June 30, 1936. C. M. STROUD 2,045,883

CONTROL FOR OIL BURNERS OR SIMILAR APPARATUS

Filed April 20, 1931 2 Sheets-Sheet 1

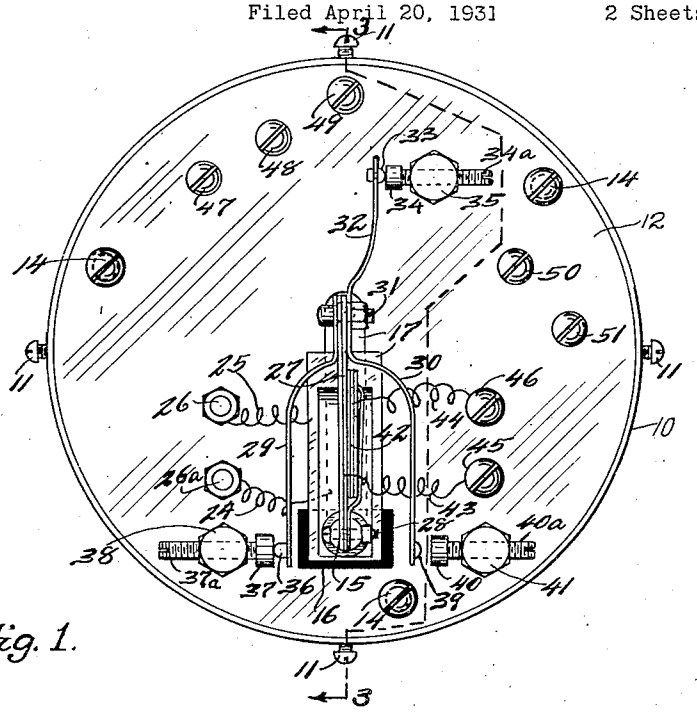


Fig. 1.

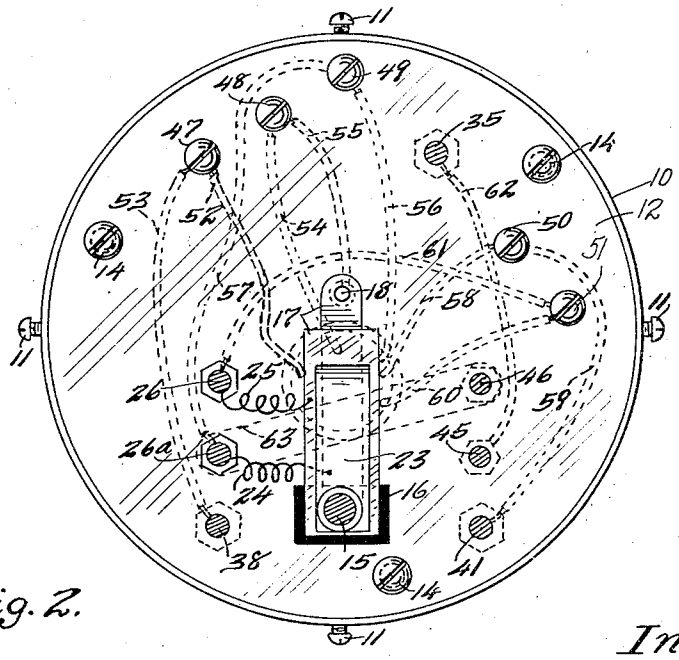


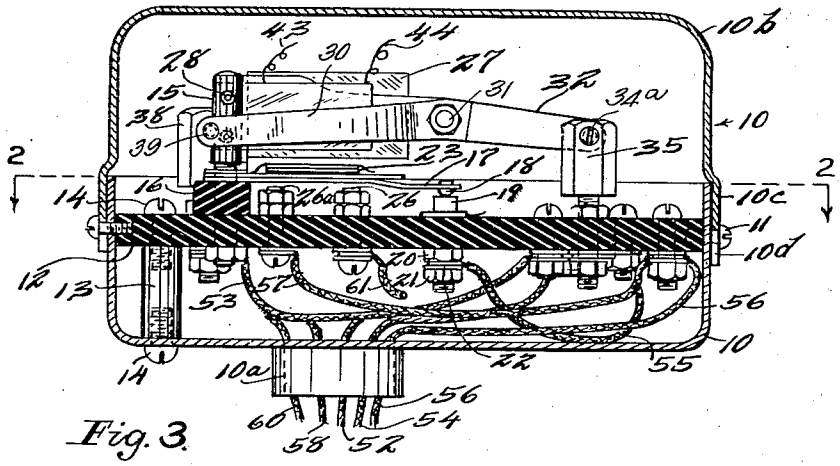
Fig. 2.

