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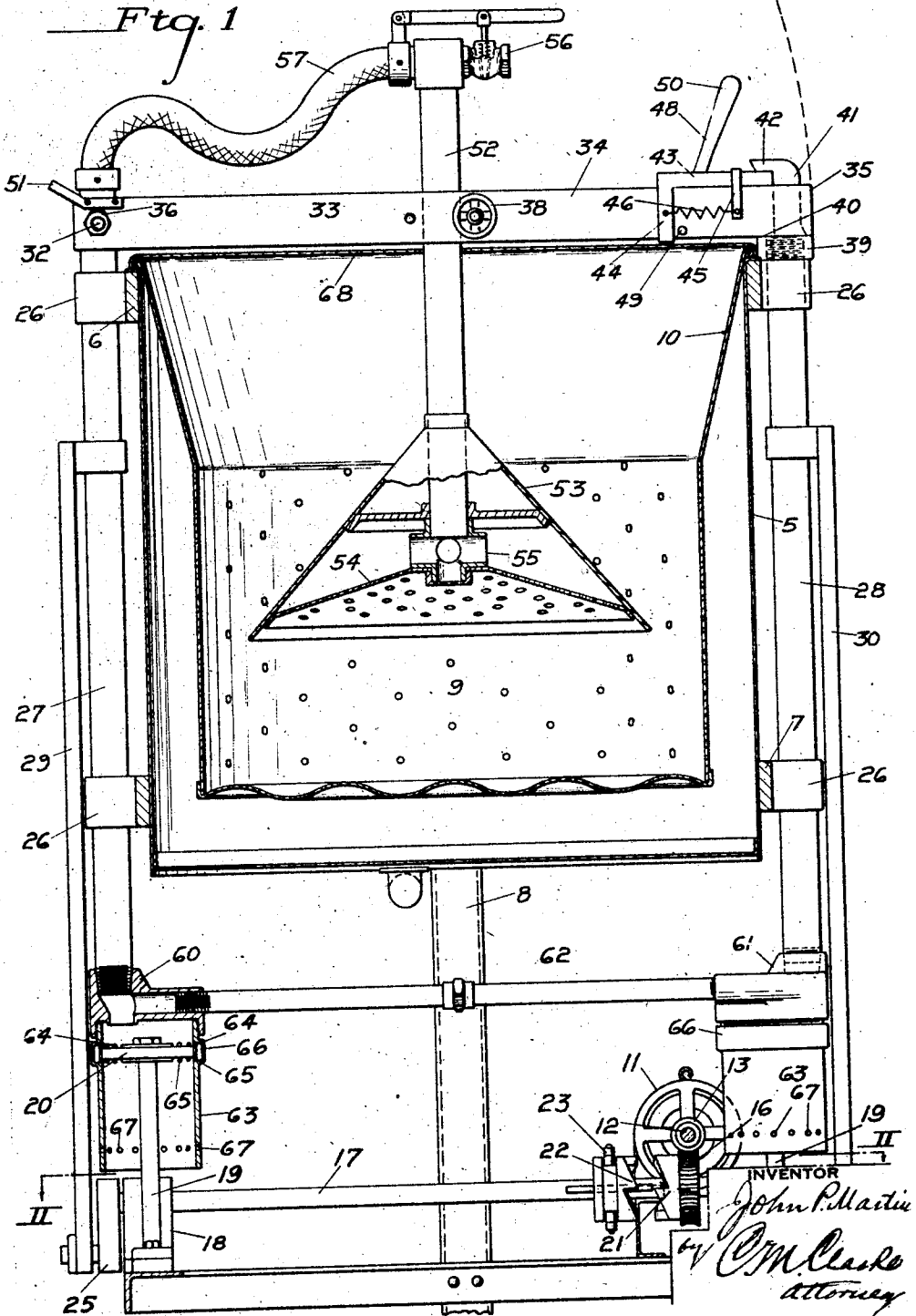
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WASHING MACHINE

