Feb. 21, 1950 W. F. OLIVER ET AL 2,498,179

WATER INLET SYSTEM FOR WASHING MACHINES

Filed March 4, 1946 3 Sheets-Sheet 1

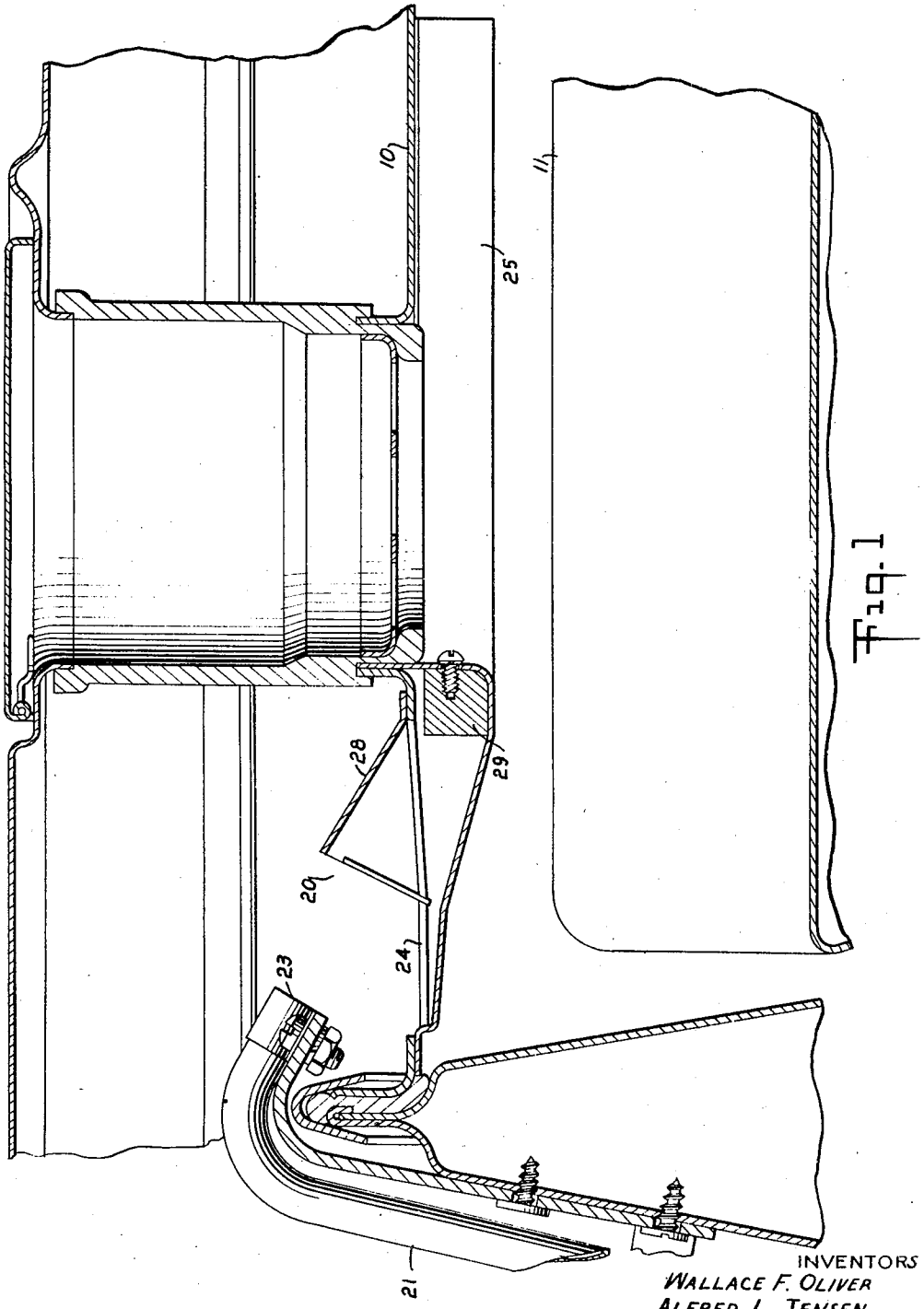


Fig. 1

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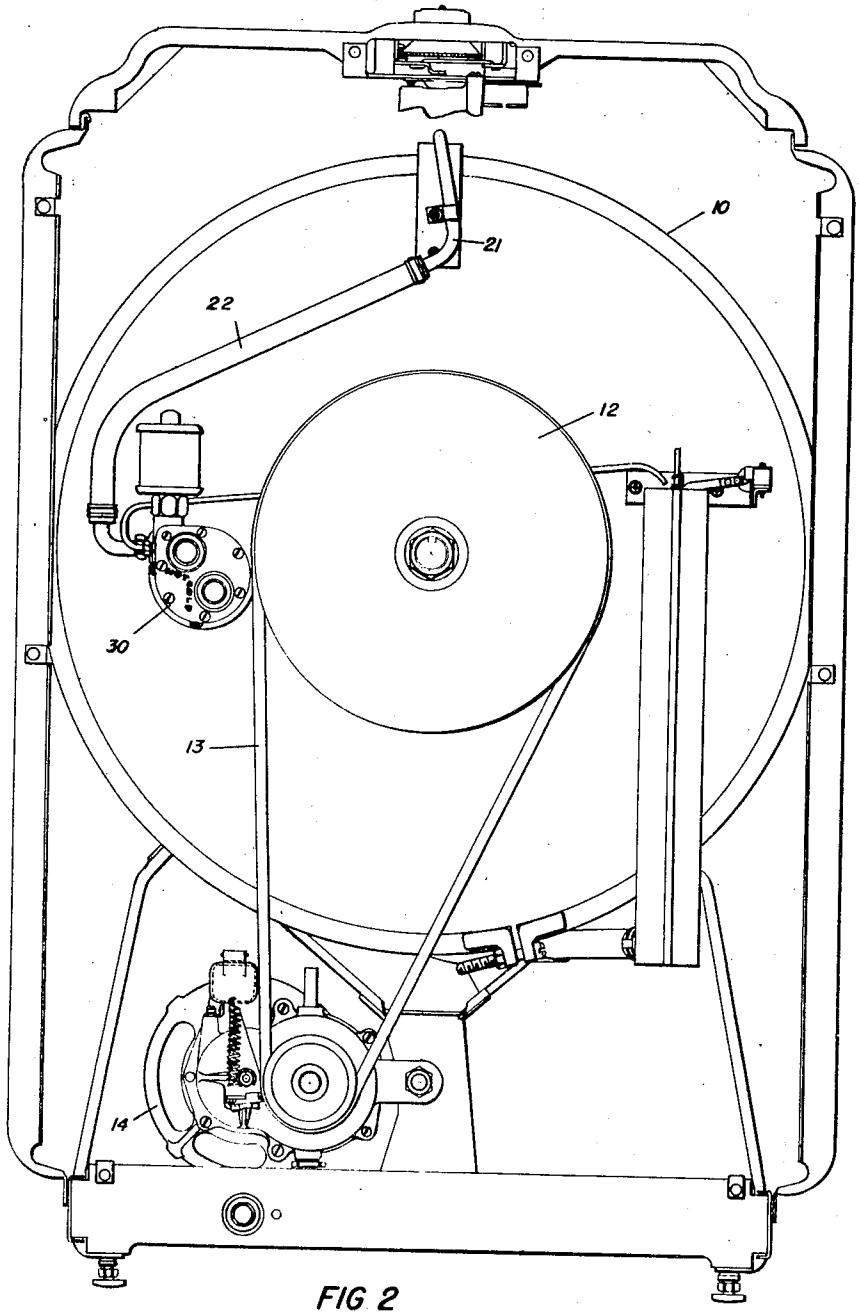