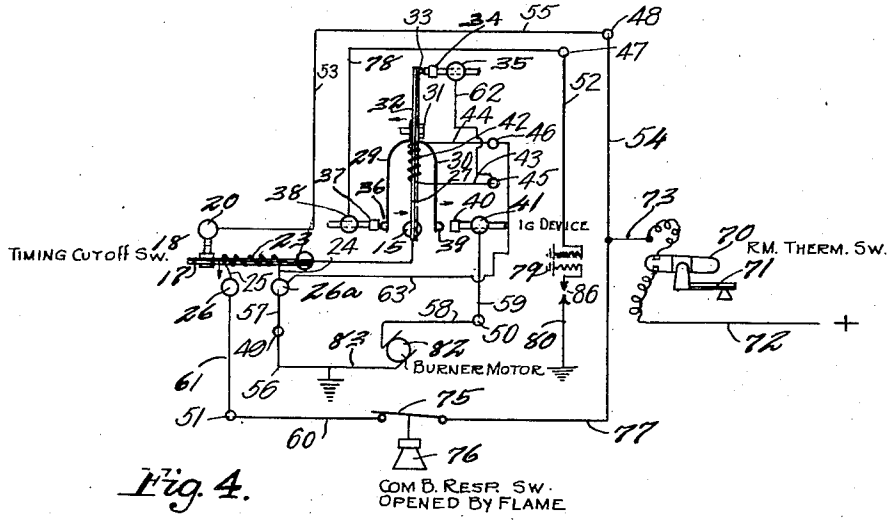
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CONTROL FOR OIL BURNERS OR SIMILAR APPARATUS

Filed April 20, 1931 2 Sheets-Sheet 2





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2,045,883

CONTROL FOR OIL BURNERS OR SIMILAR APPARATUS

Charles M. Stroud, Minneapolis, Minn.

Application April 20, 1931, Serial No. 531,387

13 Claims. (Cl. 175—320)

This invention relates to a control mechanism for a device operated by a plurality of electrical circuits. While the invention is capable of many applications, one particular application for the mechanism is in connection with an oil burner. Many modern commercial oil burners comprise a motor which drives a fan for delivering air to the burner, and this motor also usually drives the pump which supplies the oil. Such burners also include an ignition device, and there are thus electric circuits for the ignition and for the motor. It is desirable, in some burners, to turn on the ignition and the motor at the same time, while in other burners it is desirable to have the ignition turned on for different periods before the motor is started. Manufacturers of different burners also wish to keep the ignition devices operative for different periods after the motor is started. After the burner is ignited, the ignition device is thrown out of operation, or the ignition circuit broken, while the motor, of course, continues to operate. Practically all modern burners also include a protectostat or a stack device which is operated by the flame or heat of the burner and cooperates with a safety device so that in case the burner does not ignite, the motor circuit will be broken and the burner mechanism thus stopped. While various devices have been constructed for furnishing automatic control of the modern oil burners, these devices have been quite complicated and thus quite expensive.

It is an object of this invention, therefore, to provide an extremely simple and efficient device for automatically controlling a device using a plurality of circuits, such as an oil burner.

It is a further object of the invention to provide a mechanism for controlling a device using a plurality of circuits, such as an oil burner, comprising a plurality of flexible resilient members carried by a thermostatic bar, said flexible members having contacts cooperating with fixed but adjustable contacts, for controlling the various circuits of the device.

It is a further object of the invention to provide a control mechanism comprising a bendable thermostatic bar carried on a fixed support at one end and having secured thereto and spaced therefrom flexible or resilient strips, said bar and strips being constructed and arranged to carry electrical current, and said strips having contacts adjacent their free ends respectively engageable with a pair of spaced fixed contacts, which latter contacts are adjustable toward and from said strips, a heating element being carried by said thermostatic bar whereby said bar will bend when heated, and said contacts on said strips will be moved relatively to said fixed contacts.

