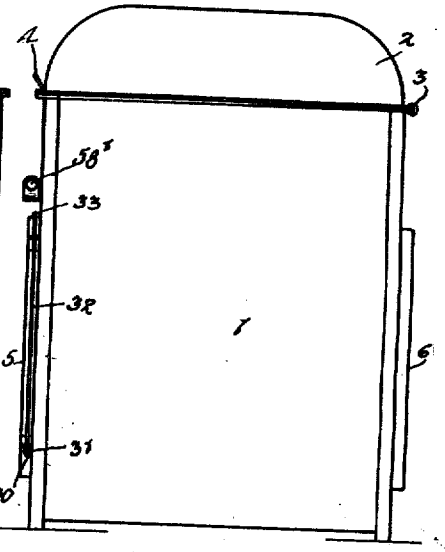


Fig 2

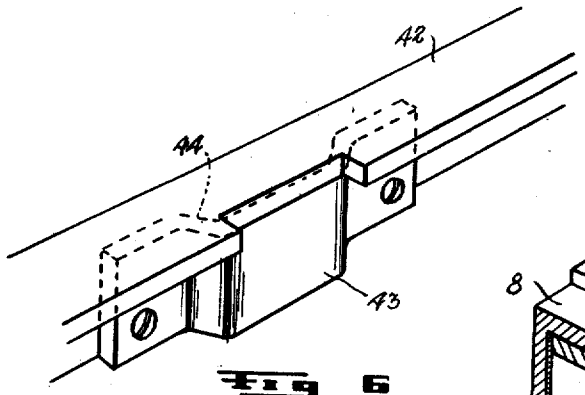


Fig 6

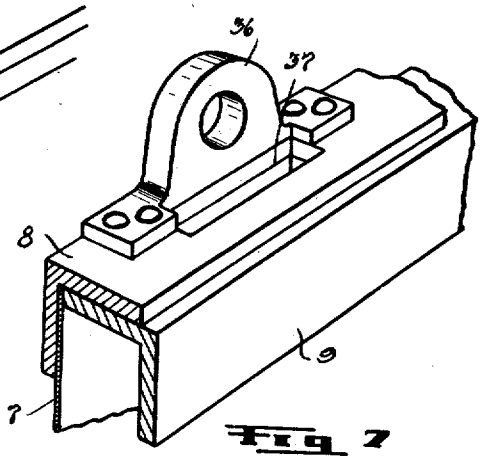


Fig 7

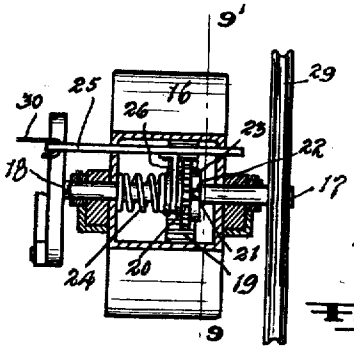


Fig 8

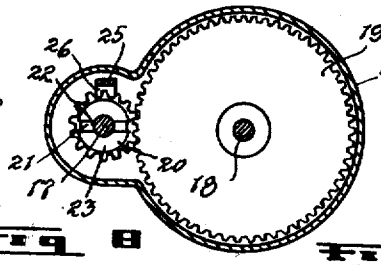


Fig 9

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July 29, 1924.

