United States Patent

Rosenberg et al.

[15] **3,665,363**

[45] **May 23, 1972**

[54] THERMOSTATIC CONTROL DEVICE AND SYSTEM UTILIZING THE SAME

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[22] Filed: **Oct. 8, 1970**

[21] Appl. No.: **79,122**

[52] **U.S. Cl.** **337/361,** 337/353

[51] **Int. Cl.** **H01h 37/12**

[58] **Field of Search** 337/111, 347, 349, 353, 360, 337/361, 379

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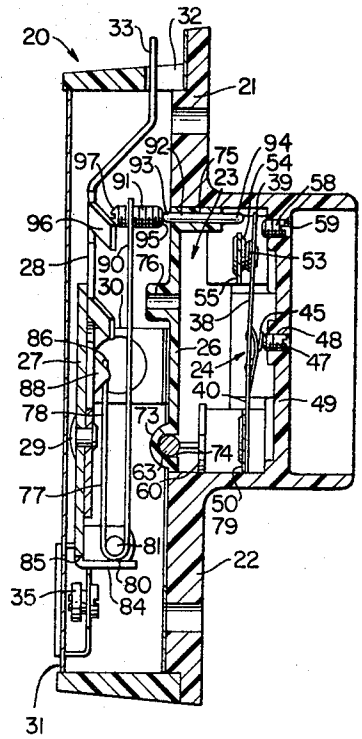
[57] **ABSTRACT**

Electrical switch means carried by frame means. A U-shaped bimetal member defining a pair of legs interconnected at adjacent ends thereof by an elbow portion pivotally mounted to the frame means. A plunger means is movably carried by the frame means and is disposed between one of the legs of the bimetal member and the switch means to operate the switch means in relation to the position of the one leg relative to the frame means. Cam means is movably carried by the frame means and acts on the other leg of the bimetal member to adjust the pivotal position of the bimetal member and, thus, the temperature setting that the thermostatic device will open the switch means, the cam means being movable across the longitudinal axis of the other leg of the bimetal member to adjust the same.