It is another object of the invention to provide a control mechanism as set forth in the preceding paragraph, a third resilient strip being secured to said bar and extending therefrom in a direction opposite to said first mentioned strips, said third strip engaging an adjustable abutment whereby said third strip can be placed under different degrees of tension to vary the operation of said first mentioned strips and contacts in response to movements of said thermostatic bar.

It is also an object of this invention to provide a control mechanism as set forth in the two preceding paragraphs, in which said third strip has a contact engaging said adjustable abutment, which abutment also constitutes a contact, a heating element secured to said thermostatic bar, the circuit for said heating element including said third strip and contact and said adjustable abutment contact.

It is still another object of the invention to provide a control mechanism for a device using a plurality of circuits comprising a thermostatic element, a member carried by and moved by said element including three flexible or resilient strips, two of which carry contacts engageable with fixed contacts in the circuits to be controlled, together with means for holding the other strip in various positions influencing the action of said first mentioned strips.

It is still another object of the invention to provide such a device as set forth in the preceding paragraph, in which said thermostatic element carries a heating element supplied with electrical current, through a circuit including said last mentioned strip.

It is also an object of the invention to provide a control mechanism including a thermostatic bar constructed and arranged to carry electrical current, a support to which said bar is secured in combination with a safety device for supplying current to said bar including a thermostatic bar, a pair of contacts through which current is supplied and which are adapted to be separated by movement of said bar, said bar having a heating element thereon supplied with current through a circuit controlled by the heat of the burner to be regulated.

It is still another object of the invention to provide a control mechanism for a device using a plurality of circuits such as an oil burner including movable contacts for controlling the ignition and motor circuits of said burner, said contacts being moved by a thermostatic element in combination

with a safety device which will cut off the current to said control mechanism and burner if the burner fails to ignite, which safety device includes a thermostatic bar and means for heating the same.

These and other objects and advantages of the invention will be fully set forth in the following description made in connection with the accompanying drawings, in which like reference characters refer to similar parts throughout the several views and in which:—

Fig. 1 is a plan view of the device;

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

Fig. 3 is a vertical section taken substantially on line 3—3 of Fig. 1; and

Fig. 4 is a wiring diagram of the device.

Referring to the drawings, particularly Figs. 1, 2 and 3, a device is shown comprising a casing 10. While this casing may be made of various shapes, in the embodiment of the invention illustrated, it is shown as of cylindrical cup-shaped form, and the same has secured therein by screws 11 a plate 12 formed of insulating material. Plate 12 is also supported on a plurality of posts 13 shown as three in number, into which are seated the screws 14 passing respectively through said plate 12 and through the bottom of the casing 10. A post 15 is secured in the plate 12 and upstands therefrom, said post passing through a block 16 seated on plate 12. A strip or bar of bimetallic thermostatic metal 17 surrounds post 15 and extends therefrom substantially parallel to plate 12, the same having a slightly downwardly offset end carrying a contact 18 engaging with a fixed contact 19 carried on a post 20 also secured in plate 12, said post having a threaded portion disposed below said plate receiving the nuts 21 and washer 22, this portion of the post being constructed and arranged for the attachment of a conductor, thus forming a binding post. A heating element 23 is secured to plate 17 and is supplied with current by conductors 24 and 25 extending respectively to binding posts 26*a* and 26 secured in plate 12. Post 15 above the bar 17 is split and has secured therein a bimetallic thermostatic bar or element 27. Bar 27 is illustrated as disposed in a vertical plane and is shown as secured to post 15 by a small headed and nutted bolt 28. Bar 27 extends toward the center of the plate 12 and has secured to its end remote from post 15, at one side thereof, a flexible member or strip 29. Plate 27 also has secured thereto another flexible element or strip 30, strips 29 and 30 being shown as secured to strip 27 by a headed and nutted bolt 31. Strip 30 is shown as extending beyond bolt 31 to form another flexible element or strip 32. Strip 32 is provided with a contact 33 adjacent its end, engaging an abutment member 34 also constituting a contact, and which has a shank 34*a* threaded in a post 35 secured in plate 12 so that abutment member 34 is adjustable therein toward and from strip 32. Strips 29 and 30 curve away from bar 27 adjacent the point at which they are attached, and extend toward post 15 in substantially parallel relation to bar 27. Strip 29 has thereon a contact member 36 engageable with another contact member 37, said latter contact having a threaded shank 37*a* adjustable in a post 38 secured to plate 12. Strip 30 has a contact 39 thereon, engageable with another contact member 40 having a shank 40*a* threaded and adjustable in a post 41 secured to plate 12. Each of the shanks 34*a*, 37*a* and 40*a* has a groove in its end for the reception of an adjusting tool such as a screw driver. The posts 35, 38 and 41 extend below plate 12 and are formed as binding posts to receive conductors to be later described. A heating element 42 is secured to bar 27 between bolt 31 and post 15, similar to the heating element 23. These heating elements can be of any suitable construction and preferably will comprise sheets of mica or similar material having a plurality of strands of high resistance wire thereon and properly insulated. Heating element 42 is supplied with current by conductors 43 and 44 connected respectively to posts 45 and 46 secured in plate 12 and adapted to have conductors attached thereto beneath said plate.

