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THERMOSTAT FOR IRONING MACHINES

Filed August 28, 1924 2 Sheets-Sheet 1

Fig. 1.

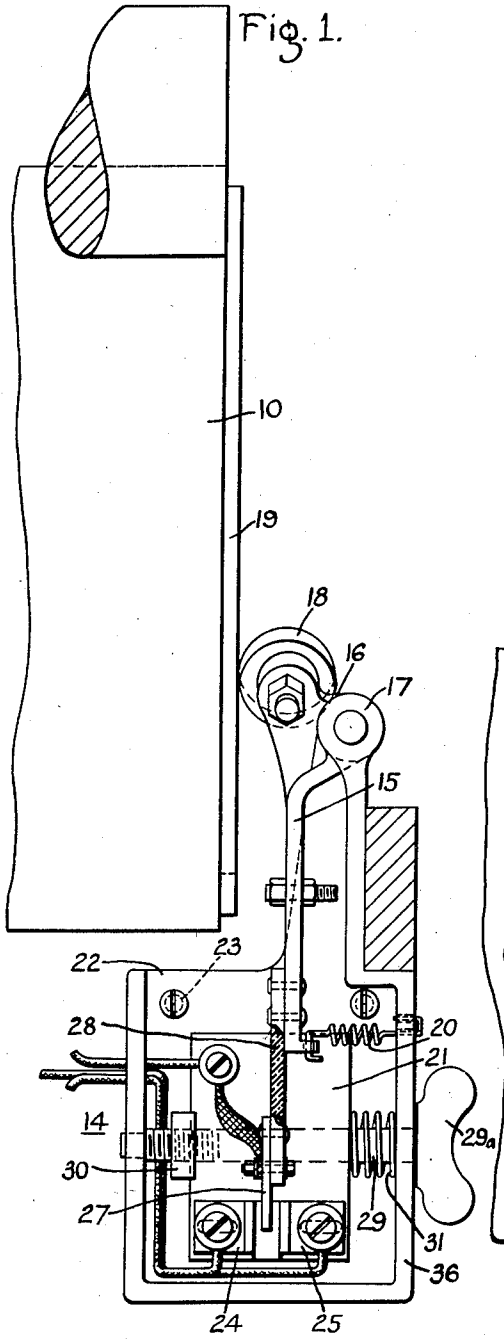
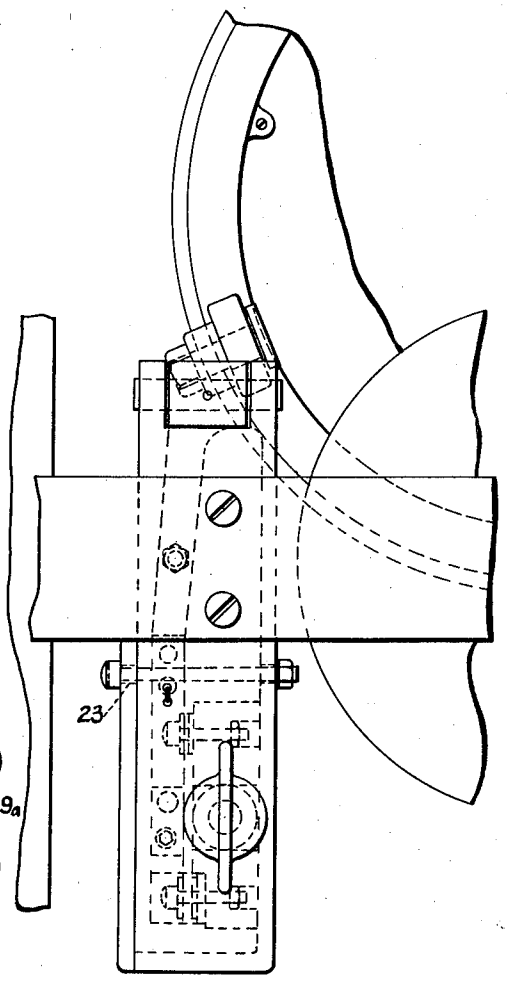


Fig. 2.