30 Claims, 10 Drawing Figures



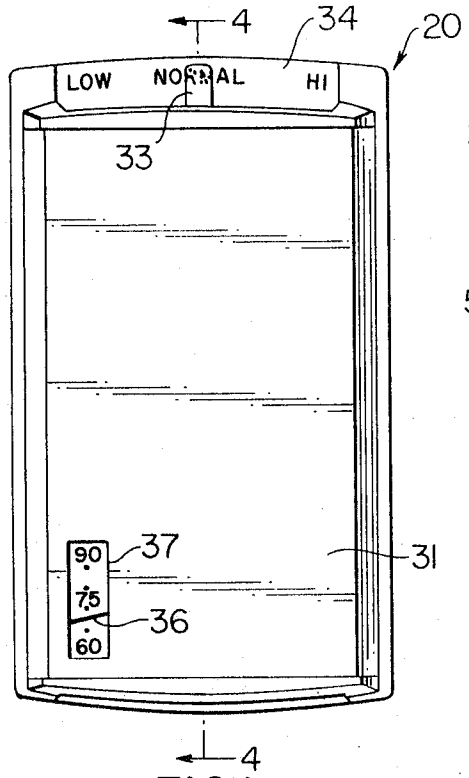


FIG.1

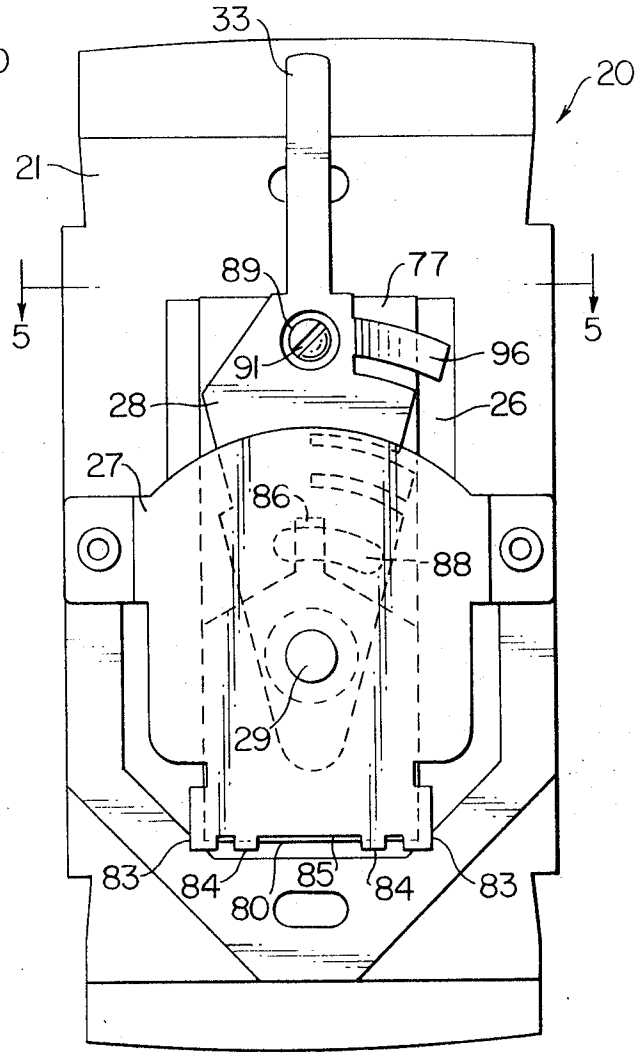


FIG.2