Five binding posts are provided, designated 47, 48, 49, 50 and 51. A tube 10*a* extends downwardly from the bottom of casing 10 communicating with said casing, and five conductors pass through said tube into casing 10 and are connected respectively to the binding posts 47 to 51. One of these conductors 52 is connected to the binding post 47 and binding post 47 is connected by conductor 53 to post 38. Conductor 52 extends to or forms part of the ignition circuit and in the code commonly used, this conductor is covered with red insulation. A conductor 54 is connected to binding post 48 and binding post 48 is connected by conductor 55 to post 20. Conductor 54 extends to the live side of the supply line and in the code generally used, this conductor is covered with black insulation. A conductor 56 is connected to binding post 49 and this post is connected by a conductor 57 to binding post 26*a*. Conductor 56 is connected to the grounded side of the line or the ground used in the device, and in the code generally used, this conductor is covered with white insulation. Another conductor 58 is connected to binding post 50 and this binding post is connected by a conductor 59 to binding post 41. This conductor extends to or forms part of the motor circuit of the device controlled, and in the commonly used code, conductor 59 is covered with blue insulation. Another conductor 60 is connected to binding post 51 and this post is connected by a conductor 61 to binding post 26. Conductor 60 extends to or is included in the circuit of the device which is operated by the heat or flame of the burner and in the commonly used code, this conductor is covered with green insulation. A conductor 62 connects post 35 to post 45. A bar or strip 63 of conducting metal on the bottom of plate 12 connects post 46 to post 26*a*. A cover 10*b* is provided for casing 10, also of cup shape and having its edge portion 10*c* offset to be of larger diameter, and provided with slots 10*d* adapted to fit down over the screws 11 and being held thereby.

In Fig. 4 a wiring diagram for the device is shown. In this diagram a mercury tube switch 70 is shown carried by a thermostatic bar 71. The latter represents a thermostat that will be disposed in the rooms to be heated. Current is supplied to one electrode of the switch through the conductor 72, and a conductor 73 extends from the other electrode. Conductor 54 extends from conductor 73 to post 48 and conductor 55 extends from post 48 to post 20. Post 20 has a contact 19 engaging contact 18 on bar 17, which bar 17 is connected to post 15. The heating element 23 is shown on bar 17 and is connected at one end to post 26*a* by conductor 24 and is connected at its other end to post 26 by conductor 25. Post 26*a* is

connected by conductor 57 to post 49 and the latter is connected by conductor 56 to ground. The conductor 61 extends from post 26 to post 51 from which conductor 60 extends to a switch 75. Switch 75 is operated by a protectostat or combustion responsive device 76 used with the burner. A conductor 77 extends from switch 75 to conductor 73. Posts 38 and 41 are shown having respectively therein the contacts 37 and 40. Post 38 is connected by a conductor 53 to post 47 and the latter is connected by a conductor 52 to the ignition device 79 of the burner, one side of which is shown as connected to ground by a conductor 80. The ignition device is now a well known piece of apparatus in the oil burner art and comprises a transformer with a pair of spaced electrodes in one circuit between which pass a series of sparks. Post 41 is connected by conductor 59 to post 50 and the latter is connected by conductor 58 to the motor 82 used with the burner. The other side of the motor is shown as connected to ground by a conductor 83. The bar 27 is shown carrying the flexible resilient members 29 and 30 and having the contacts 36 and 39 respectively thereon. A heating element 42 is carried by bar 27, one end of which is connected by a conductor 44 to post 46 and the other end of which is connected by conductor 43 to the post 45. Conductor 63 connects post 46 and 26a and conductor 62 connects posts 45 and 35, the latter having thereon the contact member 34 engaged by the contact 33 on strip 32 carried by bar 27.

