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TEMPERATURE CONTROL DEVICE FOR LAUNDRY WASHING MACHINES

Filed Feb. 4, 1924

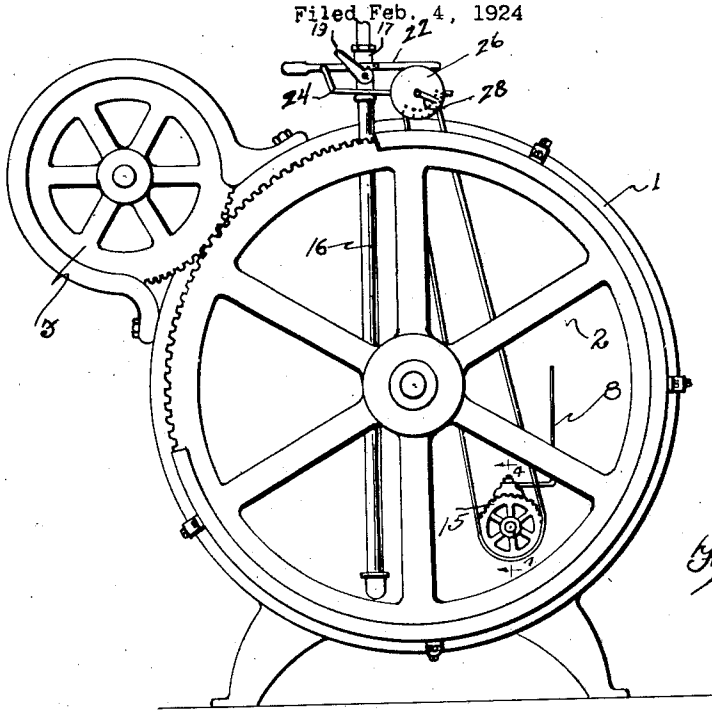
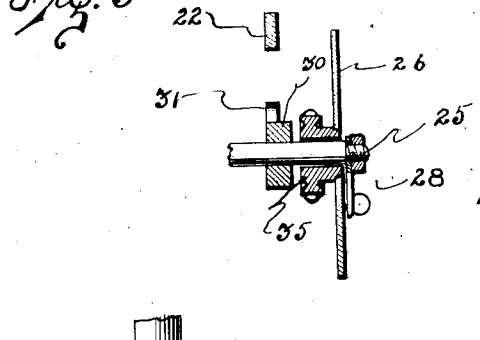


Fig. 1

Fig. 3



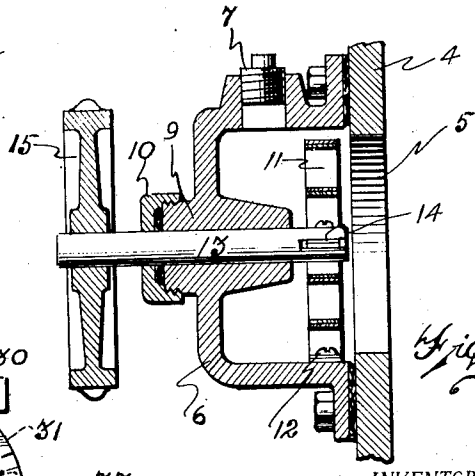


Fig. 4

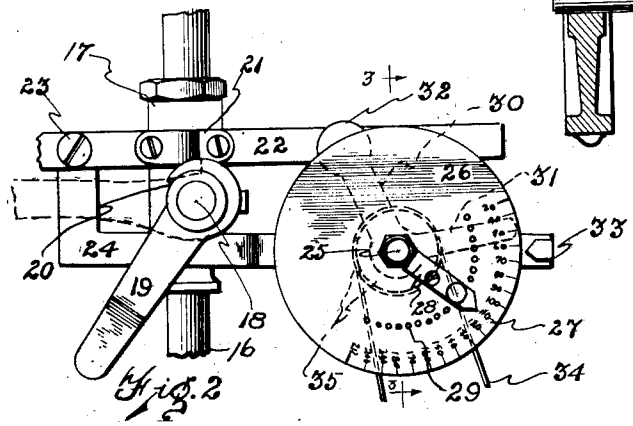


Fig. 2

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TEMPERATURE-CONTROL DEVICE FOR LAUNDRY WASHING MACHINES.