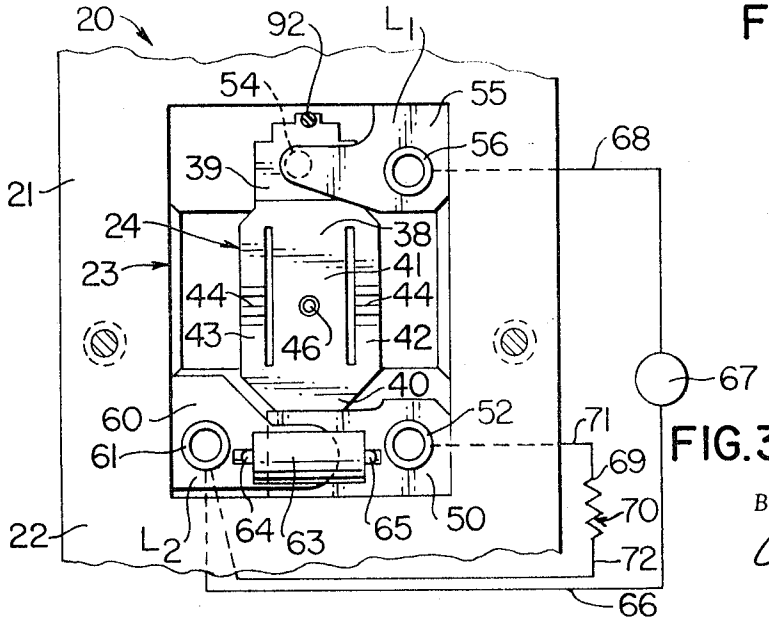


FIG.3

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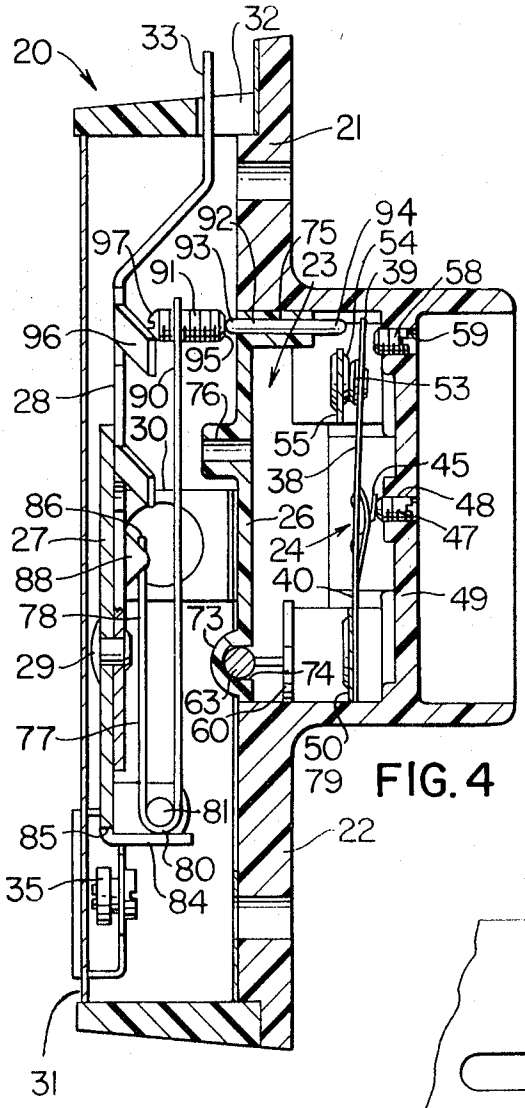

