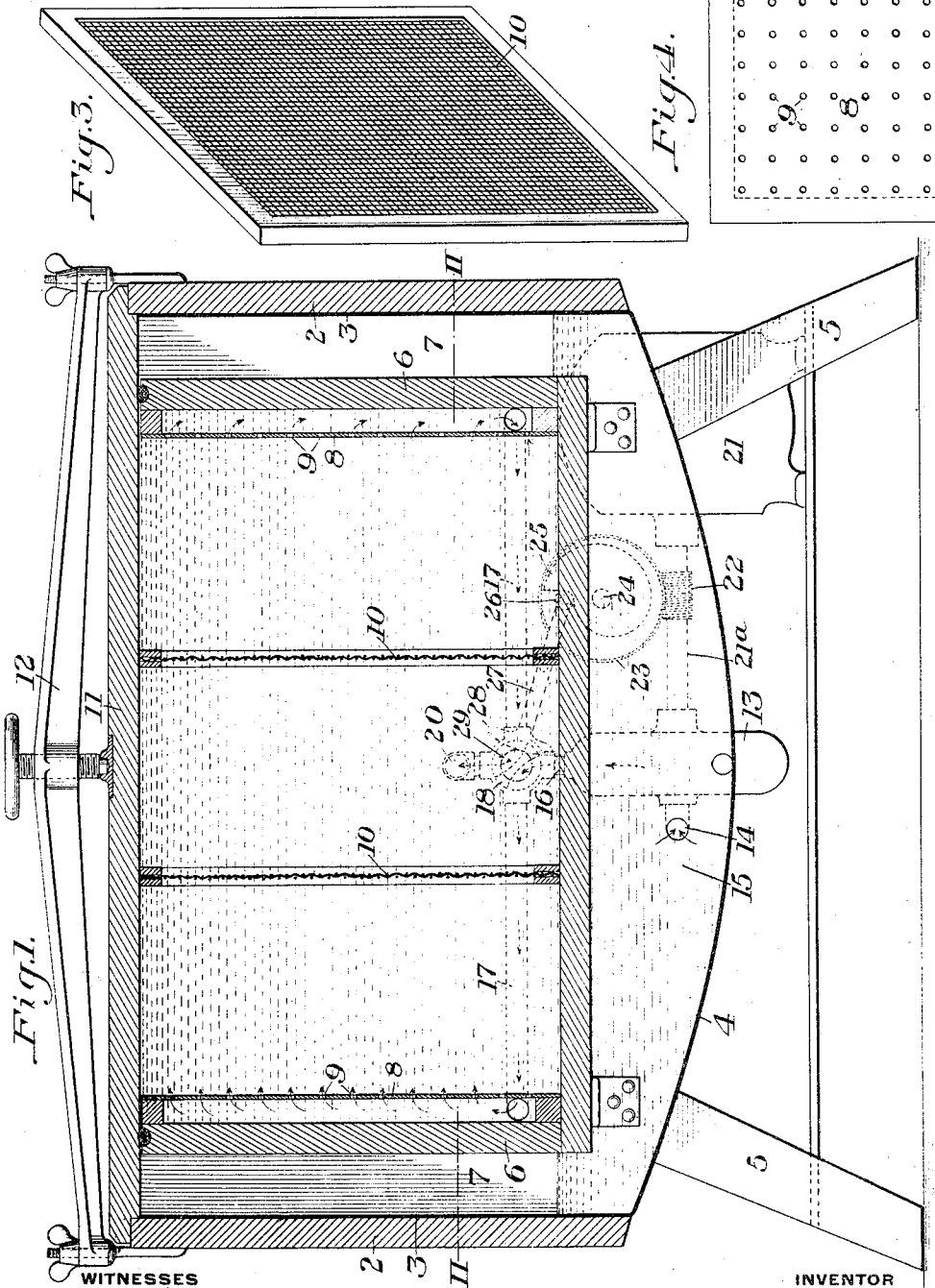


1,022,640.