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To all whom it may concern:

Be it known that I, WILLIAM M. CHACE, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Temperature-Control Devices for Laundry Washing Machines, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to temperature control devices for laundry washing machines, and the object is to provide an automatic control device adapted to automatically prevent the temperature of the water from increasing beyond a predetermined degree through injection of steam thereinto, and the novel feature of the invention resides in the combination with a steam line for supplying steam to heat the water of the washing machine of a thermostatic device through movement of which the injection of the steam into the water is stopped when the temperature of the water has reached the predetermined degree.

Usually laundry machines, especially in the larger plants, are arranged in batteries of a number and during the washing of the clothing the temperature of the water decreases and the attendant attempts to maintain the water at as nearly a predetermined temperature as possible by manually admitting steam to the water and to close the valve at the time he considers or finds the temperature to be sufficiently high. This device seeks to at all times indicate the temperature of the water in the laundry machine whereby the attendant is informed if additional heat is required and, if so, the steam valve is opened and without further attention on the part of the operator the valve is closed through operation of the device when the water has reached predetermined temperature thereby reducing the necessity of continued attention by the operator.

A further feature of the invention is involved in the arrangement of the indicator device whereby the steam line may be closed upon the water attaining any predetermined degree of temperature. Other features of the invention are involved in the arrangement of the thermostatic element and its connection with the temperature indicating mechanism. These and other objects and the several novel features of the invention are hereinafter more fully described and claimed, and the preferred form of construction of a temperature control device embodying my invention is shown in the accompanying drawings in which—

Fig. 1 is an end elevation of a laundry washing machine showing my improved temperature control device in its relationship therewith.

Fig. 2 is a front elevation of the temperature indicator and mechanism controlled thereby for causing the closing of the steam line.

Fig. 3 is a section taken on line 3—3 of Fig. 2.

Fig. 4 is an enlarged cross section taken on line 4—4 of Fig. 1 showing the arrangement of the thermostatic element and its relationship to the laundry machine.

The laundry machine is of the usual type, an end elevation only of which is here shown as the structure of the same is common and well known in the art. The machine consists of the cylinder 1 on the end of which is mounted a gear 2 driven by the small spur gears 3. This gear 2 rotates a cylinder (not here shown but as is commonly the practice) mounted within the outer cylinder 1 and the machanism for the admission of the water to this outer cylinder is not here shown. The end wall of the cylinder 1, indicated at 4 in Fig. 4, is provided with an aperture 5 and water admitted to the cylinder 1 may pass through the aperture into the closed casing 6 which is preferably flanged and bolted to the outside face of the end wall 4 preferably near the bottom of the cylinder as indicated in Fig. 1. The wash water thus may freely flow into the casing 6 and, due to rotation of the inner cylinder, this wash water is continually changed in the casing 6 so that the temperature of the water in the casing is substantially that of the water within the cylinder 1. This casing 6 at the upper end is provided with an aperture closed by means of a plug 7 for the purpose of inspection or cleaning if necessary and on one side of the casing is a small tube 8 shown in Fig. 1, which provides a vent for the casing preventing pocketing of air in the casing whereby the water may freely flow into the said casing. The casing is provided with a bearing 9 and packing gland 10 of any approved form to prevent leakage.

On the inner end of the shaft 13 rotatable in the bearing 9 is a bi-metallic element 11 which is of the usual type formed of two metals of different coefficients of expansion thereby sensitive to temperature change. Preferably, the element 11 is in the form of a spiral, the outer end of which may be attached to the casing as indicated at 12 and the inner end of which is fixedly secured to the shaft 13 as indicated at 14. This shaft extends through the bearing 9 and gland 10 and on the projecting end of the shaft is secured a sprocket wheel 15. This bi-metallic element 11 is so arranged that upon increase of temperature and tendency of the coil to unwind, the shaft is turned in one direction and upon decrease of temperature and tendency to wind up of the bi-metallic element 11 the shaft is turned in opposite direction.