In operation of the device described, when heat is needed the thermostat 71 which is disposed in the space to be heated is operated so that the mercury in switch 70 moves to the left inside of the tube and connects the electrodes therein, and a circuit is closed and current is furnished to the regulating device through conductor 54. This current passes to post 48 and thence through conductor 55 to post 20 through contacts 19 and 18 and strip 17, thence to the post 15 and into the plate 27. The contacts 37 and 40 will be so adjusted that if it is desired to have the ignition of the burner turned on before the motor is started, contact 36 will be in engagement with post 37 and contact 39 will be out of engagement with contact 40. It will be understood that contact 40 and post 41 are as stated, connected to the motor circuit. With this adjustment, as soon as current flows to the bar 27, it will pass through the bolt connection 31 to the strip 29 and through contacts 36 and 37 to post 38, thence through conductor 53 to post 47 and through conductor 52 to the ignition device 79. The ignition circuit will now be closed and the ignition device of the burner operated. The current from bar 27 passes to strip 32 and through contacts 33 and 34 to post 35 and from post 35 through conductor 62 to post 45. Current passes from post 45 through the conductor 43 to the heating element 42, from the heating element 42 to post 46, from post 46 through bar 63 to post 26a and through conductor 57 to post 49 to conductor 56 and to ground. Heating element 42 is now heated and thermostatic bar 27 begins to flex, moving its free end toward the left as shown in Fig. 1. This movement moves the strips 29 and 30 and contact 36 begins to move with a wiping movement along the face of the contact 37. Strip 30 also moves to the right as seen in Fig. 1 and after a predetermined length of time, contact 39 will engage contact 40. This will close the motor circuit and the motor of the burner will now be started. The flexible and resilient bar 29 which is flexed somewhat and under some tension, will not immediately separate its contact 36 from the contact 37, but in the initial movement of bar 27 the distortion or bending of bar 29 will be taken up. This is why contact 39 engages contact 40 before contact 36 separates from contact 37. It will be understood that as the free end of bar 27 swings to the left as shown in Fig. 1, that bars 29 and 30 will have their straight portions inclined downwardly and to the right instead of being substantially vertical as shown in Fig. 1. Heating element 42 continues to flex bar 27 and after a predetermined period, strip 29 will be moved sufficiently to move contact 36 away from contact 37 and thus break the ignition circuit. The device 76 is used with the burner adapted to be actuated by the flame or heat of the burner, and this is usually a protectostat or combustion responsive device placed close to the flame or a device placed in the stack. When the thermostat 71 in the rooms to be heated operates to call for heat, a circuit is closed and current flows to this device 70 through the conductor 77 and from said device through conductor 60 to post 51 and thence through conductor 61 to post 26. This current passes through conductor 25 to the heating element 23 and from said element through conductor 24 to post 26a, thence through conductor 57 to post 49 and through conductor 56 to ground. Heat is thus supplied to heating element 23 and the bar 17 is heated and commences to flex upwardly as shown in Fig. 3, so as to move contact 18 away from contact or post 19. If the burner ignites properly, the heat of the same will operate the protectostat or stack device 76 to open its switch 75 and the circuit supplying current to conductor 60 will be broken. If the burner does not ignite properly, heating element 23 will flex bar 17 so that after a predetermined length of time contact 18 will move away from contact 19 and the circuit therethrough will be broken. It will be noted that the current which is being supplied to the operating device and which operated the ignition and motor circuits, is supplied through contacts 18 and 19 and this current will thus be discontinued. This therefore will break the motor circuit and the motor will be stopped and the burner will be put in inoperative position, heating element 42 will immediately cool, and bar 27 will move back to its original position and contact 36 will again engage contact 37 and contact 39 will move away from contact 40. The control device has thus been brought to original position and the operation of the burner stopped. It may be stated that current is supplied to the motor through conductor 73, conductor 54, post 48, conductor 55, post 20, contacts 18 and 19 to 17, post 15, member 30, contacts 39 and 40, conductor 59, post 50 and conductor 58 to motor 82 and from motor 82 through conductor 83 to ground. The heating element 23 on bar 17 with the cooperating parts thus form a safety device for discontinuing the operation of the burner if the same fails to ignite properly. To break the circuit through heating element 23, the room thermostat will have to be moved so that its indicating member indicates a temperature below the room temperature. This breaks the circuit through conductor 60 and all parts return to original position.

