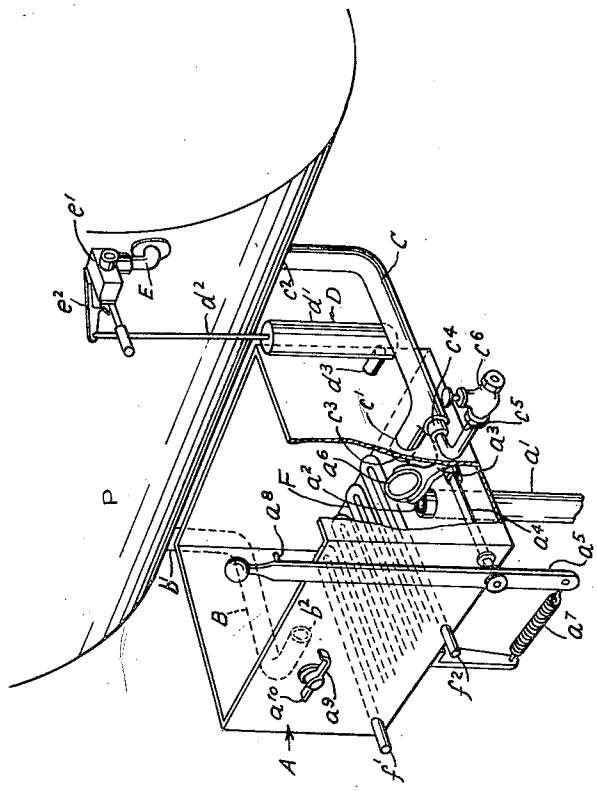
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APPARATUS FOR HEATING AND REMOVING DIRT FROM WASHING MACHINE LIQUID

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APPARATUS FOR HEATING AND REMOVING DIRT FROM WASHING MACHINE LIQUID

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This invention relates to laundry washing and similar machines of the kind in which the articles to be washed or treated are contained in a rotating cylinder having its longitudinal axis horizontal or substantially horizontal and which may be either perforated and arranged in an outer cylindrical casing or imperforate.

The object of the invention is to promote circulation of the liquid in the rotating cylinder and also to provide means by which some of the dirt received by the liquid may be removed during its circulation.

According to the invention the washing machine is provided with a system external to the machine through which the washing liquor can be circulated continually during the washing process, such external system including a means for assisting the circulation of the liquor through the machine and the external system, and a tank for removing the dirt or part of the dirt received by the liquor during its circulation through the machine.

The means for circulating the liquid may be a pump, or a jet utilising steam or other fluid as propelling medium may be arranged in the pipe through which the liquid travels from the tank to the machine.

Heating means for heating the liquid as it is circulated may be arranged within the tank and such means may consist of a steam heated pipe below the water level in the tank. Such arrangement of heating the liquid has the advantage over the usual means of heating the liquid in which free steam is admitted into the liquid in the casing or cylinder as the condensed steam is not lost nor is there dilution and consequent reduction in efficiency of the liquid by the addition of the condensed steam thereto.

The invention is particularly applicable to the washing machine described in the specification of Patent No. 2,584,070 but its use is not limited thereto and can be applied to any washing machine of the kind hereinbefore referred to.

The invention is illustrated in and will be described with reference to the accompanying drawing showing a perspective view of the invention.

In the illustrated device, A is the tank and P the casing of the washing machine having a perforated cylinder rotating in the casing. The outlet of the casing P is connected at b^1 through a pipe B to the tank A at b^2. The inlet to the casing P of the washing machine is connected to the tank A at c^1 through a pipe C to the washing machine at c^2. The tank A is connected to the drain through pipe a^1. The pipe a^1 extends a short distance into the tank A to form a valve face a^2 and the pipe C extends a short distance into the tank to form a valve face c^3.