FIG. 4

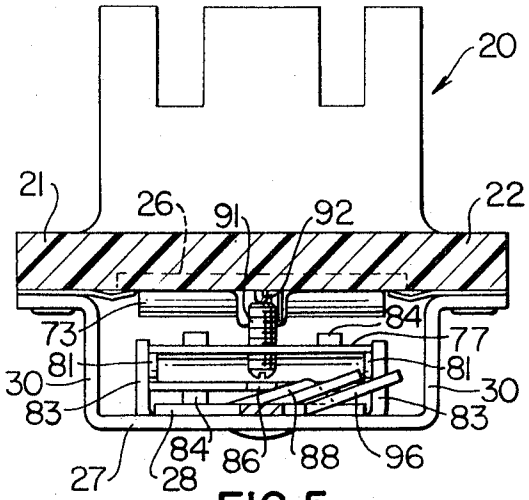

FIG. 5

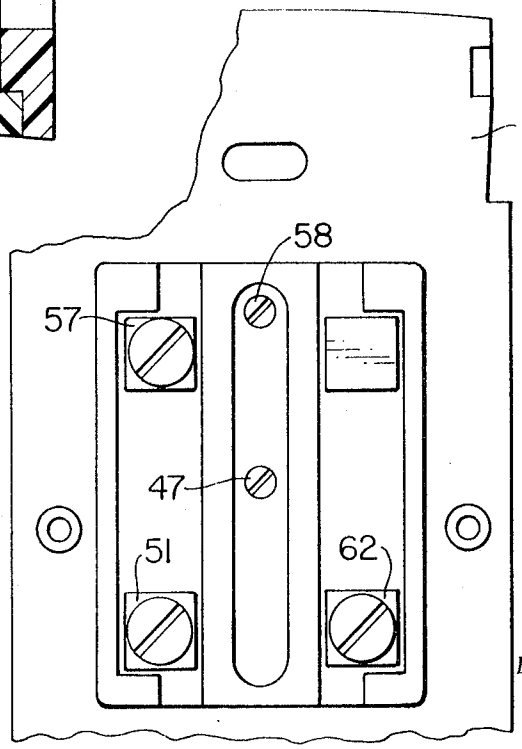

FIG. 6

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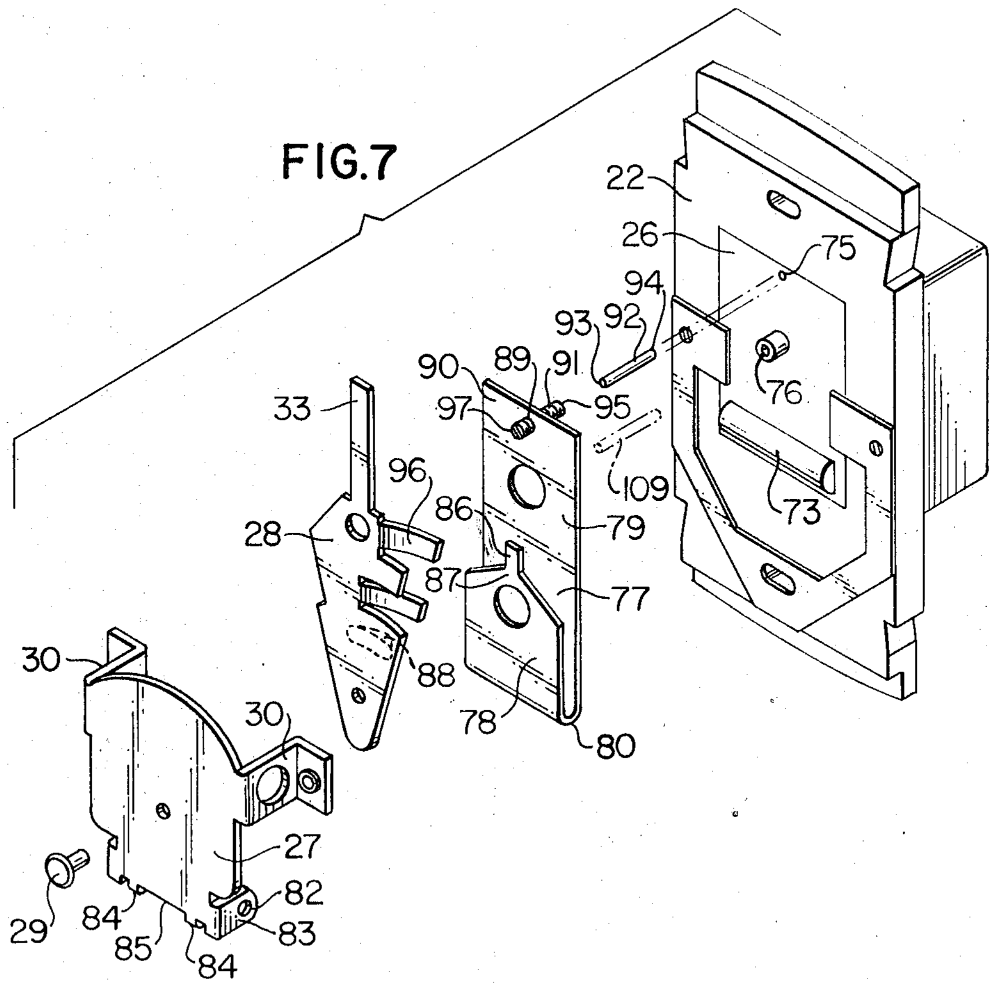
FIG.7