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Fig. 4.

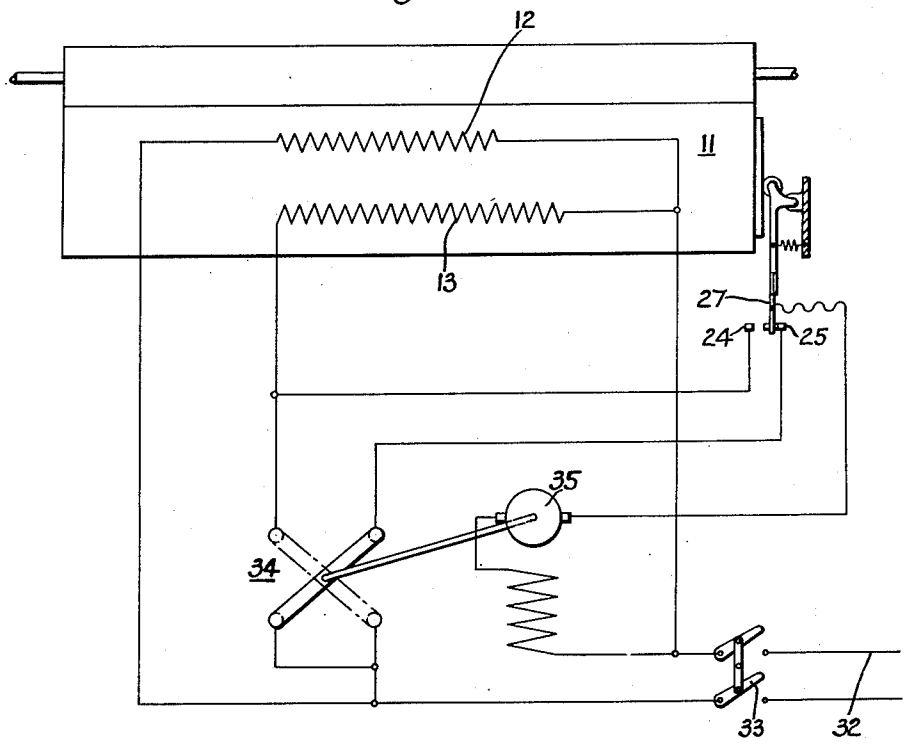
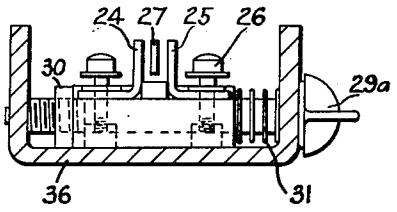


Fig. 3.



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THERMOSTAT FOR IRONING MACHINES.

Application filed August 28, 1924. Serial No. 734,602.

This invention relates to thermostats and more particularly to thermostats applicable to ironing machines of the heated-roll type.

The object of the invention, generally stated, is the provision of a thermostat that shall be simple and efficient in operation and readily and economically manufactured.

A more specific object of the invention is to provide for the automatic regulation of the temperature of an ironing machine to maintain a suitable temperature for the performance of ironing operations.

A further object of the invention is to provide for the changing of the limits of variation in temperature of an ironing machine in order to meet different ironing conditions.

Another object of the invention is to facilitate the setting of the thermostat to maintain the temperature between predetermined limits.

Other objects of the invention will, in part, be obvious and in part appear hereinafter.

The invention accordingly is disclosed in the embodiment thereof, shown in the accompanying drawings, and comprises the features of construction, combination of elements and arrangement of parts, that will be exemplified in the construction hereinafter set forth and the scope of the application of which will be indicated in the appended claims.

For a more full understanding of the nature and objects of the invention, reference may be had to the detailed description, taken in connection with the accompanying drawings in which—

Figure 1 is a front elevation showing an embodiment of the thermostat in accordance with this invention.

Fig. 2 is a side elevation of the thermostat showing details of construction.

Fig. 3 is an end elevation parts being broken away to show features of construction, and

Fig. 4 is a diagram showing the electrical connections of the thermostat.