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J. D. DOWNIE

WASHING MACHINE

Filed Feb. 27, 1922

2 Sheets-Sheet 2

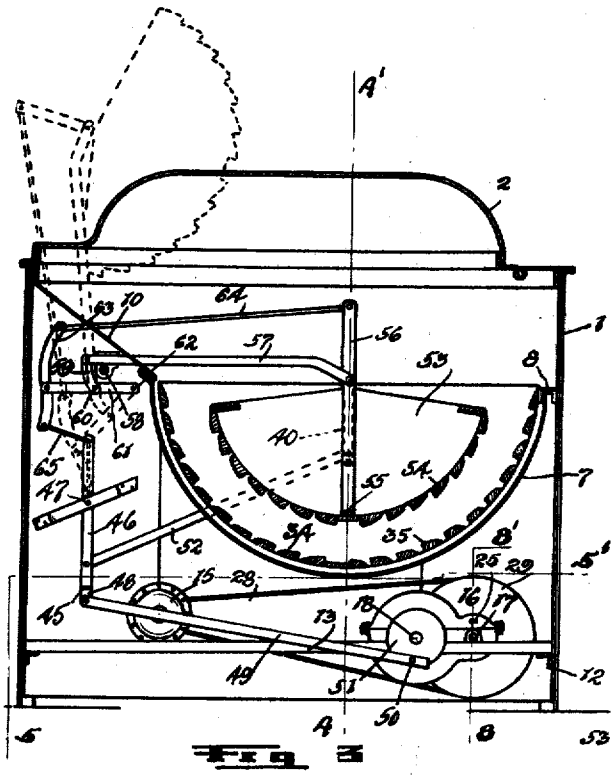


Fig 3

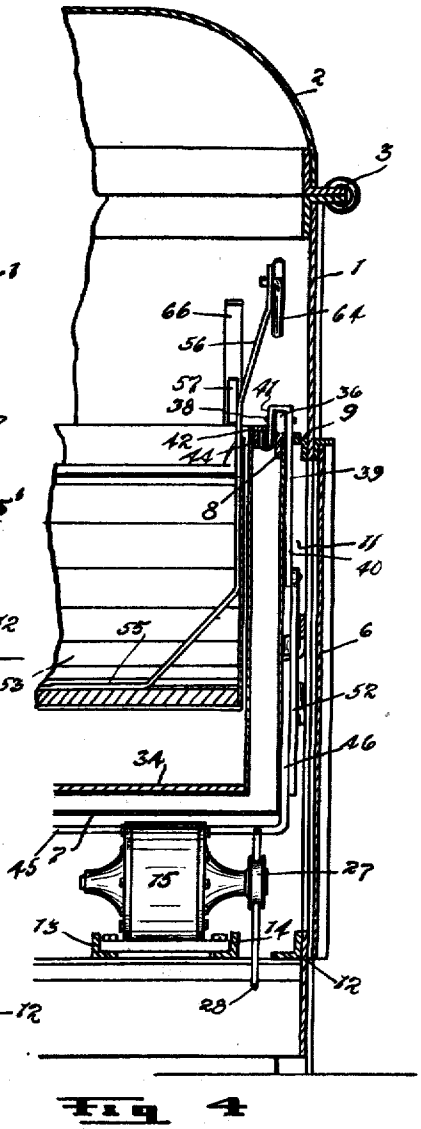


Fig 4

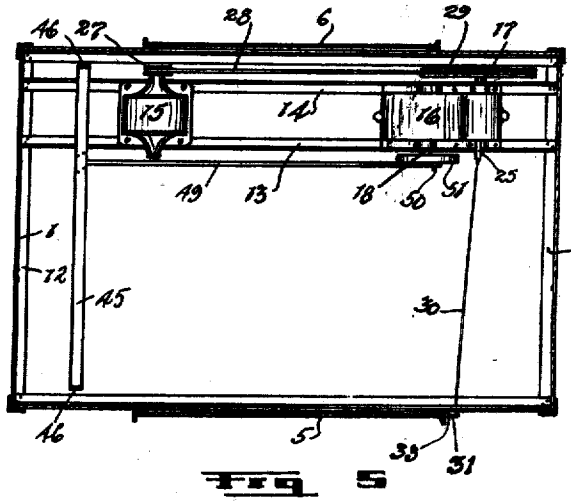


Fig 5

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Patented July 29, 1924. 1,502,942

UNITED STATES PATENT OFFICE.

JOHN DONALD DOWNIE, OF WINNIPEG, MANITOBA, CANADA.

WASHING MACHINE.

Application filed February 27, 1922. Serial No. 539,607.

To all whom it may concern:

Be it known that I, JOHN D. DOWNIE, of the city of Winnipeg, in the Province of Manitoba, Canada, have invented certain new and useful Improvements in Washing Machines, of which the following is the specification.

The invention relates to improvements in washing machines and an object of the invention is to provide a simply constructed and operated washing machine which will effectively wash the clothes placed therein and without injuring the most delicate fabrics and which is arranged so that all working parts are readily accessible for inspection or repair purposes.

A further object of the invention is to provide a washing machine embodying opposed upper and lower scrubbers between which the clothes are washed, the scrubbers moving in opposite directions and both removable and with the upper scrubber arranged so that it can be quickly and easily raised out of the machine by the manipulation of a hand lever, thereby permitting of the easy removal and insertion of the clothes.