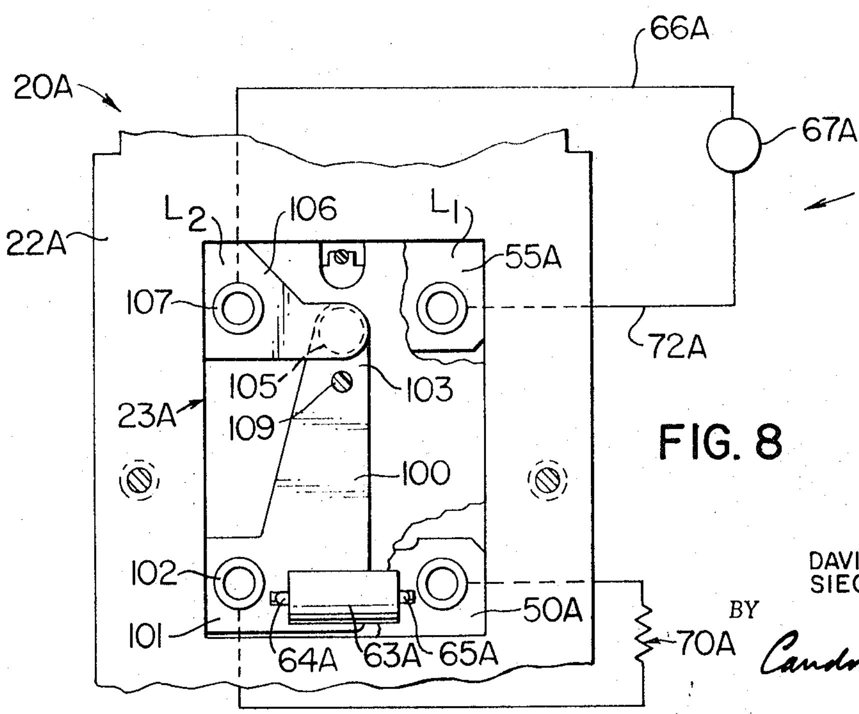


FIG. 8

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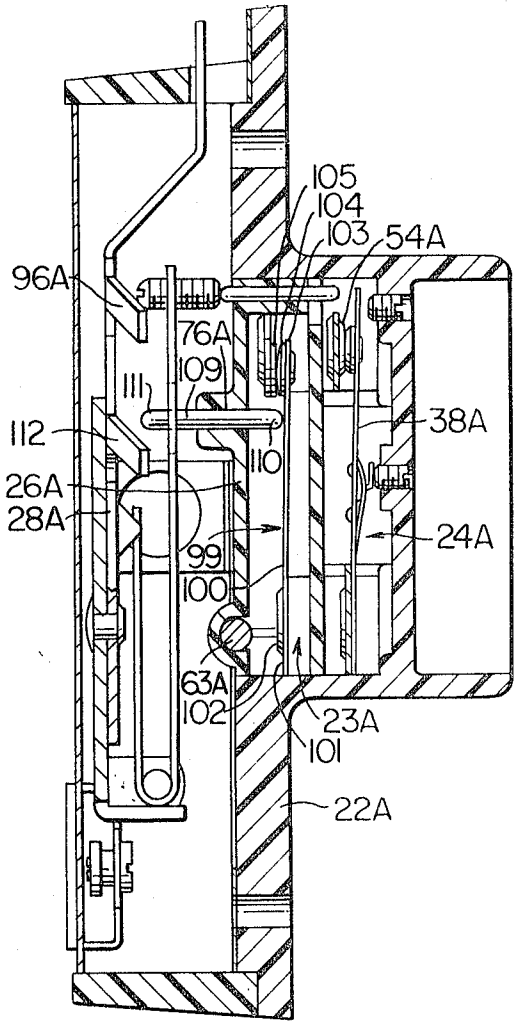

FIG.9

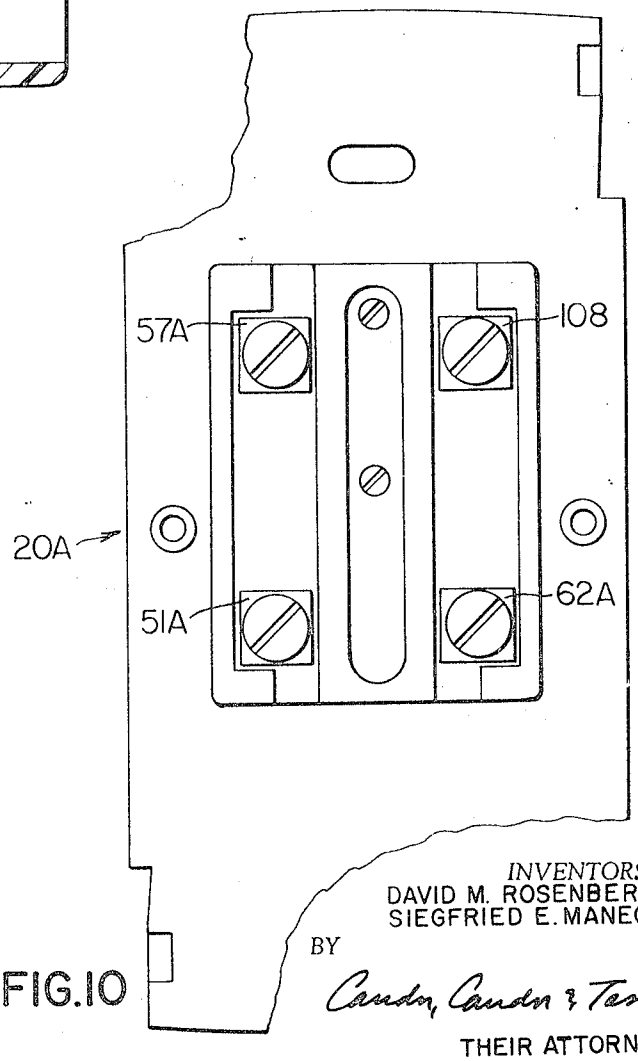

FIG.10

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THERMOSTATIC CONTROL DEVICE AND SYSTEM UTILIZING THE SAME

This invention relates to an improved thermostatic control device as well as to an improved system utilizing such a control device or the like.