R. S. ORR.
WASHING MACHINE.
APPLICATION FILED JULY 28, 1911.

Patented Apr. 9, 1912.

2 SHEETS-SHEET 1.



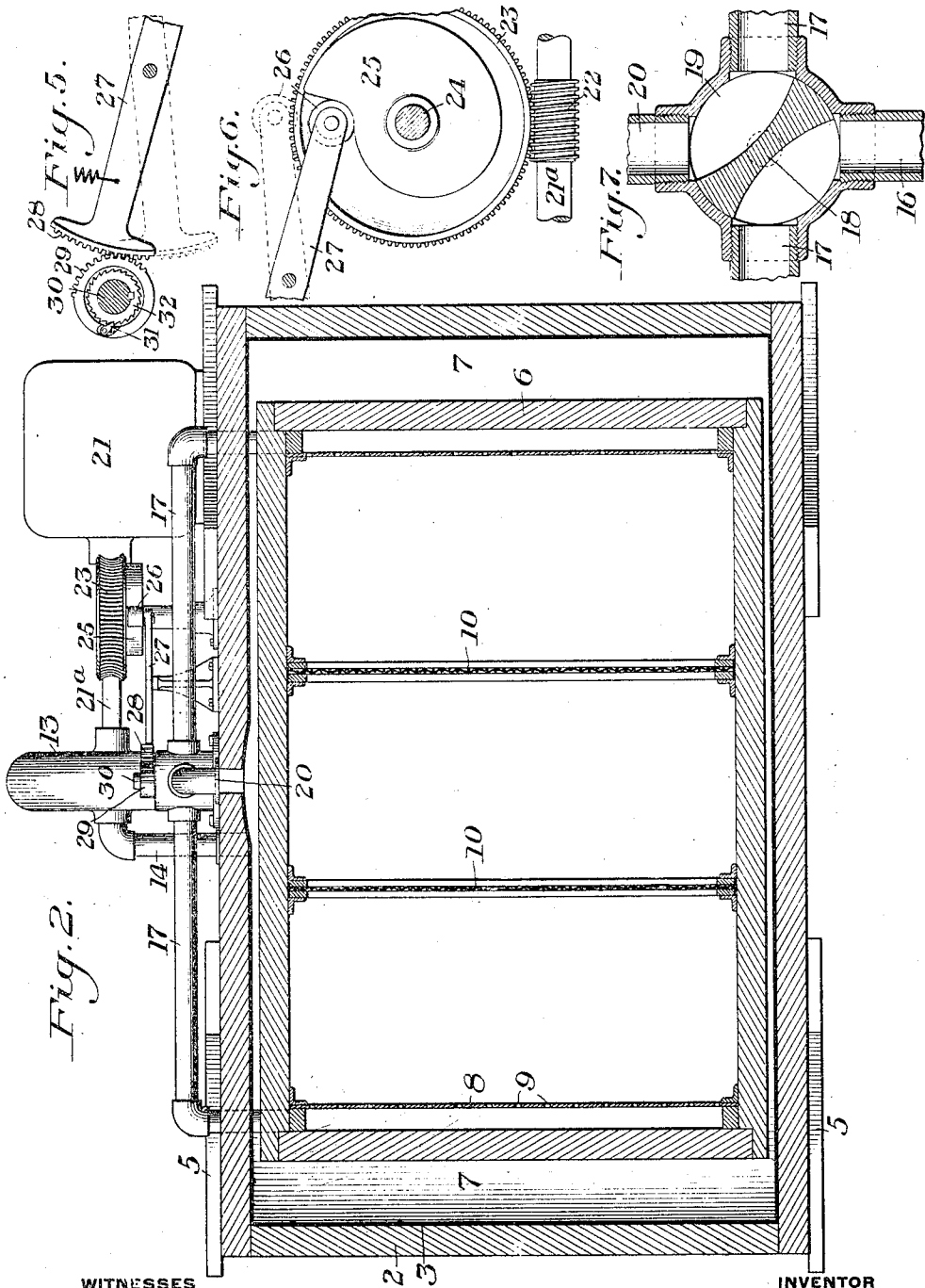
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2 SHEETS-SHEET 2.

