

May 28, 1963

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3,091,111

WASHING MACHINE OVERFLOW CONTROL UNIT

Filed Aug. 20, 1962

Fig. 1

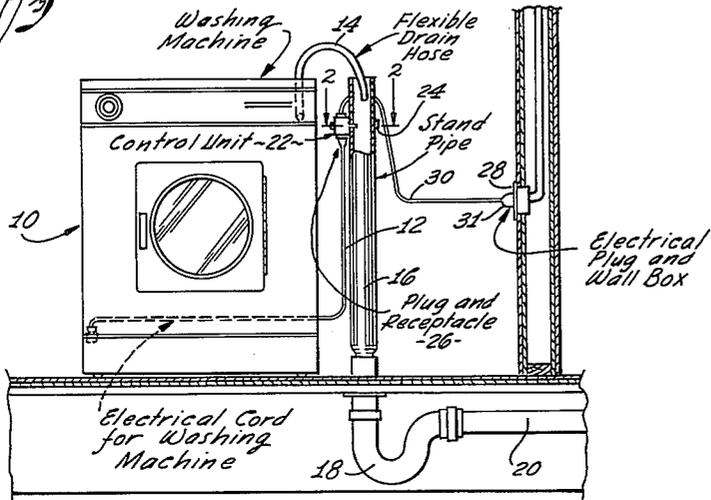


Fig. 2

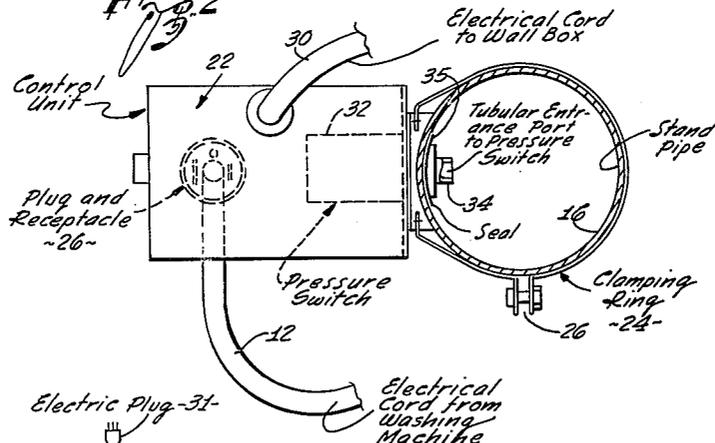
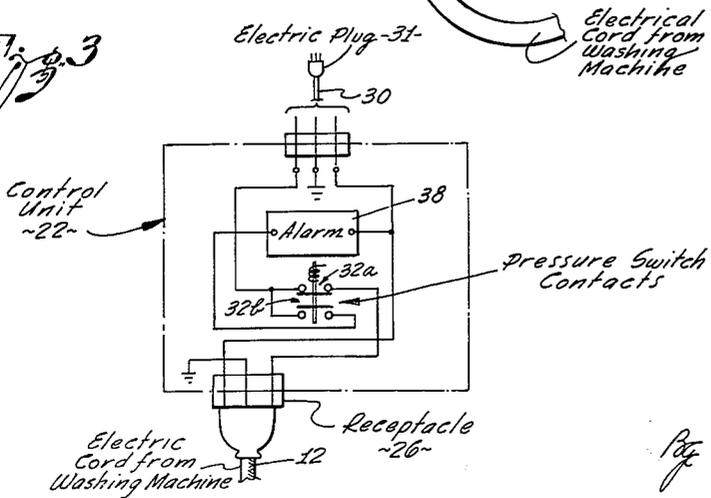


Fig. 3



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WASHING MACHINE OVERFLOW CONTROL UNIT
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Filed Aug. 20, 1962, Ser. No. 217,920
7 Claims. (Cl. 68—208)

The present invention relates to control units for use with domestic appliances, such as washing machines; and it relates more particularly to an improved control unit for use with an electric washing machine which responds to an overflow condition in the drainage system associated therewith.

