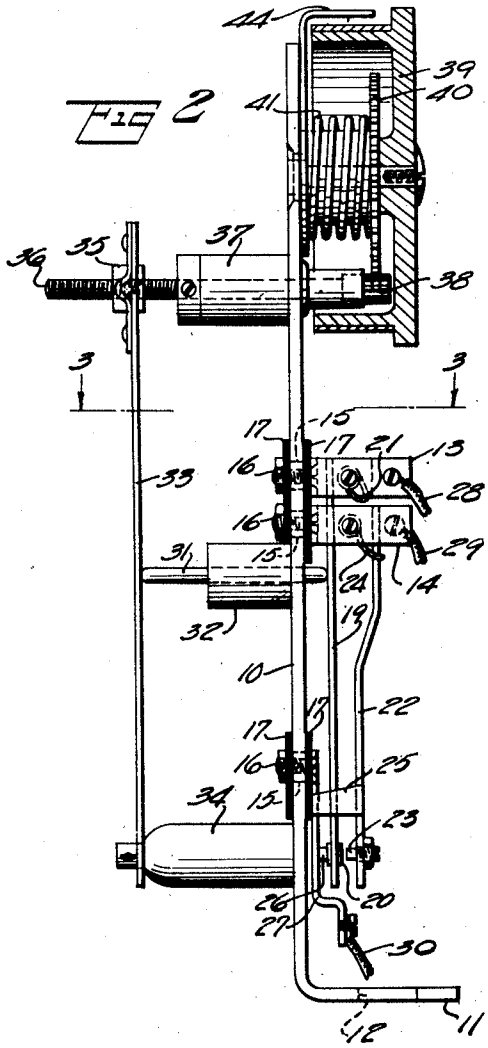
May 10, 1927. 1,627,732

E. L. FONSECA

THERMOSTATIC CONTROL FOR ELECTRIC OVENS AND THE LIKE

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FIG 2



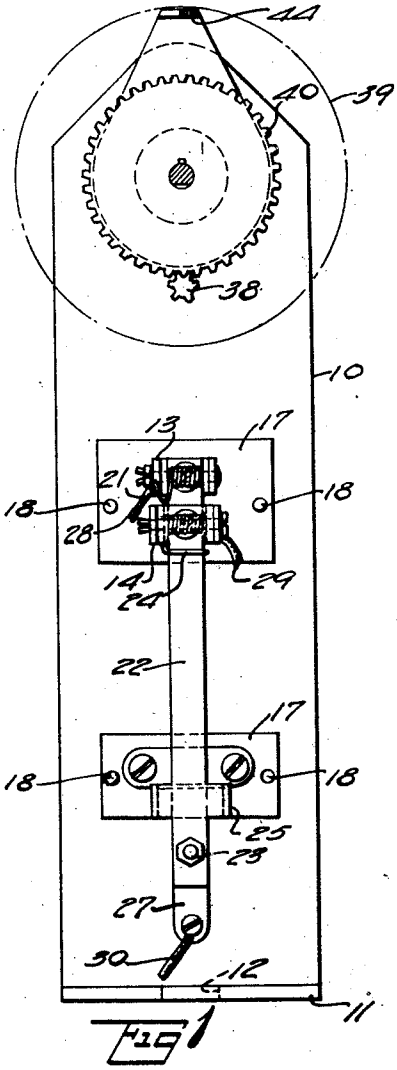
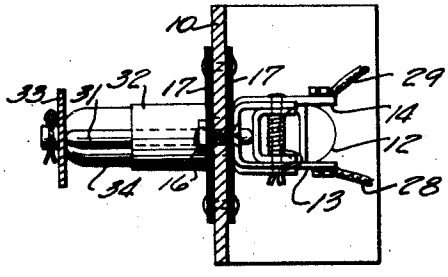