FIG 2

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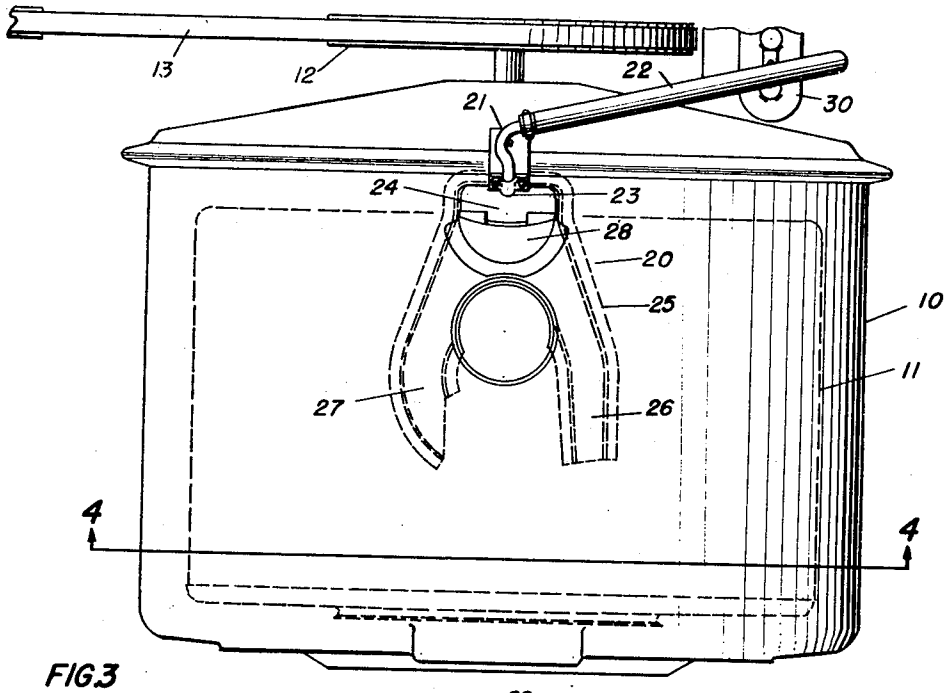


FIG.3

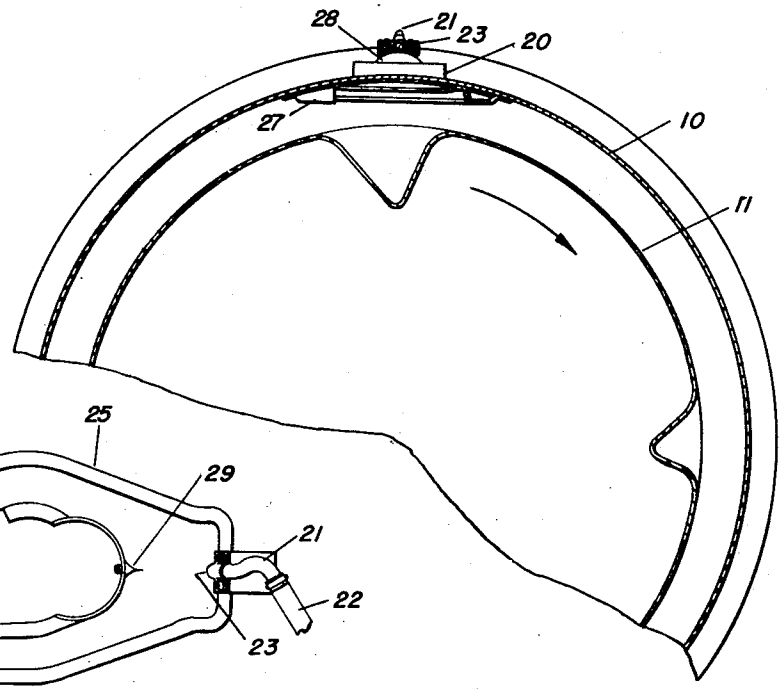


FIG.4

FIG.5

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WATER INLET SYSTEM FOR WASHING MACHINES

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6 Claims. (Cl. 68—207)

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This invention relates to a water inlet system for automatic washing machines.

In recent automatic washing machine practice it has been found that in order to satisfy requirements necessary to give positive assurance that there will be no reverse flow of used water back into a supply system that a water inlet should be provided which will make use of the water pressure to force water across a gap into a tub inlet with the water tube at the gap a definite distance (generally one inch) above the maximum possible water level. Such a construction which prevents possibility of back flow is commonly termed a "vacuum breaker." It is important in connection with such a "vacuum breaker" type of inlet system that provision be made so that even though an excessive amount of suds is generated in the washing machine during the washing operation such suds will not overflow through the water inlet.

It is therefore a primary object of the present invention to provide a water inlet system which will prevent objectionable back flow and overflow of suds out from the machine and to so arrange such construction that it can be used with a vacuum breaker which directs water across an air gap and into a tub opening.

The above and other objects of the invention will appear more fully from the following more detailed description and from the drawings forming a part hereof and wherein:

Figure 1 is a side view of a washing machine partly in section with water inlet attached thereto.

Figure 2 is a rear view of the washing machine shown in Figure 1 showing further details of the water inlet connections.