Domestic washing machines are presently in widespread use in the homes and other dwellings across the country. Most present-day washing machines are of the automatic type which automatically cycle through various operations until the clothes are completely washed, rinsed and partially dried.

The usual automatic washing machine is coupled to pressurized hot and cold water lines, and it usually includes a drain tube through which the dirty water is pumped from the machine. The drain tube from the washing machine is usually inserted in a stand-pipe which, in turn, is coupled to the household drainage system.

The normal procedure is for the housewife to place a load of laundry in the washing machine, and to set the machine and leave it unattended. The machine then automatically cycles through its various operations, and when the wash is completed, the machine turns itself off.

Problems have arisen, however, in that should the household drainage system become plugged for any reason, the stand-pipe will overflow. A large amount of water is used in the typical automatic washing machine, and in the event of overflow, sufficient water is pumped out of the machine to flood through the household and produce considerable damage.

An object of the present invention is to provide an improved control unit for detecting abnormal rises in the water level in the stand-pipe, and which responds to such rises to turn off the electric power to the washing machine and/or to sound an appropriate audible alarm.

Another object is to provide such an improved control unit which is relatively simple and inexpensive to construct, and which can be easily installed into existing washer/stand-pipe combinations.

Other features and advantages of the invention will become apparent from a consideration of the following description, when the description is taken in conjunction with the accompanying drawings, in which:

FIGURE 1 is a diagrammatic representation of a washing machine and stand-pipe combination, and which includes a control unit constructed in accordance with the invention for de-activating the washing machine upon an abnormal rise of water level in the stand-pipe;

FIGURE 2 is an enlarged view of the control unit of the invention mounted on the stand-pipe of FIGURE 1, the view being taken along the line 2—2 of FIGURE 1; and

FIGURE 3 is an electric circuit diagram of the system of the invention.

The representation of FIGURE 1 includes a usual automatic washing machine 10. This washing machine may be of any known type, and it is capable, for example, of automatically washing clothes in the manner described above.

The washing machine 10 is provided with an electrical cord 12 which normally is plugged into the electrical energizing outlet of the household in which the washing machine is installed. The washing machine 10 also in-

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cludes a drain tube, or hose, 14 through which the dirty water from the washing machine drains, as the machine progresses from cycle to cycle during its automatic washing operations.

The drain tube 14 is inserted in a vertical stand-pipe 16. The stand-pipe 16 is supported, for example, on a usual trap 18, which, in turn, is coupled to the drainage system 20 of the household.

During normal operation of the washing machine 10, and when the electric cord 12 is plugged into the usual electrical outlet, the washing machine proceeds with its washing operations, as explained above. However, in the event that the trap 18, or the drainage system 20, becomes plugged, the large amount of water used by the washing machine 10 quickly produces an overflow condition in the stand-pipe 16. As mentioned above, the quantity of water which is caused to overflow from the stand-pipe when such a condition exists, is sufficient to produce considerable flood damage to the dwelling in which the washing machine is used.

The present invention includes a control unit 22 which is mounted at a particular level on the stand-pipe 16. A mounting or clamping ring, or strap, 24 is affixed to the housing of the unit 22, and this strap extends around the stand-pipe, as best shown in FIGURE 2. The clamping ring 24 is clamped tightly around the stand-pipe by means, for example, of a screw 26 which is threaded into the ends of the ring.

The housing of the control unit 22 includes a receptacle 26. The electric cord 12 for the washing machine 10, instead of being plugged directly in the electrical outlet 28 is plugged into the receptacle 26 of the control unit 22. The control unit, itself, has an energizing cord 30 which has a plug 31; the plug being plugged into the outlet 28.