A further object of the invention is to provide a motor for oscillating the scrubbers in opposite directions and to arrange the driving connections such that the upper scrubber can be raised out of or lowered into the tank without requiring to stop the motor and further such that the upper scrubber can at all times accommodate itself to the quantity of clothes placed in the machine.

With the above more important objects in view the invention consists essentially in the arrangement and construction of parts hereinafter more particularly described and later pointed out in the appended claims, reference being had to the accompanying drawings in which:—

Fig. 1 is a front view of the machine.

Fig. 2 is an end view thereof.

Fig. 3 is a longitudinal vertical sectional view centrally through the machine.

Fig. 4 is an enlarged detailed vertical sectional view transversely and centrally through part of the machine.

Fig. 5 is a horizontal sectional view at 5—5′ Fig. 3.

Fig. 6 is a perspective view showing one of the straps attached to the outer scrubber.

Fig. 7 is a perspective view showing the bearing arrangement for the outer scrubber.

Fig. 8 is an enlarged vertical sectional view at 8—8′ Fig. 3, certain parts being shown in side elevation.

Fig. 9 is a vertical sectional view at 9—9′ Figure 8.

In the drawings like characters of reference indicate corresponding parts in the several figures.

The machine casing 1 is a substantially rectangular one and preferably formed from sheet metal and has closed sides and ends and it is provided with a dome shaped top 2 hinged at the rear side as indicated at 3 to the casing. A handle 4 is provided at the front for opening the top or cover. Hinged doors 5 and 6 are provided at the front and back of the machine to allow of ready access to the interior thereof. Within the casing I mount a stationary semi-cylindrical tank 7 preferably formed from sheet metal and having the upper edges thereof reinforced by applied angle irons 8 which have the horizontal flanges turned outwardly and supported by the inturned horizontal flanges of angle irons 9 permanently riveted to the inner side of the casing.

Here it will be observed that the length of the tank is somewhat less than the length of the casing and that a drain board 10 extends angularly upwardly from the inset edge of the tank to the end of the machine at the top and also that the front and rear sides of the tank are spaced as indicated at 11 from the sides of the casing, the spaces allowing of the insertion of certain working parts later described.

The lower part of the casing is suitably reinforced by applied angle irons 12 and the end angle irons carry two suitably spaced parallel lengthwise extending angle bars 13 and 14 which support the electric motor 15 and a gear casing 16. The gear casing is suitably cast and provides bearings for a countershaft 17 and a driving shaft 18, the driving shaft having a comparatively wide faced driving gear 19 secured thereto, whilst the countershaft is fitted with a rotatably mounted pinion 20 continuously meshed

with the driving gear. A pin 21 passes through the countershaft and is adapted to enter a cross slot 22 formed in an extension hub 23 of the pinion. A coil spring 24 normally forces the pinion in a direction such that the pin will remain in the slot and consequently effect a driving connection between the pinion and the countershaft. A shifting bar 25 extends slidably through the gear casing and is provided with a spanner fork 26 which spans the hub of the pinion, such arrangement allowing one, by end shifting the bar in a proper direction, to pull the pinion away from the pin 21 and thereby disconnect the shaft from the pinion, and permit the countershaft to rotate freely without operating the washing machine.

The driving pulley 27 of the motor is connected by a belt 28 to a driving pulley 29 secured to the counter-shaft. The shifting bar 25 is operated by a link 30 passing across the lower part of the casing and having the forward end projecting through the front of the casing and attached pivotally to a crank 31 located at the lower end of an operating rod 32 suitably mounted on the front of the machine and fitted at the upper end with a handle 33.

The arrangement of the latter parts is such that when the handle is lying parallel with the side of the casing the pin 21 is in the slot 22 and that when the handle is turned outwardly a little more than ninety degrees the crank will pass over dead central position and will lock the shifting bar 25 in a position such that the pin 24 is held entirely free of the slot.

Within the tank I mount a semi-cylindrical lower outer scrubber 34 having closed ends and a slatted bottom as indicated at 35. Holes or perforations are made between the meeting edges of the slats to allow the water to pass into the scrubber and the slats have the inner faces curved and arranged in a somewhat flattened tooth like manner as best shown in Fig. 3.