FIG 1

FIG 3



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FIG 4

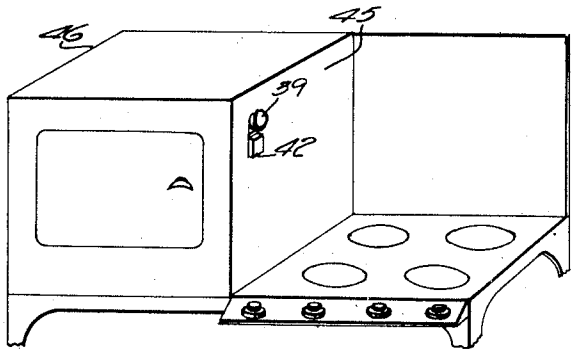


FIG 6

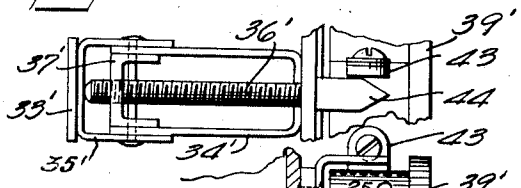


FIG 5

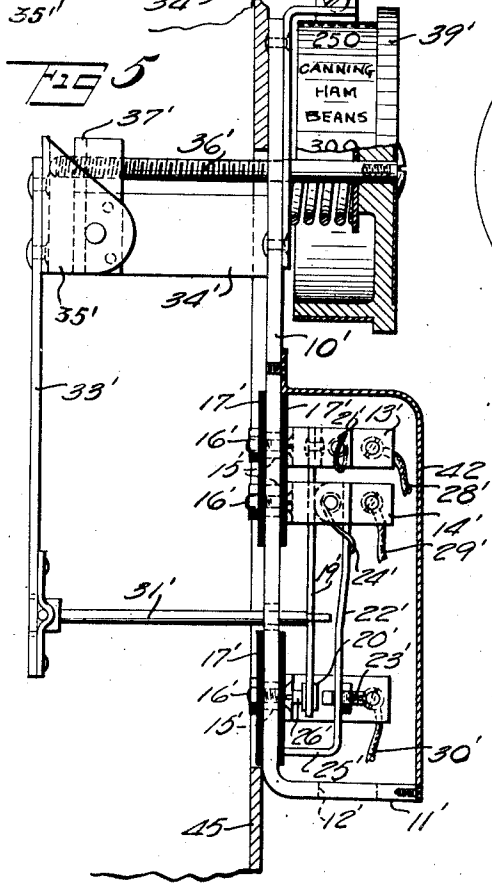
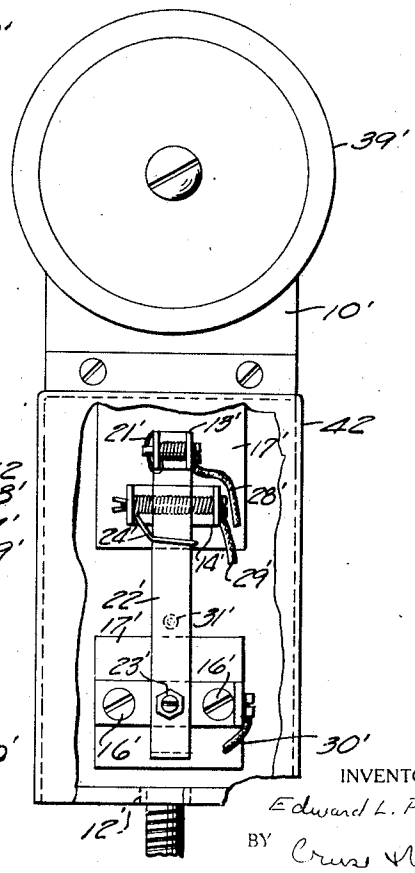


FIG 7



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UNITED STATES PATENT OFFICE.

EDWARD L. FONSECA, OF NEWARK, NEW JERSEY, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE WILCOLATOR COMPANY, OF NEWARK, NEW JERSEY, A CORPORATION OF DELAWARE.

THERMOSTATIC CONTROL FOR ELECTRIC OVENS AND THE LIKE.

Application filed September 11, 1924. Serial No. 737,049.

My invention relates to a thermostatic control for electric ovens, and has to do particularly with a three point switch which is controlled by thermostatic means so that one circuit may be closed when the oven is below the desired temperature and a second circuit may be closed when the desired oven temperature is reached. These circuits may include any well known form of apparatus intended to control the main circuit which supplies the electricity to the heating elements of the oven but such apparatus and the particular manner in which it is connected form no part of my present invention.

In the accompanying drawings which show illustrative examples of devices embodying my invention Fig. 1 shows a plan view of one form of such device with the cover-plate removed; Fig. 2 is a longitudinal section of the device shown in Fig. 1; Fig. 3 is a section on line 3—3 of Fig. 2; Fig. 4 is a perspective view showing a way in which the device may be mounted on the stove; Fig. 5 is a longitudinal sectional view of a modified form of device with a portion of the oven wall illustrated; Fig. 6 is a fragmentary end view of the device shown in Fig. 5, but without the oven wall, and Fig. 7 is a plan view of this form of device with a portion of the cover plate broken away.