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WASHING-MACHINE.

1,022,640.

Specification of Letters Patent.

Patented Apr. 9, 1912.

Application filed July 28, 1911. Serial No. 641,160.

To all whom it may concern:

Be it known that I, ROBERT S. ORR, a resident of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Washing-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in

10 which—
Figure 1 is a longitudinal vertical section of a washing machine embodying my invention. Fig. 2 is a horizontal section on the line II—II of Fig. 1. Fig. 3 is a perspective view of one of the screens. Fig. 4 is a detail view of a portion of one of the perforated bulk head plates. Figs. 5 and 6 are detail views showing portions of the motor reversing gearing, and Fig. 7 is a sectional view of the control valve.

My invention has relation to washing machines; and is designed to provide a motor operated machine having means of novel and effective character for forcibly passing the water through the clothes to be washed. These means are preferably so arranged that substantially the entire body of water contained in the washing machine will be forced through the clothes in one direction for a desired interval of time and then the action will be reversed and the same body of water will be forced through the clothes for another interval, these operations being repeated as long as may be necessary.

35 The nature of my invention will be best understood by reference to the accompanying drawings, in which I have shown the preferred embodiment thereof, it being premised, however, that various changes can be made in the details of construction and arrangement of the several parts without departing from the spirit and scope of my invention, as defined in the appended claims.

45 In these drawings, the numeral 2 designates a tank or receptacle which is shown as having a sheet metal lining 3 and sheet metal bottom 4, and which is mounted on any suitable support, such as that indicated at 5. Placed within the tank or receptacle 2 is another receptacle 6, which is preferably sufficiently smaller in size to leave a surrounding chamber 7 and which forms the receptacle for the clothes to be washed. Near each end of the washing chamber the tank or receptacle 6 is provided with a plate or bulk head 8 extending across the full width and height of the chamber and hav-

ing a plurality of relatively small perforations 9 therein. With the larger size of machines the space between these plates or bulk heads 8 is preferably divided into a number of compartments by the screen frames and screens 10. The tanks or receptacles 2 and 6 may be tightly closed by a removable cover 11 having a suitable securing or clamping means, such as the clamping bar shown at 12.

13 designates a centrifugal pump of any suitable character having an inlet 14 opening into the water space 15 below the bottom of the inner tank 6, and having an outlet pipe 16 leading upwardly therefrom, with a branch 17 extending into each end portion of the inner tank. The ends of these branches 17 terminate within the inner tank between the perforated plates or bulk heads 8 and the adjacent end walls. The circulation of the pump is controlled by a rotary valve 18 (shown in detail in Fig. 7) and which is placed at the junction of the pipe 16 with the branch pipes 17. In one position of this valve (shown in Figs. 1 and 7) the discharge from the pump passes through the valve and into the left hand branch pipe 17 and thence into the corresponding end portion of the tank 6, being discharged into the body of said tank through the small openings 9. The water is thus forcibly injected into the first clothes containing compartment, and then through all the compartments and out through the bulk head 8 at the opposite end and into the other branch pipe 17; thence back to and through the valve and thence through the port 19 and pipe 20 back into the water chamber 15. In the other position of the valve, the circulation is reversed, the water flowing out through the right hand branch pipe 17, thence through the clothes and back to the valve through the left hand branch pipe 17.

100 For the purpose of driving the pump 13, I preferably provide an electric motor 21, having its armature shaft directly connected to the rotary element of the pump, as shown at 21^a in Figs. 1 and 2.