It is well known that thermostatic devices have been provided for controlling heating means and the like that is disposed remote from the thermostatic device, the thermostatic device sensing room temperature and causing the heating means for the room or the like to turn on when the temperature of the room falls below a selected temperature as well as causing the heating means to turn off when the room temperature exceeds the selected temperature. Such thermostatic device has an auxiliary heater therein which only operates when the heating means is in its on condition to raise the temperature at the thermostat to cause the thermostat to turn off the heating means before the temperature in the room exceeds the selected temperature so as to prevent an adverse overshoot situation and thereby provide a narrow temperature differential in the room or rooms being maintained by such thermostatic means.

Accordingly, it is a feature of this invention to provide an improved thermostatic device of the above type.

In particular, one embodiment of this invention provides a frame means carrying electrical switch means. A U-shaped bimetal member that defines a pair of legs interconnected together at adjacent ends thereof by an elbow portion is pivotally mounted by the elbow portion thereof to the frame means. A movable plunger is carried by the frame means and is disposed between one of the legs of the bimetal member and the switch means to operate the switch means in relation to the position of the one leg relative to the frame means. Cam means is movably carried by the frame means and acts on the other leg of the bimetal member to adjust the pivotal position of the bimetal member and, thus, the temperature setting that the thermostatic device will open the switch means, the cam means being movable across the longitudinal axis of the other leg of the bimetal member to adjust the same.

Accordingly, it is an object of this invention to provide an improved thermostatic device having one or more of the novel features set forth above or hereinafter shown or described.

Another object of this invention is to provide an improved control system utilizing such a thermostatic device.

Other objects, uses and advantages of this invention are apparent from a reading of this description which proceeds with reference to the accompanying drawings forming a part thereof and wherein:

FIG. 1 is a front view of one embodiment of the thermostatic device of this invention.

FIG. 2 is an enlarged view of the thermostatic device of FIG. 1 with the cover member thereof removed.

FIG. 3 is a reduced fragmentary view of the thermostatic device of FIG. 2 with the selector means and another cover plate thereof removed to illustrate the electrical switch means and terminal means therefor.

FIG. 4 is an enlarged cross-sectional view taken on line 4—4 of FIG. 1.

FIG. 5 is a cross-sectional view taken on line 5—5 of FIG. 2.

FIG. 6 is a fragmentary rear view of the thermostatic device of FIG. 2.

FIG. 7 is an exploded perspective view of certain of the parts of the thermostatic device of FIG. 1.

FIG. 8 is a view similar to FIG. 3 and illustrates another thermostatic device of this invention.

FIG. 9 is a view similar to FIG. 4 and illustrates the thermostatic device of FIG. 8.

FIG. 10 is a fragmentary rear view of the thermostatic device of FIG. 8.

While the various features of this invention are hereinafter described and illustrated as being particularly adapted to provide thermostatic control of a heating means for the rooms of a building or the like, it is to be understood that the thermostatic device of this invention can be utilized for controlling other devices as desired.

Therefore, this invention is not to be limited to only the embodiments illustrated in the drawings, because the drawings are merely utilized to illustrate one of the wide variety of uses of this invention.

Referring now to FIGS. 1–7, the improved thermostatic device of this invention is generally indicated by the reference numeral **20** and comprises a frame means **21** defined by a housing member **22** having a recess **23** therein receiving an electrical switch means **24** in a manner hereinafter described and being closed by a removable cover plate **26**. The frame means **21** includes a bracket plate **27** secured to the housing member **22** in any suitable manner so as to pivotally carry a selector means **28** pivotally mounted thereto by rivet means **29**, the plate **27** having depending L-shaped legs **30** riveted to the housing member **22** so that the cover plate **27** is disposed in spaced relation relative to the previously described cover plate **26**.

A cover plate **31** is adapted to be disposed against and be secured to the housing member **22** in any suitable manner to cover the plate **27** as illustrated in FIG. **4**, the cover means **31** having a slot **32** at one end thereof and through which an outwardly directed tang **33** of the selector means **28** can project so as to be manually grasped to move the selector means **28** relative to the frame means **21** while at the same time indicating a temperature setting as provided by suitable scale means **34** provided on the housing member **22** as illustrated in FIG. **1**.