A lever a^3 is fixed to a shaft a^4 mounted in the tank A and passes through a gland in the side of the tank to carry an actuating lever a^5. The lever a^3 is arranged to swing between the valve faces a^2 and c^3 and carries a double faced valve a^6 so that in one position the pipe a^1 is shut off from the tank and in the other position the pipe C is shut off from the tank. The valve a^6 is operated by the lever a^5 which is external to the tank A and is normally held by a spring a^7 in the position causing the valve a^6 to

engage the valve face c^3 and so close the connection C to the tank. To move the lever a^5 from its normal position it is moved forward so that projection a^8 thereon engages with a catch a^9 on the front of the tank. In this position the valve a^6 is held in contact with the valve face a^2 thus closing the drain pipe a^1. When it is required to return the lever a^5 to its normal position the catch a^9 can be released by the trigger a^{10} when the lever a^5 will return under the action of the spring a^7.

The level of the water in the tank A and hence in the machine may be controlled by a float controlled unit D. The chamber d^1 of this unit contains a float connected to the tank through a pipe d^3 and a rod d^2 connects the float to a trip lever e^2 on the valve e^1. The valve e^1 may be of any suitable known design and admits water through the pipe E to the machine. The trip lever e^2 may be directly connected to the valve e^1 or it may be arranged to operate a relay valve supplying energy to close the valve e^1.

A heater F may be as shown incorporated in the tank A. The heater is shown in the form of a steam coil F the connections thereto passing through the side of the tank A at f^1 and f^2. Alternatively the heater F may be of any other suitable form such as an electrical heater.

A steam or other fluid injector c^4 is provided to cause circulation through pipe C into the machine from the machine through pipe B back to the tank A, the steam or fluid being supplied by the pipe c^5 through valve c^6. Alternatively a pump may be employed for circulating the liquid.

To carry out a typical washing operation the valve a^6 is positioned to shut off the tank A from the drain pipe a^1 and water is admitted to the machine P through the valve e^1. Water will continue to flow into the machine until it assumes a suitable level when the valve e^1 is closed by the lever e^2 being tripped by the action of the float control D. Detergents can be added to tank A at any suitable time. The steam valve c^6 is then opened to cause circulation of the liquor through the machine.

At the end of this washing process water and dirt which is removed from the washing liquor during its circulation through the washing machine settles in the tank A and can be drained from the tank A and from the machine by opening the drain pipe a^1 by raising the valve a^6 from the seat a^2 at the top of the pipe a^1.

The process can be repeated for as many washes as may be necessary for the treatment of the articles in the machine.

At the end of the washing processes the valve a^6 is raised from its seat a^2 and the same action will bring a^6 on to the valve seat c^3 thus closing the connection C between the washing machine and the tank. Water can then be admitted through the valve e^1 to the machine to perform a continuous rinsing process, water flowing through the inlet E through the machine by the pipe B into the tank A and to the drain pipe a^1. At the end of the rinsing process valve e^1 is closed and the water allowed to drain from the machine through pipe B through tank A to drain a^1. It should be noted that having opened valve e^1 to admit water to the machine and valve a^6 to drain the water from the machine the level of the water in the float chamber D will remain below that which is required to trip valve e^1.

We claim:

1. The combination of a washing machine and a system external thereto for circulation of washing liquor during a washing operation, said system comprising a tank to contain washing liquor and for removing dirt from the washing liquor during its circulation through the washing machine, heating means in said tank for heating washing liquor therein, means for assisting circulation of washing liquor between the tank and washing machine, the tank being provided with an outlet to the washing machine, an

inlet from the washing machine, and a drainage connection, a manually operable valve having an operating lever for moving said valve into one position to open the outlet from the tank to the washing machine and to close the drainage connection, and a spring acting on said lever to move said valve into another position to open the drainage connection and close the outlet to the washing machine.

2. The combination of a washing machine and a system external thereto for circulation of washing liquor during a washing operation, said system comprising a tank to contain washing liquor and for removing dirt from the washing liquor during the circulation through the washing machine, heating means in said tank for heating washing liquor therein, means for assisting circulation of washing liquor between the tank and washing machine, the tank being provided with an outlet to the washing machine, an inlet from the washing machine, and a drainage connection, a manually operable valve having an operating lever for moving said valve into one position to open the outlet from the tank to the washing machine and to close the drainage connection, a spring acting on said lever to move said valve into another position to open the drainage connection and close the outlet to the washing machine, and a trigger for releasably holding said valve in a position to close the drainage connection and open the outlet to the washing machine.

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