Should the burner ignite properly, heating element 23 will not be heated as above stated, and heating element 42 will continue to be heated. Should this heating element become too hot, bar 27 will flex sufficiently to move strip 32 so that the contact 33 is separated from the contact 34.

This breaks the circuit through the heating device 42 and it will cool somewhat. As soon as it cools, strip 32 will again move toward contact 34 and the heating circuit will be again completed. In the operation of the device, contact 33 moves out of engagement with contact 34 often, and a slight buzzing effect is produced at this point.

A great deal of work was necessary to secure the proper gauge of metal for the strips 29 and 30, which have been made of spring copper. These strips can be nicely adjusted and this, together with the adjustment of contacts 37 and 40, gives a great range of control. If it is desired to throw on the ignition and the motor at the same time, contact 40 will be adjusted so that it is normally in engagement with contact 39. When current is supplied, both the motor and ignition circuits will be closed, and after a certain period, bar 27 will flex sufficiently to move contact 36 away from contact 37 and break the ignition circuit. In this movement of bar 27 strip 30 will merely be flexed and its contact 39 will remain in engagement with contact 40. Contact 37 can be adjusted so that the ignition will remain on through different periods as desired. The contact 34 in addition to acting as a safety or break device for the heating circuit, also acts as an adjusting device. The movements of the strips 29 and 30 can be varied and influenced by the amount of tension placed on strip 32, tending to move it to the left as seen in Fig. 1, the more it will influence the movement of strips 29 and 30 to move to the right as seen in said figure. Bar 27 when heated moves quite rapidly at first and then much more slowly, so that a fine adjustment can be had at contacts 33 and 34. By positioning the three contacts 34, 37 and 40, therefore, and also positioning the strips 29, 30 and 32, a very fine adjustment of the mechanism can be had and also a great range of adjustment can be had. This is quite important, as the same control device can be used for a great many different kinds of oil burners and other devices requiring different kinds of control.

From the above description it is seen that applicant has provided an extremely simple and yet very efficient regulator, and one that has a wide range of operation. The regulator can be used for regulating various devices operating by a plurality of electrical circuits, and is particularly adapted for regulating the modern oil burner having the ignition circuit and the motor circuit. The ignition and motor circuits can be thrown into operation at the same time, or the motor circuit can be thrown into operation at different periods after the ignition circuit is closed. For instance, the motor circuit can be closed ten seconds, fifteen seconds or up to sixty seconds or more after the ignition circuit is closed. If desired, the ignition and motor circuits can be simultaneously closed and the ignition can be kept on ten or fifteen seconds or a much longer period after the motor starts. A wide range of adjustment can thus be secured and as stated, the control mechanism can be used with a great many different makes of burners which require different periods of adjustment and different timing for the various operations. As stated, all three of the spring strips can be adjusted and all cooperate in the movement of the strips by the thermostatic bar, the movement of the ignition and motor controlling strips being influenced as stated, by the postion of the strip extending in the opposite direction. This, together with the three adjustable contacts, gives the wide range of adjustment and timing. The control mechanism also includes a simple safety device which will discontinue the operation of the device or burner controlled, under certain conditions, as when the burner fails to ignite. The device as illustrated is a high voltage device, that is, using regular 110 or 220 volt current, but it is equally well adapted to be used with low voltage. When used as a low voltage device, a transformer would be used. In spite of the large range of adjustment and different timings possible with applicant's control mechanism, it is very simple and the same can be inexpensively made and marketed at a low price compared to the other present commercial control mechanisms. The device has been amply demonstrated in actual practice and found to be very successful and efficient.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the parts, without departing from the scope of applicant's invention, which generally stated, consists in a device capable of carrying out the objects above set forth, in the parts and combinations of parts disclosed and defined in the appended claims.