If desired, a suitable temperature indicating thermometer means **35** can be carried by the cover means **31** and have an indicating pointer means **36** viewable in a window means **37** cut in the cover member **31** as illustrated in FIG. **1**.

The electrical switch means **24** comprises a snap blade **38** having opposed ends **39** and **40** while being medially slotted to define three legs **41**, **42** and **43** with the outboard legs **42** and **43** being crimped at **44** to render the blade **38** snap acting in a manner fully disclosed and claimed in applicants' U.S. Pat. No. 3,238,337. A leaf spring **45** is secured to the end **40** of the blade **38** as well as to the middle leg **41** by fastening means **46** so as to bear against a set screw **47** threadedly disposed in a threaded bore **48** in an end wall **49** of the housing means **22**, the end **40** of the blade **38** being secured to a terminal plate **50** carried by the housing means **22** in the chamber **23** thereof and interconnected to an external terminal means **51** by an interconnecting cylindrical rivet means **52** whereby the external terminal **51** is electrically interconnected to the snap blade **38**.

The other end **39** of the snap blade **38** carries contact means **53** adapted to cooperate with a fixed contact means **54** carried by a terminal plate **55** secured to the housing means **22** by a cylindrical rivet means **56** that electrically interconnects the plate **55** to external terminal means **57**. The free end **39** of the snap blade **38** is adapted to snap between the fixed contact **54** and a set screw **58** threadedly carried in a threaded bore **59** in the end wall **49** of the housing means **22** except that the snap blade **38** has a natural tendency to always return its contact **53** against the fixed contact **54** as will be apparent hereinafter.

Another terminal plate **60** is disposed in the recess or cavity **23** of the housing means **22** and is secured thereto by cylindrical rivet means **61** that electrically interconnects the plate **60** to an external terminal means **62**. An electrical resistance **63** has one of its leads **64** electrically interconnected to the plate **60** while the other terminal lead **65** thereof is electrically interconnected to the plate **50**.

In this manner, a power source lead **66** from a power source **67** is adapted to be electrically interconnected to the plate **60** at the terminal **62** while the other power source lead **68** is adapted to be interconnected to the plate **55** at the terminal **57**. One end **69** of the means **70** that controls a heating means, whether the means **70** is the heating means itself or control means for a heat exchanger or the like, is electrically interconnected to plate **50** at the terminal **51** by lead **71**. The other end of the means **70** is interconnected by a lead **72** to the terminal **62** that leads to the terminal plate **60** as fully illustrated in FIG. **3**.

Upon closure of contact **53** with contact **54** a current path from one side of power source **67** through heating means **70** to

the other side of power source 67 is established. The current path includes lead 68 connected to one side of power source 67, terminal 57, plate 55, contact 54, contact 53, snap blade 38, plate 50, terminal 51, lead 71, heating means 70, lead 72 connected to terminal 62 of plate 60 and continues via lead 66 to the other side of power source 67. Since the electrical resistance 63 is connected between plates 50 and 60 it is in parallel with the heating means 70 and is therefore energized when heating means 70 is energized.

The cover member 26 that closes the open end of the chamber 23 includes an arcuate portion 73 that provides a recess means 74 for retaining the resistor 63 therein as fully illustrated in FIG. 4. In addition, the cover member 26 has bores 75 and 76 passing therethrough for a purpose hereinafter described.

A U-shaped bimetal member 77 is provided and defines two parallel legs 78 and 79 interconnected together at adjacent ends thereof to a U-shaped elbow portion 80 that is adapted to be disposed around a pivot pin 81 carried within suitable apertures 82 of opposed ears 83 of the bracket member 27 as illustrated in FIG. 4. The bracket member 27 has a pair of depending tangs 84 at one end 85 thereof that holds the elbow 80 against the pivot shaft 81 in the manner fully illustrated in FIG. 4 so that the bimetal member 77 will pivot about the shaft 81 and, thus, about the frame means 21.

The leg 78 of the bimetal member has a tang 86 depending from the free end 87 thereof to be engaged by an arcuate cam track 88 on the selector means 28 which is adapted to be pivoted on the bracket means 27 so that the cam track 88 will move across the longitudinal axis of the leg 78 and bear against the end tang 86 thereof so as to adjust the pivotal position of the bimetal member 77 relative to the frame means 21 and, thus, determine the temperature setting of the thermostatic device 20 as will be apparent hereinafter.