Referring now to the drawing, 10 designates generally a heated roll of an ironing machine of the roll type. In this particular construction, the roll is heated by means of an electric element 11 located therein, but it will be readily undertood that gas burners or any other suitable heating means may be substituted for the electrical heating element.

In case an electric element is provided to heat the roll, in order to mount the element and to provide for the supply of electric energy, the roll may be rotatably mounted on a hollow axle which serves as a support for the element and a conduit for the feed conductors. If gas burners are used, they may be mounted in a similar manner and the hollow axle used as a supply pipe for the fuel.

The control of the amount of heat delivered by the element 11 may be accomplished in a number of ways. In this embodiment of the invention, the element is made in sections, such as 12 and 13 and each section is connected independently across the source of supply of electric energy so that the number of energized sections may be varied. In designing these sections, the main section 12 is made of sufficient capacity to maintain the roll at any desired ironing temperature when the machine is idling, while the section 13 is given a capacity sufficient to supply the heat given up during an ironing operation.

In order to maintain the roll 10 within predetermined limits of temperature, a thermostat, shown generally at 14, is provided to automatically cut the section 13 of the heating element into and out of the supply circuit.

As shown, the heated rolls 10 and a movable member 15 constitute the thermo-couple of the thermostat 14. Ordinarily, in the construction of ironing rolls, the length of the roll is much greater than the diameter, consequently, the variations in length, due to changes in temperature, are much more pronounced than the variations in diameter. Accordingly, the movable member 15 is disposed at the end of the roll as shown in Figs. 1 and 2.

Since the changes in length of the ironing roll, caused by variations in temperature, within the limits required for ironing purposes, is not very great, it is preferable to locate, at the end of the roll opposite the movable member 15, a stop, made of some material that is not subject to changes in size under the influence of heat within the range of ironing temperatures. In this manner, the end of the movable member 15 in contact with the roll will be given a move-

ment equal to the change in length of the roll.

As will now be observed, the movable member includes an elongated member or arm having a lug 16 formed thereon. This lug is pivotally connected to a projection 17 formed on the casing 18 provided to carry contact plates to be described hereinafter. In this manner, the arm is supported in a substantially vertical position.

In order to magnify the movement of the lower end of the arm, as compared with the movement of the upper end which is disposed adjacent to the end of the roll 10, the lug 16 is off set from the arm and located only a short distance below the point of contact with the roll 10. With a view to reducing the wear at the point of contact to a minimum, a roller 18 is mounted on the upper end of the arm to engage the roll 10.

An annular track 19 is provided on the end of the roll 10 to be engaged by the roller 18. Since it is desired that the arm may be operated only on changes in length of the roll, the track 19 is so disposed that its face lies in a plane at right angles to the axis of the roll.

The track may be formed by machining the end of a roll to obtain the desired surface, or by constructing the track as a separate unit and attaching it to the roll in any suitable manner such, for example, as by the use of screws.

It will be readily understood that the upper end of the arm may be so shaped that the roller 18 may properly engage the track 19. It will also be noted that the roller 18 is retained continually in engagement with the track by means of a spring 20, connected between the frame 36 and the arm and located below the pivot point of the latter.

The frame 18, previously referred to, includes a base 22, the edges of which are provided with an upturned flange on three sides, giving the frame substantially the appearance of a box. A plurality of holes 23 are provided in the base 22 for the reception of screws or bolts which may be utilized to attach the structure to the ironing-machine frame.

In order to utilize the movement of the member 15, to control the heat delivered by the electric heating element, a motor-driven switch is provided, the switch being connected in the supply circuit of section 13. The operation of the motor is controlled through the closing of the motor circuit by the movement of the arm 15 and the breaking of the circuit through the operation of the switch.

Contact members 24 and 25, which are employed in closing the motor circuit, are mounted on an insulation block 21 by means of screws 26, which also constitute binding-posts for the reception of conductors.