Filed August 16, 1924

2 Sheets-Sheet 1



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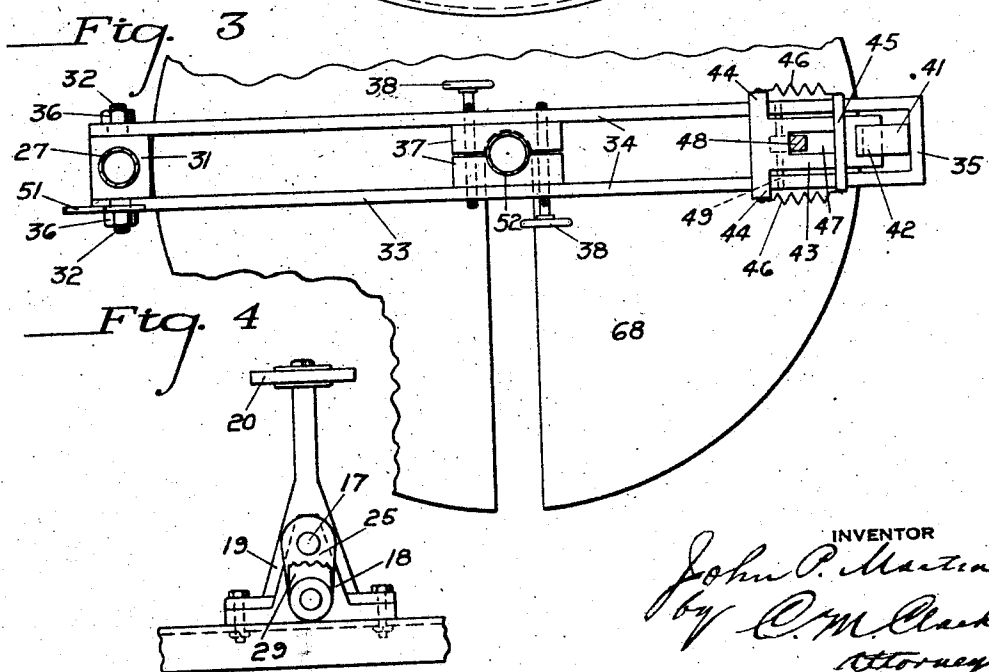
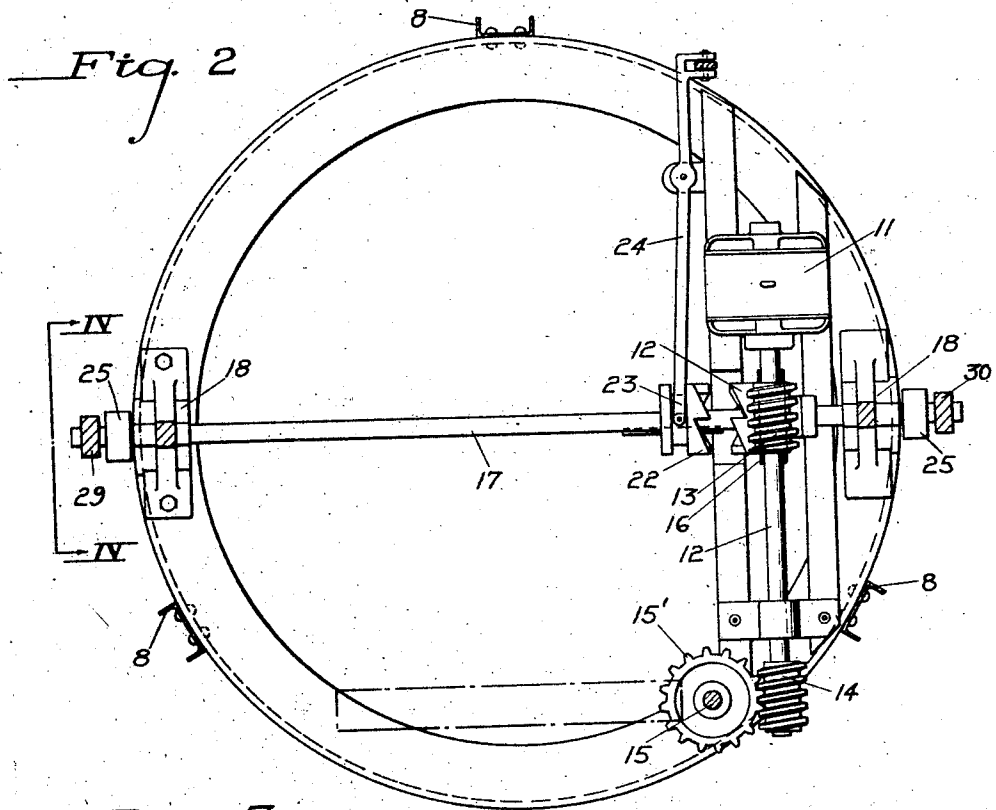
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2 Sheets-Sheet 2



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WASHING MACHINE.