The control unit 22 includes a pressure responsive electric switch 32. A tubular inlet member 34 is mounted on the housing of the control unit 22. This tubular inlet member 34 extends through an aperture in the stand-pipe 16 into the interior of the stand-pipe, as best shown in FIGURE 2. The pressure switch 32 is mounted adjacent the inner end of the inlet member 34, and the pressure switch includes a diaphragm which is actuated to actuate the switch, when the water pressure in the inlet member 34 is in excess of a particular predetermined pressure. An appropriate sealing gasket 35 is inserted between the inlet member 34 and the wall of the stand-pipe 16 to provide a pressure seal between the inlet member and the wall.

The pressure responsive electric switch 32 includes a pair of normally closed contacts 32a (FIGURE 3) which are caused to open when the pressure in the inlet tube 34 exceeds the predetermined pressure. The pressure switch may also include a pair of normally open contacts 32b which close when the pressure in the inlet tube 34 exceeds the predetermined pressure.

The electric energizing cord 30 may be a three lead type, and one of the leads is grounded by the circuitry of FIGURE 3. One of the remaining leads of the cord 30 is connected by the circuitry of FIGURE 3 to a terminal of the receptacle 26, and the other remaining lead is connected by the circuitry through the normally closed contact 32a to a second terminal of the receptacle 26. The receptacle 26 may include a third terminal which is grounded by the circuitry of FIGURE 3.

The leads of the cord 30 may also be connected to an electric alarm unit 38 by the circuitry of FIGURE 3, with the contacts 32b being in series circuit therewith. As mentioned above, the electrical cord 12 of the washing machine is plugged into the receptacle 26.

Under normal operation of the washing machine of FIGURE 1, the contacts 32a of the pressure responsive switch 32 are closed, and the contacts 32b are open. Therefore, the washing machine is energized through the

closed contacts 32a, and the alarm 38 is deenergized because of the open condition of the contacts 32b. However, should a stoppage occur in the drainage system, such that the water level in the stand-pipe 16 rises above the level of the control unit 22, the resulting increase in water pressure in the tubular member 34 causes the pressure responsive switch 32 to be actuated.

This actuation of the pressure responsive switch 32 causes the contacts 32a to open. These contacts remain open so long as the stoppage condition exists, so as to de-energize the washing machine and its drainage pump. Should the stoppage condition correct itself, the contacts 32a will close automatically, and the washing machine will again be energized.

If so desired, the circuit of the alarm 38 may be included, so that the contacts 32b will close at the same time that the contacts 32a are open. This causes the alarm 38 to be actuated, so that the householder is made aware of the abnormal condition.

The invention provides, therefore, a simple and inexpensive control unit. As mentioned above, the control unit may be easily installed in existing washer-stand-pipe combinations. When so installed, the control unit of the invention serves immediately to de-energize the washer, should a stoppage condition occur in the drainage system.

The use of the present invention serves to prevent costly damage due to floods which often occur, when a stoppage condition in the drainage system arises.

While a particular embodiment of the invention has been shown and described, modifications may be made, and it is intended in the claims to cover such modifications as fall within the spirit and scope of the invention.

What is claimed is:

1. A control unit for use with a stand-pipe drain and washing machine combination, the washing machine having a drain tube to be inserted in the stand-pipe to discharge water into said stand-pipe under control of electric circuitry in said washing machine and further having an electrical energizing cord for supplying electric current to said electric circuitry, said control unit including: a housing; a stand-pipe; a tubular inlet member mounted on said housing and adapted to extend through an aperture in the side of the stand-pipe and into the interior of the stand-pipe; a pressure responsive electric switch mounted in said housing adjacent said inlet member to be actuated by a water pressure in said inlet member in excess of a predetermined pressure; and circuitry in said housing for connecting said pressure responsive electric switch in series circuit between the electrical energizing cord of the washing machine and a source of electrical energy so as to establish an electric connection to said electric circuitry in the washing machine adapted to be interrupted in the presence of a water pressure in said inlet member in excess of said predetermined pressure and cut off the water discharged into said stand-pipe by said drain tube.