The scrubber 34 is pivotally mounted and is removable. To the angle bars 8 of the tank I secure permanently a pair of opposing centrally positioned bearings 36 and I slot both the angle bars 8 and 9 immediately adjoining the bases of the bearings, the slot being indicated at 37 (see Fig. 7). The bearings each carry a pivot pin 38 and the pin supports in each instance a specially bent bar 39 which spans the bearing and has the lower end forming a lever 40 passing downwardly through the slot 37 and the upper end hooked as indicated at 41 to form a hanger. The upper part of the bearing is curved concentric to the pin and the arrangement is such that when the lever, which is in the space 11 at the outer side of the tank, is swung backwardly and forwardly the hanger will swing and oscillate the outer scrubber which it supports.

By referring to Figures 4 and 6 it will be observed that the front and rear sides of said scrubbers are fitted at the top with reinforcing angle irons 42 and that a strap 43 is attached centrally to each angle iron 42, the strap forming a pocket 44 which receives snugly the upturned end of the hanger. This construction permits of the removal of the outer scrubber and also effects a positive connection between the scrubber and the hanger sufficient to cause the scrubber to oscillate when the lever is reciprocated.

Within one end of the machine I locate a cross bar 45 having upstanding lever-like ends 46 which are pivotally attached to the sides of the casing by pivot pins 47. The cross bar carries a downwardly extending lug 48 to which I pivotally connect one end of a connecting bar 49, the other end of which is pivotally attached by an eccentric pin 50 to a disc wheel 51 permanently secured to the driving shaft.

A pair of similar operating bars 52 are connected to the lower ends of the levers 46 and to the lower ends of the levers 40, such operating bars oscillating the outer scrubber when the machine is working.

The inner or upper scrubber 53 is semi-cylindrical and somewhat smaller than the outer scrubber and it is formed from suitable end pieces and rubbing slats 54 similar to those of the outer scrubber. A bar 55 is permanently secured centrally to the bottom and to the ends of the inner scrubber and is fitted with upward extensions forming lever arms 56. To each of the lever arms 56 I connect pivotally a lifting bar 57, each lifting bar being attached permanently to a rotatably mounted cross shaft 58 passing from the front to the rear of the machine and fitted at its forward end with a normally horizontally disposed hand lever 58'. A swinging link 59 is pivotally connected to the left hand end of each lifting bar and the free end of the link is pivotally connected at 60 to a swinging lever 61 pivotally attached to the casing at 62. The ends of the levers 61 remote from the pivot points 62 are fitted in each instance with a pivoted rocker arm 63 and the upper end of the rocker arm in each case is connected by a connecting rod 64 to the upper ends of the lever arms 56 whilst the lower ends thereof are connected by comparatively short connecting rods 65 to the upper ends of the levers 46. The draining pan is slotted at 66 (see Fig. 4) to allow the lifting arms 57 to swing upwardly and downwardly freely.

From the above arrangement it will be

apparent that the inner scrubber can accommodate itself to the thickness of the clothes placed in the machine between the scrubbers as the arms 57 can swing up and down around the pivot points 58. Further, it will be seen that in all working positions, which the inner scrubber may have, the levers 46 will operate through the connecting rods 64 and 65 and rocker arm 63 to reciprocate the inner scrubber in the opposite direction to the outer scrubber.

When the machine is working the clothes are effectively rubbed between the scrubbers and the weight of the upper scrubber holds it down sufficiently to do effective work on the clothes but without any liability of injuring the finest fabrics.

By the arrangement provided it is possible for one to raise the inner scrubber to the position shown in dotted outline in Fig. 3 by manipulating the lever 58′ and without having to throw out the clutch formed by the pin 21 and slot 22.

When one wishes to raise the inner scrubber such as when putting in or removing clothes he opens the cover 2 and then turns the lever 58′ to a more or less vertical position. In so moving the lever he swings up the lifting arms and at the same time swings down the lever 61 and brings the rocker arms and links into such a position that the oscillating movement of the lever 46, in so far as the inner scrubber is concerned, is nullified.

In the up position there is only the slightest vibratory movement of the scrubber 53. Obviously as the scrubber 53 passes downwardly into the scrubber 34 it will start to move and will have its full oscillating action as soon as it has resumed its normal working position.

What I claim as my invention is:—

1. In a clothes washing machine, the combination with a casing and a semi-cylindrical stationary tank mounted within the casing, of a semi-cylindrical outer scrubber pivotally and removably mounted within the tank and adapted to receive the clothes to be washed, a pair of pivotally mounted swinging arms extending inwardly at the sides of the outer scrubber, an inner semi-cylindrical scrubber pivotally carried by the arms and normally resting on the clothes to be washed, manually operated means for lifting the arms to raise the inner scrubber completely out of the outer scrubber and motor driven means for reciprocating the scrubbers in opposite directions and when contained one within the other, said driving means being arranged such that in the removed position of the inner scrubber the said inner scrubber remains inert.