As shown in Figs. 1 and 3, the contact plates 24 and 25 are disposed in spaced relation and have located between them a contact plate 27 carried by the movable member or arm 15. As will be noted, the contact plate 27 is insulated from the arm by means of an insulating member 28, made of suitable material, such as micarta.

The plates 24 and 25 are preferably set in the desired spaced relation in the shop where the thermostat is constructed. This may be accomplished by measuring the movement of the contact plate 27 and the changes in temperature. When such data has been obtained, the variation in temperature that is permissible without interference with the ironing operation, is determined, and the plates set accordingly.

In some cases, it may be necessary to vary the limits of the temperature at which the thermostat operates. Accordingly, the insulation block 21 is slidably mounted in the frame 18.

As shown in Figs. 1 and 3, a bolt 29, threaded at one end, is rotatably mounted in opposite portions of the flange, forming a part of the frame 18. This bolt extends through an opening provided in the block 21, and the threaded end engages a nut 30. It will be noted that a notch is provided in the side of the block 21 for the reception of the nut 30 and in this manner the nut is held against rotation where the bolt is rotated.

Interposed between the portion of the flange adjacent the head of the bolt 29 and the block 21, is a spring 31 which serves to retain the block pressed firmly against the nut 30. It will be readily understood that, when the bolt is operated to move the nut 30 to the left, the spring will function to move the block 21 in the same direction, maintaining it in contact with the nut. When the bolt is operated to move the nut to the right, the spring 31 is compressed.

Since it may be desired to adjust the contact members 24 and 25 at will, the bolt 29 is provided with a head 29^a suitable for its manual operation. In this particular construction, the head simulates a wing nut and is, therefore, suitable for manual operation or for operation by means of a wrench or the like.

In order to avoid breaking or bending the plates 24 and 25 or the arm 15 because of an excessive movement of the latter, the insulating member 28 may be of flexible material, such as micarta. Further, when the arm 15 swings to the right, as shown in Fig. 1, the resilient mounting of the block 21 affords an additional measure of safety.

Referring to Fig. 4, it will be seen that the section 12 of the heating element is connected across the line 32 and the supply of electrical energy is controlled by means of the switch 33 inserted in the line. The section 13 of the heating element is also connected

across the line 32 and has a two-way switch, shown generally at 34 and disposed between it and the line.

The switch 34 is of a four-pole type, provided with a rotatable arm disposed simultaneously with pairs of diametrically opposite poles. It will be noted that two adjacent poles are connected to one terminal of the line, while the other two poles are connected, respectively, to the plates 24 and 25. The pole of the switch which is connected to the plate 24 is also connected to the section 13 of the heating element. A motor 35, provided to operate the switch 34, is connected between one terminal of the line 32 and the plate 27.

Assuming that the ironing machine is idle and the roll 11 cold, then the member 27 will be in contact with the contact plate 25. Upon the closing of the switch 33, electrical energy is supplied to section 12 of the heating element. Current also flows through the switch 34, contact plate 25, plate 27, motor 35 and back to the line. The motor being thus energized, operates and moves the switch one step forward to connect the section 13 of the heating element across the line. Then, the heating element operates at full capacity until the ironing roll 11 is raised to a desired ironing temperature.

Since the section 12 is of sufficient capacity to maintain the roll at a desired ironing temperature when the machine is idle, the two sections being in operation, tend to raise the temperature above a predetermined limit. As the roll 11 is heated, it expands, operating the arm 15 to swing the plate 27 into contact with the plate 24. In this manner, the motor is again energized and operates to move the switch another step and thus disconnect the section 13 of the heating element from the line.

If now, the articles to be ironed are fed into the machine, the roll gives up a certain amount of heat. This causes the roll to contract, and permits the lower end of the arm 15 to swing to the right, under the influence of the spring 31, thus throwing the plate 27 into contact with the plate 25. The motor is again energized to move the switch another step to connect the section 13 of the heating element across the line 32. The two sections of the heating element are thus brought into operation to maintain the desired ironing temperature during the ironing operation.