Referring particularly to Figs. 1, 2 and 3, 10 is a base plate which has one end bent out at 11, where an opening 12 is provided for the cable containing the connecting wires as illustrated in connection with the form of device shown in Fig. 7. Attached to the base plate 10 are two brackets 13 and 14. These brackets must be insulated from the base plate and from each other, and I find this can be done quite cheaply by providing openings 15 considerably larger in diameter than the attaching bolts 16, and by covering both faces of this portion of the base plate 10 with mica strips 17 in which are openings just large enough to receive bolts 16. The mica strips 17 are held in place by rivets 18.

Pivotally mounted in bracket 13 is an arm 19 which carries a double faced contact 20. A spring 21 exerts pressure to force the arm 19 towards base plate 10. In the same way bracket 14 carries an arm 22, which has an adjustable contact point 23, and is forced towards base 10 by a spring 24. However arm 22 carries a stop 25, which prevents this arm from moving closer to base 10 than the position shown in Fig. 2. A third contact 26 is carried by a plate 27, which is attached to base 10. Three wires 28, 29 and 30 are connected to brackets 13 and 14 and plate 27 respectively.

When the parts thus far described are in the positions shown in Fig. 2 in which one face of contact 20 is in engagement with contact 26, and the other face is spaced from the contact 23, the wires 28 and 30 are connected and the wires 28 and 29 are disconnected. If arm 19 is moved to carry its free end away from plate 10, the circuit connection from wire 28 to wire 30 will be broken and on further movement of the arm 19, contact 20 will engage contact 23 and thus electrically connect wires 28 and 29.

In order to move arm 19 I supply a push rod 31 which slides in a bearing 32 attached to base 10. The outer end of rod 31 contacts with arm 19 while the inner end contacts with thermostatic element 33. In the example shown this element is of the type made of two strips of materials having different temperature coefficients, the composite strip being adapted to bend under the influence of heat and this is the form of thermostat which I prefer to use. However other forms of thermostatic elements may be used and still retain many of the advantages of my invention.

The thermostatic element 33 is rather loosely mounted at one end on the bracket 34, and at the other end is pivotally connected with the threaded sleeve 35. The sleeve 35 moves on the screw 36 which rotates in a bearing 37 and has on its outer end a small gear 38. A dial 39 carries a gear 40 which meshes with the gear 38. The dial 39 may carry any appropriate temperature marks or cooking instructions, as illustrated in connection with the form of device shown in Fig. 5. A spring 41 is provided to keep the dial under tension so that it will stay where placed.

When connecting the device I intend that the parts shall be in the position shown in

Fig. 2 when the oven is heating up—that is, with the wires 28 and 30 connected. Accordingly I so arrange the thermostatic element 33 that as the temperature increases this member will bend to exert pressure on rod 31 which eventually will push arm 19 out until contact 20 moves away from contact 26 and, on further movement against contact 23. This engagement of contacts 20 and 23 effects the closure of a circuit which causes the heat to be turned off from the oven. The exact temperature at which this will take place can readily be controlled and adjusted by rotating dial 39.

The ordinary temperature range at which an oven is used is from 250° F. to 550° F., and this may be the range of temperatures controllable by dial 39, so that when the oven is not in use and cools down to room temperature a considerable movement of element 33 will take place. However by the arrangement which I provide this will place no load on the element 33 for it will simply move away from rod 31. Provision is also made to take care of another possible source of strain. Let us suppose that a very hot oven has been used so that sleeve 35 has been forced out to the limit of movement of dial 39, but element 33 has bent enough to move contact 20 away from contact 26. Suppose the operator now wishes to use the oven at a much lower temperature and so rotates dial 39 to draw back sleeve 35. This exerts additional pressure on rod 31, but no harm results as arms 19 and 22 can both swing out against only the relatively light pressure exerted by springs 21 and 24.

The temperature range between the time that contact 20 leaves contact 26 and the time that it meets contact 23—which is substantially the fluctuation range of the oven for any given setting of dial 39,—can be controlled by adjusting the position of contact 23.

In Figs. 5, 6 and 7 a modified form of device is shown. The two forms are similar in principal and accordingly corresponding parts are given like reference characters but with a prime added, and where the functions are identical the parts are not again described in detail. In this modified form it will be noted that push rod 31′ is pivotally connected to the thermostatic element 33′ and that instead of having a bearing corresponding to bearing 32, it passes freely through an opening in base 10′. In order to hold rod 31′ in place its outer end is reduced in size and this reduced portion slides in an appropriate opening in arm 19′.

The upper end of element 33′ is riveted to a support 35′ which pivots on a bracket 34′. This bracket likewise carries a threaded bearing 37′ for the shaft 36′ on the outer end of which the dial 39′ is mounted. The inner end of shaft 36′ is adapted to bear against support 35′ so that as dial 39′ is rotated the lower end of element 33′ can be forced towards base 10′.