2. In a washing machine of the type embodying upper and lower relatively movable rubbers, the provision of means supporting the upper rubber for displacement from an operative to an inoperative position with respect to the lower rubber, power driven means for actuating said rubbers and means acting automatically to render said power driven means substantially inoperative with respect to actuation of the upper rubber upon displacement of the latter to an inoperative position.

3. In a washing machine of the type embodying upper and lower rubbers, the provision of means supporting the upper rubber for displacement from an operative to an inoperative position with respect to the lower rubber and articulated power driven means connected to the upper rubber to effect actuation thereof, when the said rubber is in operative position, the jointed sections of said actuating means being relatively shiftable to permit the upper rubber to remain substantially idle upon displacement thereof to an inoperative position and without causing a break in the driving connection between the said rubber and the actuating means.

4. In a washing machine of the type embodying upper and lower rubbers of the reciprocal type, the provision of means supporting the upper rubber for displacement from an operative to an inoperative position, a motor, means driven from the motor for actuating said rubbers and means controlled by displacement of the upper rubber to an inoperative position for rendering the actuating mechanism substantially inoperative with respect to effecting reciprocation of the upper rubber.

5. In a washing machine of the type embodying relatively movable rubbers, one of which is displaceable to an inoperative position with respect to the other, the provision of a motor and means actuated thereby for moving said rubbers in opposite directions and control means acting automatically to render the rubber actuating means inoperative with respect to the displaceable rubber upon movement of the latter to an inoperative position, said control means serving to automatically render the actuating means effective upon return of the displaceable rubber to operative position.

6. In a washing machine of the type embodying upper and lower pivotally mounted rubbers, the provision of swinging supporting means carrying the upper rubber and movable to displace the latter from an operative to inoperative position with respect to the lower rubber, articulated power driven means connected to and serving to actuate the upper rubber when the latter is operatively disposed with respect to the lower rubber, and control means, actuated by movement of said supporting means, for rendering said rubber actuating means sub-

stantially ineffective when the upper rubber is disposed in an inoperative position with respect to the lower rubber.

7. In a washing machine of the type embodying upper and lower rubbers, the provision of a rock shaft, supporting arms fixed at an intermediate point to the said shaft and movable therewith from a horizontal to a vertical position, means pivotally supporting the upper rubber from the inner ends of said arms and articulated power driven means connected to the rubber and to the said arms and serving to actuate the rubber in the horizontal position of the arms, the articulated sections of said actuated means being relatively shiftable, by movement of the arms to vertical position, to automatically render said actuating means substantially inoperative with respect to the rubber carried by the arms.

8. In a washing machine of the type embodying upper and lower oppositely movable rubbers, the provision of means pivotally supporting the lower rubber, a pair of supporting arms pivotally supporting the upper rubber at their inner ends, a rock shaft secured to the arms at an intermediate point thereof and serving to support the said arms for swinging movement from a horizontal to a vertical position, a pair of levers pivotally mounted at one end, connections extending between intermediate portions of the levers and said arms, a pair of rocker arms pivoted to the outer ends of the said levers, means connecting the upper ends of the rocker arms to the upper rubber and actuating means connected to the lower rubber and to the lower ends of said rocker arms to effect swinging movement of the rubbers.

9. In a washing machine of the type embodying upper and lower rubbers, the provision of pivotally mounted hangers having portions detachably entering sockets provided in the lower rubber, a pair of pivotally mounted supporting arms supporting the upper rubber for displacement from an operative to an inoperative position with respect to the lower rubber and power driven actuating means connected to said hangers and to the upper rubber to effect actuation of the rubbers when disposed in operative position.

10. In a washing machine of the type embodying upper and lower rubbers and power driven means for actuating the same, the provision of socket members carried by the upper rubber pivotally mounted hangers provided with portions entering said socket members to detachably support the lower rubber and to effect actuation thereof and means connecting said hangers to the actuating means to form an operative portion thereof.

Signed at Winnipeg, this 14th day of December, 1921.

JOHN DONALD DOWNIE.

In the presence of—
GARALD S. ROXBURGH,
M. B. KELLEHER.