Steam may be admitted to the cylinder 1 by means of a steam line 16, the lower end of which opens into the interior of the cylinder 1 as will be understood from the drawing. This steam line is provided with a valve indicated at 17, the stem 18 of which has connected therewith a lever 19. This lever, when the valve is closed lies in the position shown in full lines in Fig. 2 and is to be manually opened by raising the lever from the position shown in full lines in Fig. 2 to the position shown in dotted lines in the said figure. The lever is provided at its inner end with a notch 20 and when raised to the position shown in dotted lines in Fig. 2 this notch engages behind a lug 21 provided on a lever 22. The said lever 22 is pivoted at 23 to an arm 24 which is to be understood as being fastened to the valve member and extends outwardly therefrom and provides a bearing for a shaft 25. Rotatable on the shaft is the temperature indicating plate 26 calibrated as indicated at 27 to indicate various degrees of temperature. Attached to the shaft 25 is a spring arm 28, the end of which provides a pointer movable relative to the calibrations and on the inner side of this spring arm is a pin insertible in any one of a number of apertures 29 provided in the plate 26. By raising this arm to withdraw the pin from the aperture, the arm as well as the shaft 25 may be turned and the arm positioned to indicate any one of a number of degrees of temperature. On the inner end of the shaft and fixed thereto is a weight lever 30 indicated by dotted lines in Fig. 2 and in full lines in Fig. 3. The end 31 of this lever is in the same plane as the projecting end of the pivoted lever 22 which lies behind the temperature indicating plate. The lever 30 is also provided with a counter weight 32, and it is to be noted that in moving the spring pointer 28 and turning of the shaft the lever 30 is also turned to bring the end 31 nearer to or farther from the end of the lever 22 depending upon the direction in which the lever 28 is moved. Also, on the end of the lever 24 which extends beyond the indicator plate is provided a pointer member 33 relative to which the calibrations are to be read.

In the position of the parts shown in Fig. 2, the temperature indicated is approximately sixty degrees F., and it is to be understood that the lever 28 has been moved to indicate approximately one hundred and ten degree. Under the condition shown in Fig. 2 the attendants is advised that the temperature of the water in the cylinder 1 is too low. Therefore, the lever 19 is raised to the position shown in dotted lines which opens the valve in the steam line and the valve remains open due to the notch 20 engaging behind the lug 21 of the pivoted lever, the weight of which tends to hold the lug behind the notch. This opening of the valve admits steam to the water of the cylinder and by consequent increase in temperature of the water, the thermostatic element 11 tends to expand or unwind turning the shaft 13 and sprocket 15. This sprocket 15 is connected by means of a chain 34 with a sprocket 35 attached to the back of the plate 26. The unwinding of the coil and turning of the sprocket 15 therefore turns the indicator plate and as the temperature is increased the lever 31 and indicating plate are turned to the left of the position shown in Fig. 1, and, as the indicating temperature calibration 110 reaches the fixed point 33 the upper end of the lever 31 raises the end of the lever 22 raising the lug 21 out of the notch 20 and releases the steam valve lever 19 which drops by gravity and closes the valve. It is apparent from the above description that the attendant is at all times informed as to the temperature of the water in the washing machine and if the temperature decreases and through the action of the thermostatic element turns the indicator pointer plate in clockwise direction the attendant may observe the extent of the decrease in degree of temperature and manually open the steam line whereupon the increase in temperature of the water in the cylinder 1 reverses the direction of rotation of the plate and causes the closing of the steam line as previously described.

It is further to be observed that this device is applicable for use in various ways not alone with laundry machines but with other devices wherein the temperature of an element, for instance a fluid, is to be indicated and further where it may be desired to prevent the temperature increasing beyond a certain degree by controlling an element providing the heat.

It is further evident that the device is very simple in construction; is practically indestructible and not at all liable to get

out of order; is inexpensive to manufacture and, due to the fact that the setting of the indicator plate and the calibrations thereon are made strictly in accord with the variation in the thermostatic element through change in the degree of temperature. the device is extremely accurate in operation and the various objects of the invention are secured.