What is claimed is:—

1. A regulator having in combination, a pair of spaced, fixed contacts, a support between said contacts, a thermostatic bar secured at one end to said support, flexible resilient members secured respectively at the sides of said bar at some distance from said support, said members extending from said bar at opposite sides thereof and then extending in substantially parallel relation with their free ends directed toward the fixed end of said bar, one of said members having a contact thereon adapted normally to engage one of said adjustable contacts and the other member having a contact thereon adapted to engage but normally spaced from the other of said adjustable contacts, a heating element secured to said bar, means for heating said element to flex said bar, and means for supplying current to said bar, members and contacts thereon, whereby said bar will be flexed when heated and the contact on said one of said flexible members will be moved to wipe along its respective one of said adjustable fixed contacts and then be moved away therefrom and the contact on the other of said flexible members will be moved into engagement with its respective adjustable contact.

2. The structure set forth in claim 1, a third flexible resilient member extending from said bar in a direction opposite to said first mentioned members, a contact carried on said third member, an adjustable contact with which said last mentioned contact engages, and means for supplying current to said heating means through said last mentioned contacts, whereby if said bar is flexed sufficiently by said heating element, said contact on said third member will be separated from said last mentioned adjustable contact and the circuit through said heating element will be broken.

3. A switching device for controlling a plurality of circuits having in combination, a pair of fixed adjustable contacts adapted to be connected respectively in the circuits to be controlled, a fixed support substantially midway between said contacts, a thermostatic bar fixed at one end in said support and extending in a direction substantially perpendicular to a line joining said contacts, flexible resilient current carrying members secured respectively to each side of said bar at some distace from said support extending

away from said bar and then extending substantially parallel in spaced relation thereto with their free ends directed toward said fixed end of said bar, a contact on each of said members, said contacts being adapted respectively to engage said fixed adjustable contacts and one of said last mentioned contacts being normally in engagement with one of said fixed adjustable contacts and the other being normally spaced from the other of said fixed adjustable contacts, a heating element carried by said bar for flexing the same, and means for supplying current to said bar and to said heating element for flexing said bar whereby said one of said last mentioned contacts will wipe along said fixed adjustable contact with which it is in engagement and will then separate therefrom and said other of said last mentioned contacts will move into engagement with its fixed adjustable contact.

4. A switching device for controlling a plurality of circuits having in combination, a fixed support, a thermostatic bar secured at one end therein, a pair of flexible resilient movable members carried adjacent the free end of said bar having contacts thereon respectively, a pair of fixed adjustable contacts engageable respectively by said contacts, a safety means including a thermostatic member through which current is supplied to said bar, members and contacts, a heating element for said member, a contact engaging said member, and means for supplying current to said heating element through said last mentioned contact to cause movement of said thermostatic member away from said last mentioned contact and cut off the supply of current from said bar, members and first mentioned contacts.

5. A control device for a plurality of electrical circuits having in combination, a stationary contact adapted to be disposed in one circuit, a second stationary contact adjacent said first mentioned contact adapted to be disposed in another circuit, a fixed support midway of and substantially in a line joining said contacts, a thermostatic bar secured at one end to said support, flexible resilient strips secured to said bar at a point spaced quite a distance from said support extending away from said bar at opposite sides thereof and then extending substantially parallel in spaced relation to said bar toward the fixed end thereof, a contact carried by each of said strips and engageable with one of said first mentioned stationary contacts, and means for heating said bar to flex the same and move said strips to move the contacts thereon relatively to said first mentioned and second contacts.

6. A control device for a plurality of electrical circuits having in combination, a stationary adjustable contact adapted to be disposed in one circuit, a second stationary adjustable contact adjacent said first mentioned contact adapted to be disposed in another circuit, a fixed support located equidistant from said contacts and substantially on a line joining said contacts, a thermostatic bar secured at one end to said support, flexible resilient strips secured to said bar at a point spaced quite a distance from said support extending away from said bar at opposite sides thereof and then extending substantially parallel thereto in a direction toward the fixed end of said bar, contacts carried by said strips respectively and adapted respectively to engage said first mentioned and second contacts, and means for heating said bar to flex the same and move said strips to move the contacts thereon relatively to said first mentioned and second contacts.