Application filed August 16, 1924. Serial No. 732,450.

This invention is for a washing machine of the reciprocating cone or bell type, and constitutes an improvement on the machine shown in my Patent No. 1,528,682, Mar. 3, 1925.

The present invention has for its principal object to provide a machine wherein the same variations of pressure are secured in the cone, but to a greater degree, and with a more simple and cheaper, and a more durable construction.

Another object of the invention is to provide a reciprocable cone washer wherein the range of movement of the cone may be adjusted with respect to the bottom of the tub, whereby the machine may wash a few clothes with the same degree of efficiency that it washes a tub full.

Further objects are to provide an improved mechanical construction simplifying the construction and operation of the machine, and to provide a machine which will insure the effective washing of all clothes, including those which are unusually soiled.

These and other objects and advantages are obtained by my invention, as will be hereinafter more fully apparent.

According to the present invention, I propose to provide a reciprocable cone in the tub, but instead of having a pump located inside the cone, I provide pumping means outside of the cone, preferably below the tub, and convey air to and from the cone through a suitable conduit.

The invention may be readily understood by reference to the accompanying drawings, in which:—

Fig. 1 represents a vertical section through my improved machine;

Fig. 2 is a horizontal section on the plane of line II—II of Fig. 1;

Fig. 3 is a top plan view of the reciprocating cross head at the top of the machine;

Fig. 4 is a detail view of the pump piston and crank shaft bearing.

In the drawings, 5 designates a tub which is supported in a suitable frame, the frame including upper and lower tub supporting rings 6 and 7 respectively, and supporting legs 8.

Set inside of the tub is a clothes receptacle 9 having a flared upper portion 10, the edges of which rest on the top of the tub to hold the receptacle in suspension in the tub, with its bottom and the vertical portion of its

side spaced away from the tub. The vertical wall of the receptacle and the bottom, which is preferably corrugated, are amply perforated with small holes to permit of a circulation of water through the receptacle. The receptacle may be readily lifted out of the tub.

Supported on the frame below the tub is a motor 11 which drives shaft 12. The shaft has an intermediate worm gear 13 thereon and an end worm 14 thereon. Worm 14 drives a vertical shaft 15 through pinion 15', and this shaft operates the conventional swinging wringer, indicated in dotted lines in Fig. 2.

Worm 13 engages pinion 16, loose on a shaft 17, disposed at right angles to the shaft 12 and extending across a diameter of the tub. This shaft will hereinafter be called the crank shaft, and is supported at opposite sides of the tub on the frame below the tub by bearing members 18. Each member 18 has associated therewith a support 19, on the upper end of which is a piston 20.

Pinion 16 has a clutch member 21 associated therewith. Splined on the crank shaft is a cooperating clutch member 22 operated by a suitable yoke 23 and lever 24 into and out of engagement with member 21. When clutch members 21 and 22 are cooperating, the crank shaft may be driven from the motor.

The ends of the crank shaft 17 project beyond the sides of the tub and on each end is a crank 25.

On each side of the tub, and carried by the frame, directly over the ends of the crank shaft, are guide members 26. Slidable vertically in these guides, one at each side of the tub, are vertical rods 27 and 28. A pitman 29 connects one of the cranks 25 with rod 27, and a pitman 30 connects the other crank with the other rod 28. Thus, when the crank shaft rotates, rods 27 and 28 are moved up and down in unison.

Fixed to the upper end of rod 27, which is in the form of a pipe, its interior being hollow, is a block 31 having trunnions 32 projecting therefrom. These trunnions engage the reciprocating cross head 33. This cross head, in the embodiment shown in the drawings, comprises a metal bar folded at one end to provide two parallel spaced apart lengths 34, connected at 35. The free ends of these lengths engage the trunnions 32

and are held in spaced relation by block 31. Nuts 36 on the trunnions hold the ends from spreading. At the center of the cross head are clamping blocks 37 that are operated
5 toward and from each other by hand screws 38.

On the upper end of rod 28 is secured a block 39, having flat shoulders 40 on its upper surface, and having a vertical extension
10 41 thereon, which is bent over toward the tub to provide a hook, as indicated at 42. This hooked extension normally projects through the other end of the cross-head.