In these views I likewise show the coverplate 42, and also the stop 43 carried by dial 39′ which co-operates with indicator point 44 to limit rotation of dial 39′.

Figs. 4 and 5 show the way my device is installed on an oven. A portion of the outer wall 45 of the oven 46 is cut away so that the thermostatic element will be inside of the oven with base 10′ against wall 45. This permits the thermostatic element to function properly, and at the same time leaves the dial 39′ readily accessible.

It is to be understood that the examples given are intended only as illustrations of ways in which my invention may be utilized and that many modifications may be made without departing from the spirit of my invention.

What I claim is:

1. In a thermostatic control mechanism, the combination of a fixed contact, a movable contact spaced therefrom, a movable arm carrying a contact which lies between said spaced contacts, a thermostatic element pivotally mounted to swing, this element having a portion which is movable to different positions as the element is exposed to different temperatures, means engaging the element to limit its swinging movement, means for adjusting the position of the limiting means, and a connection between the said movable portion of the element and the said arm.

2. In a thermostatic control mechanism, the combination of a pair of contacts in spaced relation, an arm carrying a contact lying between the contacts, this arm being adapted to swing to bring its contact into engagement with one or the other of the contacts first mentioned, a thermostatic element pivotally mounted to swing and having a portion movable to different positions in accordance with temperature variations, adjustable means for limiting the swinging movement of the element, and a connection between the movable portion of the element and the contact-carrying arm for transmitting the movement of the element due to temperature variations to the arm.

3. In a thermostatic control mechanism, the combination of a pair of contacts disposed in spaced relation, a swinging arm carrying a contact lying between the two spaced contacts, this arm being arranged to swing to bring its contact into engagement with either of the said contacts, a thermostatic element mounted to swing, this element having a portion movable to different positions in accordance with temperature variations, a rod connecting the movable portion of the element and the swinging arm and arranged to transmit the movement of

the movable portion of the element resulting from temperature variations to the arm, and manually operable means for swinging the element on its pivot to alter the effect of movements of the movable portion of the element upon the movable arm.

4. In a thermostatic control mechanism, the combination of a stationary contact, a movable arm carrying a contact spaced from the contact first mentioned, a second movable arm carrying a contact adapted to be brought into engagement with one or the other of the contacts first mentioned, a thermostatic element mounted to swing about a pivot, an operative connection between the second arm such that the arm is moved in accordance with the movement of the element due to temperature changes, and manually operable means for swinging the element on its pivot to vary the effectiveness of the connection.

5. In a thermostatic control mechanism, the combination of a stationary contact, a movable arm carrying a contact adapted to engage the stationary contact, a thermostatic element mounted to swing about a pivot, a rod adapted to transmit the movement of the element to the arm, and manually operable means for adjusting the element with reference to its pivot to vary the action of the element upon said rod.

6. In a thermostatic control mechanism, the combination of a stationary contact, a movable arm carrying a contact held normally in definite spaced relation to the contact first mentioned, a movable arm having a contact lying between the stationary contact and the contact on the first movable arm, this arm being arranged to permit its contact to engage with one or the other of the said contacts, and the two arms being arranged to swing in unison with their contacts engaged, a thermostatic element mounted to swing about a point, a rod connecting the element with the second movable arm, and manually operable means for moving the element with reference to its pivotal point to vary its action upon the rod.

7. In a thermostatic control mechanism, the combination of a stationary contact, a movable arm, a contact on the arm adapted to be brought into engagement with the stationary contact, a thermostatic element adapted to swing about a pivotal point, means for transmitting the movement of the element due to temperature changes to the arm, and manually operable means for varying the position of the thermostat with reference to its pivotal point to vary its effect upon said transmitting means.

8. In a thermostatic control mechanism, the combination of a stationary contact, a movable arm, a contact on the arm adapted to be brought into engagement with the stationary contact, a thermostatic element adapted to swing about a pivotal point and having a portion movable to different positions in accordance with temperature changes, a rod adapted to transmit the movement of the movable portion of the element due to temperature changes to the arm, and manually operable means for adjusting the position of the thermostatic element with reference to its pivotal point.

9. In a thermostatic control mechanism, the combination of a stationary contact, a movable arm carrying a contact adapted to engage the stationary contact, a thermostatic element having one end pivotally mounted, this element having a portion movable to different positions as the element is exposed to temperature variations, a manually adjustable device for varying the position of the element with reference to its pivotal point, and a rod engaging the part of the element movable in accordance with temperature variations and transmitting such movements to the arm.

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