2. A control unit for use with a stand-pipe drain and electric washing machine combination, the washing machine having a drain tube adapted to be inserted in the stand-pipe to discharge water into said stand-pipe under control of electric circuitry in said washing machine and further having an electrical energizing cord for supplying an electric current to said circuitry, said control unit including: a housing; a mounting strap affixed to said housing and adapted to be clamped around the stand-pipe to mount the control unit on the stand-pipe; a tubular inlet member mounted on said housing and adapted to extend through an aperture in the side of the stand-pipe and into the interior of the stand-pipe; a pressure responsive electric switch mounted in said housing adjacent said inlet member to be actuated by a water pressure in said inlet member in excess of a predetermined pressure; electrical connecting means extending from the housing and adapted to be connected to a source of elec-

trical energy; receptacle means on the housing for receiving the electrical energizing cord of the washing machine; and electrical connections in the housing for connecting said electrical connecting means to said receptacle means and to said pressure responsive electric switch so as to supply energizing current to said electric circuitry in the washing machine adapted to be interrupted in the presence of a water pressure in said inlet member in excess of said predetermined pressure and cut off the water discharge into said stand-pipe by said drain tube.

3. The control unit of claim 2 and which includes an electrically activated alarm connected to said electric switch to be energized upon such actuation of said electric switch.

4. In combination: a stand-pipe drain; an electric washing machine having a drain tube adapted to be inserted in the stand-pipe to discharge water into said stand-pipe under control of electric circuitry in said washing machine; pressure responsive means mounted on said stand-pipe to be actuated upon a water level rise in said stand-pipe above a predetermined level; electric switching means coupled to said pressure responsive means to be actuated thereby; and electrical connections connecting said electric switching means in series circuit between said electric circuitry in the electric washing machine and a source of electrical energy so as to supply an electrical current to said electric circuitry in the washing machine to be interrupted in the presence of a water lever in said stand-pipe exceeding said predetermined level and cut off the water discharge into said stand-pipe by said drain tube.

5. In combination: a stand-pipe drain; an electric washing machine having a drain tube adapted to be inserted in the stand-pipe to discharge water into said stand-pipe under control of electric circuitry in said washing machine and having an electrical energizing cord for supplying an electric current to said electric circuitry; a control unit including a pressure responsive electric switch mounted on said stand-pipe; a tubular inlet member mounted on said control unit adjacent said switch and extending through an aperture in the side of the drain pipe and into the interior of the drain pipe, said switch being actuated by a water pressure in said inlet member in excess of a predetermined pressure; and electric circuitry in said control unit for connecting said electric switch in series circuit between the energizing cord of the washing machine and a source of electrical energy so as to supply an electric current to said electric circuitry in the washing machine to be interrupted by a water level rise in said stand-pipe above a predetermined level and cut off the water discharged into said stand-pipe by said drain tube.

6. In combination: a stand-pipe drain; an electric washing machine having a drain tube adapted to be inserted in the stand-pipe to discharge water into said stand-pipe under control of electric circuitry in said washing machine and having an electrical energizing cord for supplying electric current to said electric circuitry; a control unit including a housing mounted on said stand-pipe; a tubular inlet member mounted on said housing and adapted to extend through an aperture in the side of the stand-pipe and into the interior of the stand-pipe; a pressure responsive electric switch mounted in said housing adjacent said inlet member to be actuated by a water pressure in said inlet member in excess of a predetermined pressure; electrical connecting means extending from the housing and adapted to be connected to a source of electrical energy; receptacle means mounted on said housing for receiving the electrical energizing cord of the washing machine; and connections in said housing for connecting said electrical connecting means to said receptacle means and to said pressure responsive electric switch so as to supply an electric current to said electric circuitry in the washing machine adapted to be interrupted in the presence of a water level rise in said

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stand-pipe above a predetermined level and cut off the water discharged into said stand-pipe by said drain tube.

7. The combination of claim 6 and which includes an electrically activated alarm connected to said connections in said housing to be energized upon the interruption of said electric circuit to the washing machine.

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