If it is found that the limits of temperature at which the thermostat functions are not suitable to meet the existing ironing conditions, they may be adjusted at will, by the manipulation of the bolt 29. The plates 24 and 25 may also be adjusted relative to one another to vary the range of ironing temperatures.

The applicant does not desire to limit himself to the use of electric heating elements for heating the roll. It will be readily understood by those skilled in the art that a heat-controlled device of the character described may be utilized for controlling a sectional gas heater or the like.

A thermostat of this type may also be adapted to control the supply of gas to a single burner.

While the illustrated example constituted a particular embodiment of my invention, I do not limit myself strictly to the exact details herein illustrated, since manifestly the same can be considerably varied without departing from the spirit of the invention, as set forth in the appended claims.

I claim as my invention:

1. In a thermostat, in combination, a rotatable member adapted to be heated, and means for controlling temperatures disposed for operating by the rotatable member as it expands and contracts.

2. In a thermostat, in combination, a rotatable member adapted to be heated and means disposed for actuation by the rotatable member as it expands and contracts to automatically control the limits of temperature of said rotatable member and means for setting said automatically actuable means to function at different predetermined temperatures.

3. In a thermostat for ironing machines, in combination, a rotatable ironing member adapted to be heated and a movable switch member disposed to engage the rotatable member, said rotatable member being adapted to operate the movable switch member as it expands and contracts upon changes in temperature.

4. In a thermostat, in combination, a plurality of cooperative members, comprising a rotatable member adapted to be heated, and a second member disposed to engage the rotatable member, one of said members being movable as the rotatable member expands and contracts, and means actuated by the movable member to control the temperature of the rotatable member.

5. In a thermostat for ironing machines, in combination, a rotatable ironing member and means disposed for operation by the ironing member as it expands and contracts to automatically control the changes in temperature of the ironing member.

6. A thermostat comprising, in combination, a rotatable member adapted to be heated and a member mounted to engage one end of said rotatable member, said member being disposed for movement as the rotatable member expands and contracts upon changes in temperature, and means operable by said movable member to control the temperature of the ironing member.

7. A thermostat comprising, in combination, a rotatable member adapted to be

heated and a movable member disposed to engage the rotatable member, said rotatable member being adapted to effect the operation of the movable member as it expands and contracts upon changes in temperature, and means operable by said movable member to control the temperature of the ironing member, said means being adapted to maintain the temperature within predetermined limits.

8. In a thermostat for ironing machines, in combination, a rotatable heated ironing roll, means disposed to ride on an end of the roll and movable as the roll expands and contracts upon changes in temperature, and means actuated by said movable means to control automatically the temperature of the roll.

9. In a thermostat for ironing machines, in combination, a rotatable heated roll, a track carried by the roll, means disposed to ride on the track and movable as the roll expands and contracts upon changes in temperature, and means actuated by said movable means to control automatically the temperature of the roll.

10. In a thermostat for ironing machines, in combination, a rotatable heated roll, a track mounted on one end of the roll and disposed for movement as the roll expands and contracts upon changes in temperature, means disposed to ride on said track, and means actuated by said track engaging means to control automatically the temperature of the roll.

11. A thermostat for ironing machines comprising, in combination, a rotatable heated roll and a movable arm disposed to ride on one end of the roll, thereby to effect movement of the arm as the roll expands and contracts upon changes in temperature, said roll having a track provided on one end to be engaged by said arm, said arm being provided with a roller adapted to ride on the track, and means operated by said arm to control the heating of the roll.

12. A thermostat for ironing machines comprising, in combination, a rotatable heated roll, a pivoted arm disposed to ride on the roll, means cooperative to retain the arm in engagement with said roll as it expands and contracts upon changes in temperature, and means operated by the arm to control the heating of the roll.

13. A thermostat for ironing machines comprising, in combination, a rotatable heated roll, a pivoted arm disposed to ride on the roll, means cooperative to retain the arm in engagement with said roll as it expands and contracts upon changes in temperature, and means operated by the arm to control the heating of the roll, said control means being adapted to function upon predetermined changes in temperature.