Figure 3 is a top view of the tub and the water inlet showing the relation of the inlet and the rotating cylinder inside the tub.

Figure 4 is a section taken from the line 4—4 of Figure 3 and shows the water inlet in relation to the tub and cylinder.

Figure 5 is a top view of the water inlet conduit forming member showing the branched conduits relative to the water tube inlet.

Referring to the drawings, Figures 1 and 2 show side and rear views of an automatic washing machine of the horizontal cylinder type. A tub 10 has a cylinder 11 mounted for rotation therein, the cylinder being driven from the rear of the tub 10 through a pulley 12 and belt 13 from a source of power such as a motor 14 located in the base of the machine. The cylinder 11 is perforated around its circumference. Articles to be washed are placed inside the cylinder 11, the tub 10 containing water and soap and the cylinder is rotated first at a speed suitable for washing and at a later time in the cycle of operations, the cylinder is rotated at a higher speed as a centrifuge for the purpose of removing water. The machine is so constructed as to automatically proceed through a cycle of operations including washing, rinsing and the draining of water.

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The water inlet system includes a water inlet unit 20 at the top portion of the tub 10 as shown in Figure 1. A water tube 21 is secured to a hose 22, the end 23 of the tube being suitably fastened by a clip as shown. An opening 24 is provided in the top of the tub under the end of the tube 23 and a conduit forming member 25 is secured inside the tub, the member 25 being of such form as shown in Figures 1, 3 and 5, so that two branches of the conduit extend inside the tub wall. One of the branches 26, formed by this conduit member 25 is of such shape that its direction of outlet causes water to flow into the tub in a direction substantially parallel to the axis of rotation of the cylinder, while the other inlet 27 has a curved portion providing for outlet of water in a direction at a substantial angle to the direction of water afforded by the outlet 26. Both of the outlets, however, eject water in a direction substantially tangent to the surface of the cylinder 11. A lip member 28 is positioned outside the tub above the opening 24 so that it will receive and deflect the water from the end 23 of the inlet tube 21, a fluid receiver open to the atmosphere being thus formed in the tub wall. As shown in Figures 1 and 5, a baffle member 29 is inserted and secured in the opening 24 to assure that water will be deflected on contact therewith partly to one branch 26 and partly to the other branch 27, the relative position of the baffle member 29 and its alignment with the tube end 23 is shown more clearly in Figure 5.

The tube 22 is fed from a water mixing valve 30 shown in Figures 2 and 3. This valve may be of any desired type which will mix water from hot and cold conduits leading to the valve. The details of such a valve although forming no part of the present invention may be of a type such as disclosed in U. S. Patent Number 2,269,259 or 2,310,975.

In operation the mechanism controlling flow of water through the tube 21 is actuated to allow water under pressure to flow out through the end 23 of the tube and this end is directed as shown

in Figure 5 toward the baffle member 29 so that flow of water is across the air gap between the opening 24 and the end of the tube 23. The end of the tube 23 is spaced above the opening 24 and even though the tub 10 be assumed entirely full there could never be a back flow of water from the tub 10 to the end of the tube 23. A vertical height between the maximum possible water level in the tub and the tube 23 is on the order of one inch, which conforms to general requirements in ordinances requiring a "vacuum breaker." As the water is directed against the baffle 29 it divides into conduits 26 and 27. As shown in Figure 4, the cylinder rotates clockwise in the direction of the arrow and the two streams of water ejected from the conduits 26 and 27 come together at a point adjacent the end of conduit 26. The direction of flow afforded from the conduit 27 causes that flow to be directed in the same direction as the outer surface of cylinder 11 during rotation. Therefore the tendency of the cylinder rotation is to in effect "pull" water from the end of conduit 27 and to induce flow therein in a direction into the tub. However, the outlet of the conduit 26 is in a different direction, substantially parallel to the axis of rotation, and strikes the rotating cylinder surface nearly at right angles to the direction of movement of such surface past the end of the conduit and therefore the same flow is not induced in such conduit 26 as is induced in conduit 27. Therefore, the amount and direction of flow in the two conduits 26 and 27 is not equal. Therefore, even though there should be sufficient suds pressure to cause a back flow out through conduit 26 the flow induced in conduit 27 will pull such minor flow of suds into the tub again as it will flow only up to the baffle 29 before being subjected to the suction in conduit 27. It is also apparent that either or both conduits provide a degree of restricted entry into the tub which in itself is sufficient to take care of a majority of the excessive suds conditions which are encountered in practice since the conduits are of sufficient length to assure that the outlet ends of conduits inside the tub are a distance definitely removed from the opening 24 in the tub wall.