Having thus fully described my invention, what I claim is—

1. A device of the character described, comprising the combination with a container for fluid, means for heating the fluid and a control device, of a means for preventing the temperature of the fluid increasing beyond a predetermined degree comprising a calibrated member indicating temperatures, a movable member for indicating the predetermined highest degree of temperature desired, an actuator member positioned relative to the control device by the positioning of the movable member, and a bi-metallic element in contact with the fluid of the container adapted through increase in degree of temperature to turn the indicator and actuator and actuate the control device to stop injection of heat when the desired temperature is attained.

2. A control device for controlling the temperature of the water in laundry washing machines comprising the combination with the said machines, a steam line for heating the water, a valve therein adapted to be manually opened and to close by gravity, and means for holding the valve open, of automatic means for preventing increase of temperature beyond a predetermined degree comprising a calibrated plate, an arm movable relative to the plate to indicate any particular degree of temperature, a lever connected with the arm and movable therewith whereby the same is positioned relatively with the arm, means for holding the steam valve normally open, and a thermostatic element adapted to turn the plate, arm and lever connected therewith as the temperature increases and thereby turning the said lever to release the valve holding mechanism.

3. The combination with a receptacle for holding fluid and a steam line opening into the receptacle of a valve adapted to be manually opened to permit admission of steam to heat the fluid and to close by gravity, means for holding the valve open, a bi-metallic element subject to the influence of temperature change in the fluid of the receptacle, a temperature indicating plate, a pointer member adapted to be adjusted on the plate to indicate any degree of temperature, a lever correspondingly positioned by the positioning of the pointer member, the said plate being connected with the thermostatic element in a manner whereby the expansion thereof turns the plate to bring the said lever to position to release the valve holding means upon the temperature reaching the degree indicated by the pointer.

4. The combination with a receptacle for holding fluid and a steam line opening into the receptacle, of a valve adapted to be manually opened to permit an admission of steam to heat the fluid, said valve being adapted to automatically close by gravity, a lever adapted to hold the valve open and means for releasing the lever comprising a bi-metallic element subject to the influence of temperature of the fluid in the receptacle, a shaft rotatable by expansion or contraction of the bi-metallic element, an indicator plate calibrated to indicate degrees of temperature and adapted to be turned by said shaft, a shaft on which the plate is rotatably mounted, a pointer member secured to the shaft and adapted to be fixed to the plate to indicate any one of the degrees of temperature, a lever also attached to the shaft and movable with the pointer member, the pointer shaft being turned in one direction to release the valve holding lever, the relationship of the calibrated plate, pointer shaft and lever thereon being such that the said lever releases the valve holding lever when the fluid has reached the predetermined degree of temperature.

5. The combination with a receptacle for fluid and a steam line opening thereinto, of a valve adapted to be manually opened to permit flow of steam into the fluid to heat the same and to close by gravity, a lever provided with a lug adapted to engage a notch provided in the valve lever when the valve is opened to hold the valve open, and a temperature controlling device for releasing the lever to permit the valve to close by gravity comprising a bi-metallic element, a casing housing the same, the casing being open to permit flow of fluid from the receptacle thereinto, a plate calibrated to indicate temperature, a fixed point relative to which the calibrations may be read, a shaft on which the plate is rotatably mounted, a pointer member attached to the shaft and adapted to be moved to indicate any one of the degrees of temperature, means for securing the pointer member in any of its possible positions to the plate, a shaft to which the bi-metallic element is secured, the said shaft being in geared relation with the said plate whereby the same may be turned by expansion or contraction of the bi-metallic element, and means whereby, upon the turning of the plate and pointer member to registration with the fixed point, the valve holding lever is released permitting the valve to close by gravity.

6. Means for controlling operation of a valve to control flow of steam for heating a material comprising a device adapted to

be actuated to close the valve and shut off the steam, means influenced by temperature change to actuate the device, the said means comprising a bi-metallic element subject to influence of the temperature of the heated material, a member calibrated to indicate degrees of temperature and moved by means of the elongation or contraction of the bi-metallic element, an indicator member movable on the calibrated member to indicate any predetermined temperature, and an element moved by the positioning of the said indicator member to such position that the said valve closing device is actuated to close the valve when the material has attained the temperature indicated by the indicator member.

In testimony whereof, I sign this specification.

WILLIAM M. CHACE.