14. A thermostat for ironing machines comprising, in combination, a rotatable ironing member adapted to be heated, a pivoted member disposed to engage the ironing member, said ironing member being adapted to oscillate said pivoted member as it expands and contracts upon changes in temperature, means to control the heating of the ironing member, and means cooperating with said pivoted member to effect the operation of said control means.

15. In a thermostat for ironing machines, in combination, a rotatable ironing member adapted to be heated, a pivoted member disposed to engage the end of the ironing member, and a track provided on the end of the ironing member to receive said pivoted member, said track presenting a face extending in a plane at right angles to its axis of rotation.

16. In a thermostat for ironing machines, in combination, a rotatable ironing member adapted to be heated, a pivoted member disposed to engage the end of the ironing member, and a track provided on the end of the ironing member to be engaged by said pivoted member, said track presenting a face extending in a plane at right angles to its axis of rotation, said pivoted member being provided with a roller disposed to ride on said track.

17. In a thermostat for ironing machines, in combination, a rotatable member adapted to be heated, a pivoted member disposed for oscillation by the rotatable member as it expands and contracts upon changes in temperature, a motor-operated switch adapted to control the heating of the rotatable member, spaced contact members connected in the motor circuit, and a contact plate carried by the pivoted member disposed between said contact members to close the motor circuit as the pivoted member oscillates upon changes in temperature.

18. In a thermostat for ironing machines, in combination, a rotatable member adapted to be heated, a pivoted member disposed for oscillation by the rotatable member as it expands and contracts upon changes in temperature, a motor-operated switch adapted to control the heating of the rotatable member, spaced contact members connected in the motor circuit, and a contact plate carried by the pivoted member disposed between said contact members to close the motor circuit as the pivoted member oscillates upon changes in temperature, said contact members being movable as a unit to vary the limits of temperature at which said motor circuit is closed.

19. In a thermostat for ironing machines, in combination, a rotatable member adapted to be heated, a pivoted member disposed for oscillation by the rotatable member as it expands and contracts upon changes in temperature, a motor-operated switch adapted

to control the heating of the rotatable member, spaced contact members connected in the motor circuit, and a contact plate carried by the pivoted member disposed between said contact members to close the motor circuit as the pivoted member oscillates upon changes in temperature, said contact members being movable relative to one another whereby the range of temperatures of the ironing member may be varied.

20. In a thermostat for ironing machines, in combination, a rotatable member adapted to be heated, a pivoted member disposed for oscillation by the rotatable member as it expands and contracts upon changes in temperature, a motor-operated switch adapted to control the heating of the rotatable member, spaced contact members connected in the motor circuit, and a contact plate carried by the pivoted member disposed between said contact members to close the motor circuit as the pivoted member oscillates upon changes in temperature, said contact members being adjustable relative to one another and in fixed relation to vary the limits of temperature of the ironing member.

21. In a thermostat for ironing machines, in combination, a rotatable member adapted to be heated, a pivoted member disposed for oscillation by the rotatable member as it expands and contracts upon changes in temperature, a motor-operated switch adapted to control the heating of the rotatable member, spaced contact members connected in the motor circuit, and a contact plate carried by the pivoted member disposed between said contact members to close the motor circuit as the pivoted member oscillates upon changes in temperature, and an adjustable block adapted to carry said contact members whereby said contact members may be moved to vary the limits of temperature of the ironing members.

22. In a thermostat for ironing machines, in combination, a rotatable member adapted to be heated, a pivoted member disposed for oscillation by the rotatable member as it expands and contracts upon changes in temperature, a motor-operated switch adapted to control the heating of the rotatable member, spaced contact members connected in the motor circuit, and a contact plate carried by the pivoted member disposed between said contact members to close the motor circuit as the pivoted member oscillates upon changes in temperature, and an adjustable block adapted to carry said contact members whereby said contact members may be moved to vary the limits of temperature of the ironing members, said contact members being adjustable relative to one another on said block to vary the range of temperatures of the ironing members.

In testimony whereof, I have hereunto subscribed my name this 14th day of August, 1924.

WALTER H. HIMES.