Secured to the cross-head is a latch for
15 cooperation with the hook. This latch comprises a reciprocable member 43 on the top of the cross-head, having straps 44 that extend over the sides of the cross-head and under the cross-head for slidably retaining it
20 in place. At 45 is a keeper for assisting in retaining the latch in position. Springs 46 urge the latch into latching engagement with the hook. In the latch member 43 is a slot
25 47 through which extends a lever 48 pivoted to the cross-head between the bars at 49 and having a handle 50 at its free upper end. Upon movement of this lever, the latch may be moved toward and from the hook 42.

When the latch is cooperating with the
30 hook, the cross-head is held firmly down against the flat shoulders on block 39, so that there is no lost motion. When the parts are thus engaged, the cross-head may be reciprocated by rods 27 and 28. When
35 the latch is disengaged, and this would only be done when the cross-head is not being operated, the cross-head may be swung upwardly, pivoting on trunnions 32 until it is past vertical position, where it will not obstruct access to the interior of the tub. A
40 lug 51 may be secured to the pivoted end of the cross-head to limit it from moving a very great distance past center.

Adjustably fixed between clamps 37 is a
45 vertical pipe 52 having a washing cone 53 on its lower end. This cone has a relatively large diameter with respect to the diameter of the perforated receptacle, and has a perforated web 54 on the inside thereof. Pipe
50 52 terminates in an outlet member 55 that has several outlet passages, as shown.

At the top of pipe 52 is a T-connection having a valve 56 at one side thereof and having its other side connected with a flexible pipe or hose 57 that joins a connector
55 on the top of rod 27.

Rod 27 screws into a cylinder head 60 at its lower end, while rod 28 connects with a somewhat similar head 61. Head 61 communicates with head 60 through pipe 62.
60 Rod 28 has no connection with its cylinder, so no air passes up the rod 28. Rod 27, on the other hand, communicates with both cylinder heads 60 and 61. Each cylinder
65 head carries a cylinder 63. These cylinders

cooperate with stationary pistons 20 on supports 19.

Each of the cylinders 63 has two series of ports therein near the upper end thereof, one series 64 being above the other series 65.
70 The distance between the two series is just a little greater than the thickness of the piston. A casing or jacket 66 connects ports 64 and 65. Near the bottom of each cylinder is a series of ports 67.

In operation, the reciprocation of rods 27 and 28 moves the cross-head 33 to reciprocate the washing cone 53. At the same time, cylinders 63 are reciprocated, moving in the same direction as the cross-head. With the
80 parts in the lowermost position shown in Fig. 1, atmospheric pressure obtains in the cone and various pipes, the system being open to atmosphere around pistons 20 through ports 64 and 65. As the cross-head
85 lifts, the cylinders rise up, ports 65 being closed to atmosphere by the initial upward movement of the cylinder. Thereafter, a suction is created in the system, including the immersed washing cones which draws
90 water up into the cone. This suction also lifts the clothes and keeps them from packing.

As the uppermost limit of the cross-head is reached, ports 67 are uncovered, and atmospheric pressure is restored in the cone, letting the water therein seek its level. Then, as the motion reverses and the cylinders move down, air is forced or pumped
95 into the cone which forces water through the clothes as the cone bears down against them. Some of the air will also be forced through the clothes. As ports 65 are uncovered on the downward movement, the pressure in the cone is again restored to atmospheric, and the cycle is ready to start again.

This action of the cone, together with the pumping of air and water through the clothes, provides a highly efficient and satisfactory way of washing the clothes, without
100 subjecting the clothes to undue wear.

By suitable operation of the clamps 37, the cone may be properly positioned with respect to the bottom of the tub so as to operate to the best advantage when there
105 are a large number of clothes in the receptacle, or when there are only a few. It will, of course, be moved down closer to the bottom when there are but a few clothes to be washed.

Valve 56 is provided to relieve the suction in the system, should it be desired to open the cross-head, in the manner hereinbefore described, when the machine is stopped on
110 the upward or suction stroke.

The tub may have a removable cover 68, which is slotted in from one edge to receive the pipe 52.

The arrangement of the piston and cylinders is such that they may be kept well
120 125 130

lubricated without liability of grease being forced into the cone. The flexible pipe 57 is used, of course, to permit of the adjustment of the cone vertically, and to permit of the swinging movement of the cross-head.