Although the invention has been described by reference to a structure found practical in actual operation it is understood that various modifications are intended within the scope of the following claims.

We claim:

1. In a washing machine having a rotatable clothes containing member and a tub with a wall spaced from and surrounding said rotatable member, a water inlet for said tub designed to prevent flow of suds from an open fluid receiver in the wall of said tub comprising a pair of conduits branching and extending into said tub from a common communicating opening formed by said receiver, said branching conduits extending in the same general direction but having outlets therefrom directing fluid in different directions relative to the direction of rotation of said rotatable member, whereby rates of flows induced in said conduits by rotation of said rotatable member are unequal.

2. In a washing machine having a rotatable clothes containing member and a tub with a wall spaced from and surrounding said rotatable member, a water inlet for said tub designed to prevent reverse flow from said tub comprising a pair of conduits extending into said tub, one of said conduits having an inner outlet directed to produce a flow substantially parallel to the axis of rotation of said rotatable member and at right angles to the direction of rotation of the outer surface of said rotatable member and the other of said conduits having an outlet directed substantially tangential to the outer surface of said rotatable member, and in the same general direction as the rotation of the outer surface of said rotatable member, a water tube having an outlet spaced from the wall of said tub and positioned to direct a stream of water toward said conduits, and a dividing member between said conduits positioned to divide the stream of water from said water tube for flow into each of the said conduits.

3. In a washing machine having a rotatable clothes containing member and a tub with a wall spaced from and surrounding said rotatable member, a water inlet for said tub designed to prevent reverse flow from an open fluid receiver in the wall of said tub comprising a pair of conduits branching from said fluid receiver and extending into said tub in a direction substantially parallel to the wall thereof, a water tube having an outlet spaced from the wall of said tub and positioned to direct a stream of water into said fluid receiver and said conduits and a dividing member in said fluid receiver adjacent the region of branching of said conduits and positioned to be contacted by said stream and to divide said stream for flow into said conduits.

4. In a washing machine having a rotatable clothes containing member and a tub with a wall spaced from and surrounding said rotatable member, a water inlet for said tub designed to prevent reverse flow of suds from an open receiver in the wall of said tub comprising a conduit extending into said tub from said fluid receiver and having a length sufficient to extend a distance inside said wall to an outlet positioned in the space between said wall and the outer surface of said rotatable member, said conduit having two branches and a dividing member in said conduit adjacent the region of branching to divide the stream of water for flow into each of said branches, one of said branches being so formed to discharge a stream of water which is directed into said tub at right angles to the axis of rotation of said rotatable member and the other of said branches being so formed to discharge a stream of water which is directed into said tub parallel to the axis of rotation of said rotatable member.

5. In a washing machine having a rotatable clothes containing member and a tub with a wall spaced from and surrounding said rotatable member, a water inlet for said tub designed to prevent a reverse flow from said tub, said water inlet comprising a conduit extending into said tub with an inlet end on the wall thereof, and a water tube having an outlet end thereof spaced outwardly from the wall of said tub and spaced from said inlet end of said conduit to form a gap, said tube positioned to direct a stream of water across said tub through said conduit, said conduit having two branches, one of said branches being so formed to discharge a stream of water which is directed into said tub at right angles to the axis of rotation of said rotatable member and the other of said branches being so formed to discharge a stream of water which is directed into said tub parallel to the axis of rotation of said rotatable member.

6. In a washing machine having a rotatable clothes containing member and a tub with a wall spaced from and surrounding said rotatable mem-

ber, a water inlet for said tub designed to prevent reverse flow from said tub comprising a conduit extending into said tub and providing an outlet in said tub between the wall of said tub and said rotatable member, and a water tube having an outer end thereof spaced outward from the wall of said tub and spaced from the outer end of said conduit to form a gap and being positioned to direct a stream of water across said gap into the open outer end of said conduit, said conduit having two branches, one of said branches being so formed to discharge a stream of water which is directed into said tub at right angles to the axis of rotation of said rotatable member and the other of said branches being so formed to discharge a stream of water which is directed into

said tub parallel to the axis of rotation of said rotatable member.

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