105 In order to automatically reverse the valve 18 various connections to be operated by the motor may be employed. A simple means for this purpose is illustrated in the drawings as consisting of a worm wheel 22 mounted on the driving shaft 21^a and engaging a worm wheel 23, mounted on a shaft 24. This shaft 24 has fixed thereto a cam 25 which contacts with a roller 26 on one

arm of a pivoted spring pulled lever 27. The other arm of this lever carries a toothed segment 28, whose teeth engage with the teeth of a gear wheel 29 loosely mounted on the shaft or stem 30 of the movable valve member. This gear 29 carries a pawl 31 which, in one direction of rotation of the wheel 29 has a driving engagement with the teeth of a ratchet wheel 32 fast to the shaft 30.

The operation of the device as just described will be readily seen. The gear wheel 23 and cam 25 will be slowly rotated; and at each rotation, the cam 25 will actuate the lever 27 and thereby the gear wheel 29 and the pawl and ratchet device to rotate the valve sufficiently to reverse its position. The reverse movement of the lever 27 simply causes the gear wheel 29 to run idly on the shaft 30 without moving the valve. The valve is then reversed by an intermittent rotary movement in one direction. By proper arrangement of the gearing, the valve may be reversed at the desired intervals. During the periods between reversal, the water is being forced continuously through the clothes; and at each reversal the flow of the water is changed. This forcing of the water through the clothes in alternate directions is extremely effective in loosening and removing the dirt from the clothes. The combined area of the holes in the plates or bulk heads 9 is preferably about equal to the cross sectional area of one of the branch pipes 17; and the intervals between successive reversals of the valve are preferably at least long enough to cause all the water in the washing machine to be forced through the clothes. Sufficient water should be placed in the machine to entirely fill the clothes compartments and to keep the level of water in the water chamber 15 above the pump inlet 14.

It will be obvious that various changes can be made in the construction and arrangement of the parts. Thus the construction and arrangement of the inner and outer tanks may be varied; any suitable form of pump and driving motor therefor can be employed; different means from those described, actuated by the pump driving motor, may be used to effect the periodical reversal of the valve, and various other changes may be made within the scope of the appended claims.

What I claim is:

1. In a washing machine, a clothes containing vessel having a perforated plate or bulk head at each end portion thereof, a pump, means for driving the pump, pipe connections leading from the pump to opposite ends of the clothes containing vessel

a source of water supply for the pump, a valve controlling the circulation through said pipes arranged to reverse the direction of circulation, and means for automatically reversing the valve at intervals; substantially as described.

2. A washing machine, comprising a clothes containing vessel having a water receiving space at each end, one wall of each space being formed by a perforated plate or bulk head, a source of water supply, a pump, pipe connections leading from the pump to each of said spaces, a valve controlling the circulation of water through said pipes into and from said spaces, and means for periodically reversing the valve; substantially as described.

3. A washing machine, comprising a clothes containing vessel having a water receiving space at each end, one wall of each space being formed by a perforated plate or bulk head, a source of water supply, a pump, pipe connections leading from the pump to each of said spaces, a valve controlling the circulation of water through said pipes into and from said spaces, and means for periodically reversing the valve, together with a return water connection leading to the source of water supply; substantially as described.

4. A washing machine, comprising a clothes containing vessel having a water receiving space at each end, one wall of each space being formed by a perforated plate or bulk head, a source of water supply, a pump, pipe connections leading from the pump to each of said spaces, a valve controlling the circulation of water through said pipes into and from said spaces, and means for periodically reversing the valve, the clothes containing vessel having a plurality of compartments with a screen separating the compartments; substantially as described.

5. A washing machine, comprising an outer tank having a water chamber therein, a clothes containing vessel mounted in said tank, a valve, a water space at each end portion and an intermediate clothes containing space, a pump connected with the water chamber and also connected with each of said spaces, a valve for controlling the circulation of the pump and arranged to reverse the same, a motor for driving the pump, and connections operated by the motor for periodically reversing the valve; substantially as described.

In testimony whereof, I have hereunto set my hand.

ROBERT S. ORR.

Witnesses:

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