Various changes and modifications may be made in the construction of the invention within the contemplation of my invention and under the scope of the appended claims.

What I claim is:—

1. A washing machine comprising a tub, a vertically reciprocable washing cone in the tub, means for driving the washing element, and pumping means outside the tub communicating with the cone for forcing air into the cone on the downward movement of the cone and for removing air from the cone on the upward movement thereof, said pumping means including means for restoring atmospheric pressure in the cone at each limit of its travel.

2. A washing machine comprising a tub, a washing element in the tub, means for operating the washing element, and a pump below the tub having a reciprocable cylinder connected with said operating means for alternately forcing air into the washing element and exhausting air therefrom.

3. A washing machine including a tub, a reciprocable washing cone in the tub, means for reciprocating the cone vertically, a reciprocable pump cylinder and a fixed co-acting plunger outside the tub communicating with the washing cone, said pump cylinder being operatively connected with said cone reciprocating means to move in synchronism therewith.

4. A washing machine including a tub, a reciprocable washing cone in the tub, means for reciprocating the cone vertically, a reciprocable pump outside the tub communicating with the washing cone, said pump being operatively connected with said cone reciprocating means to move in synchronism therewith, and means associated with the pump for restoring atmospheric pressure in the cone at each limit of movement in the cone, said pump serving to force air into the cone on the downward movement of the cone and to exhaust air therefrom on the upward movement.

5. A washing machine including a tub, a vertically reciprocable cross head above the tub, a reciprocable pump cylinder, a vertically reciprocable rod at one side of the tub to which one end of the cross-head is pivotally secured, a similar rod at the other side of the machine, a latch mechanism detachably connecting the other end of the cross-head with the second rod, means for reciprocating said rods vertically in unison, and a washing cone carried by the cross-head extending down into the tub, one of said rods forming a conduit between the re-

ciprocable cylinder and the interior of the cone.

6. A washing machine including a tub, a vertically reciprocable cross-head above the tub, a reciprocable pump cylinder, a vertically reciprocable rod at one side of the tub to which one end of the cross-head is pivotally secured, a similar rod at the other side of the machine, a latch mechanism detachably connecting the other end of the cross-head with the second rod, means for reciprocating said rods vertically in unison, and a washing cone adjustably carried by the cross-head extending down into the tub, one of said rods forming a conduit between the reciprocable cylinder and the interior of the cone.

7. A washing machine including a tub, a vertically reciprocable cross head above the tub, a vertically reciprocable hollow rod at one side of the tub, to the upper end of which one end of the cross-head is pivotally secured, a second vertically reciprocable rod at the other side of the tub, a detachable connection between the other end of the cross-head and the second rod, a pipe extending from the cross-head into the tub, a washing cone on the lower end of the pipe, a flexible pipe connection between said pipe and said first hollow reciprocable rod, pumping means at the lower end of said hollow rod for alternately forcing air thereinto and into the cone and withdrawing air therefrom, and means for reciprocating the rods.

8. A washing machine including a tub, a vertically reciprocable cross head above the tub, a vertically reciprocable hollow rod at one side of the tub, to the upper end of which one end of the cross head is pivotally secured, a second vertically reciprocable rod at the other side of the tub, a detachable connection between the other end of the cross-head and the second rod, a pipe extending from the cross-head into the tub, a washing cone on the lower end of the pipe, a flexible pipe connection between said pipe and said first hollow reciprocable rod, a cylinder carried by the lower end of the hollow rod and communicating therewith, a stationary piston with which the cylinder co-acts, said cylinder having ports therein which are closed and opened to atmosphere by the piston and located at opposite limits of movement of the cylinder, said cylinder thereby serving to force air into the cone on its downward movement and remove air therefrom on its upward movement, and atmospheric pressure being restored through said ports at each limit of movement, and means under the tub for reciprocating the rods.

9. The combination with a washing machine having a tub and a reciprocable washing element therein, of means for reciprocating

ing the washing element, and a pair of pumping units under the tub communicating with the washing element and comprising an inverted cylinder carried by and reciprocated with the means for reciprocating the washing element, and a stationary piston for each cylinder, said cylinder being suitably ported to restore atmospheric pressure in the cone at each limit of their movement. 10

In testimony whereof I hereunto affix my signature.

JOHN P. MARTIN.