7. The structure set forth in claim 3, said heating means being electrically heated, a flexible resilient member extending from the free end of said bar in a direction substantially opposite to said strips and having a contact adjacent its free end and a fixed adjustable contact engaging said last mentioned contact, said means for supplying current to said heating means including said last mentioned contacts.

8. A switching device for controlling a plurality of circuits having in combination, a contact adapted to be disposed in one circuit, a contact adapted to be disposed in another circuit, a bar secured at one end, a pair of flexible strips carried by the free end of said bar each having a contact thereon, said contacts being engageable respectively with said first mentioned contacts, a heating means acting to flex said bar and move said strips and contacts thereon, a pair of movable contacts through which current is supplied to said bar and a heating element adapted when sufficiently heated to separate said last mentioned contacts and cut off current from said bar.

9. A switching device for controlling a pair of circuits having in combination, a pair of fixed contacts connected respectively in said circuits, a current-carrying member in the general shape of a Y constructed and arranged to carry electric current, a thermostatic bar secured substantially at the junction of the legs of said Y and extending between the legs thereof, a fixed support for the other end of said bar, the sides of said Y having contacts engageable respectively with said fixed contacts, said fixed contacts being adjustable toward and from the sides of said Y and an adjustable contact engaging the stem of said Y adjacent its end, a heating element carried by said bar and means for supplying current to said heating element and to said bar.

10. A control device for a plurality of electrical circuits having in combination, a stationary contact adapted to be disposed in one circuit, a second stationary contact adjacent said first mentioned contact adapted to be disposed in another circuit, a fixed support adjacent and substantially in a line joining said contacts, a thermostatic bar secured at one end to said support, flexible resilient members secured to said bar at a point spaced from said support and disposed at opposite sides of said bar extending substantially parallel thereto with their free ends directed toward the fixed end of said bar, contacts carried respectively by each of said last mentioned members engageable respectively with said first mentioned stationary contacts and means for heating said bar to flex the same and move said members to move the contacts thereon relatively to said first mentioned and second contacts.

11. A control device for a plurality of electrical circuits having in combination, a stationary contact adapted to be disposed in one circuit, a second stationary contact adjacent said first mentioned contact adapted to be disposed in another circuit, a fixed support midway of and substantially on a line joining said contacts, a thermostatic bar secured at one end to said support, contacts disposed at either side of said bar spaced therefrom and engageable respectively with said stationary contacts and means respectively carrying said last mentioned contacts connected to said bar and yieldingly movable toward and from the same.

12. A control device for a plurality of electrical circuits having in combination, a stationary contact adapted to be disposed in one circuit, a second stationary contact adjacent said first mentioned contact adapted to be disposed in another circuit, a fixed support disposed between and substantially midway of said contacts and adjacent a line joining said contacts, a thermostatic bar secured at one end to said support and extending substantially perpendicular to a line joining said contacts, flexible resilient members secured to said bar at a point spaced some distance from said support and contacts and disposed at opposite sides respectively of said bar and extending substantially parallel thereto, contacts carried respectively at the end of each of said last mentioned members engageable respectively with said first mentioned stationary contacts and means for heating said bar to flex the same and move said members to move the contacts thereon relatively to said first and second mentioned contacts.

13. A switching device for controlling a plurality of circuits having in combination, a thermostatic bar adapted to be flexed, a pair of resilient flexible strips secured to said bar and extending away from the same respectively at opposite sides thereof and then extending in spaced relation substantially parallel to said bar, contacts carried adjacent the free ends of said strips, a pair of spaced fixed adjustable contacts adapted to be respectively engaged by said contacts on said strips, means for supporting one end of said thermostatic bar in fixed relation adjacent said contacts, a heating means on said bar, means for supplying current to said heating means and bar, said last mentioned means comprising a flexible resilient strip extending from said bar in a direction opposite to said strips and havng a contact adjacent its free end and a fixed adjustable contact adapted to engage said latter contact.

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