The other leg 79 of the bimetal member 77 has an internally threaded opening 89 passing through the free end 90 thereof and threadedly receiving an adjusting screw 91 which is alignable with the bore 75 in the cover member 26 when the bimetal member 77 is assembled to the bracket means 27 as illustrated in FIG. 4.

An insulating rod or pin 92 is disposed in the bore 75 of the cover member 26 so that the opposed ends 93 and 94 of the pin 92 can respectively engage the end 95 of the set screw 91 and the free end 39 of the snap blade 38 of the electrical switch means 24.

The selector means 28 has an outwardly directed and arcuately bent tang 96 alignable with the other end 97 of the set screw 91 for a purpose hereinafter described.

The operation of the thermostatic device 20 of this invention as utilized in the control system of this invention, which is generally indicated by the reference numeral 98 in FIG. 3, will now be described.

The operator or the like positions the end 33 of the selector means 28 relative to the scale 34 for a desired temperature setting so that the thermostatic device 20 will tend to maintain the temperature in the room containing such thermostat 20 at the set temperature because the thermostat 20 will operate the heating means 70 when the temperature sensed in the room is below such setting of the end 33 of the selector means 28.

In particular, as long as the temperature in the room is above the temperature setting of the end 33 of the selector means 28, the cam track 88 has pivotally positioned the bimetal member 77 in such a manner that the leg 79 thereof has its free end 90 in such a position that leg 79 of the bimetal member 77 through the plunger or pin 92 acts against the end 39 of the snap blade 38 to overcome the natural bias of the snap blade 38 and maintain the snap blade 38 against the set screw 58 whereby no current is adapted to flow between the spaced contacts 54 and 53 and, thus, no current is permitted to flow through the heating means 70 nor through resistance 63 connected in parallel across heating means 70.

However, when the temperature in the room falls below the selected temperature setting of the thermostat 20, the leg 79 of the bimetal member 77 has warped to the left in FIG. 4 a distance sufficient to cause the snap blade 38 to move its contact 53 against the fixed contact 54 and, thus, complete the circuit through the heating means 70 to heat up the room carrying the thermostat 20. However, at this time, current is also flowing through the resistor 63 which begins to heat up adjacent the bimetal member 77 to cause the same to again open the contacts 53 and 54 a short time before the room would reach such temperature should the heating means 70 continue to operate so as to prevent adverse temperature overshooting condition.

Thus, it can be seen that the bimetal leg 79 by warping back and forth in response to temperature change will tend to maintain the temperature of the room at the temperature set by the selector means 28.

If desired, movement of the end 33 of the selector means 28 completely to the left in FIG. 1 can cause the tang 96 thereof to bear against the end 97 of the set screw 91 in such a manner that the same will positively force the plunger means 92 and free end 39 of the snap blade 38 away from the fixed contact 54 and, thus, against the set screw 58 so as to maintain a positive "off" condition of the thermostat 20. However, if such a positive "off" of the thermostat 20 is not desired for the snap blade means 38 thereof, the tang 96 can be bent to be coplanar with the remainder of the selector means 28 so that the same will not act on the end 97 of the set screw 91 so that no positive "off" condition will be provided by the selector means 28.

Should it be desired to provide a positive "off" position of the control system 98 when the selector means 28 is moved to an "off" position thereof, a second electrical switch means can be provided for the thermostat 20. The second electrical switch is connected to open one side of the power source with switch means 24 connected to open and close the other side of the power source. Upon moving selector means 28 to the off position at least one side of the power source will be broken regardless of the position of the switch means 24.

In particular, reference is now made to FIGS. 8, 9 and 10 wherein another thermostatic device of this invention is generally indicated by the reference numeral 20A and parts thereof identical to the thermostat 20 previously described are indicated by like reference numerals followed by the reference letter "A."

As illustrated in FIG. 9, the thermostat device 20A is substantially identical to the thermostat device 20 previously described except that another switch means 99 is disposed in the chamber 23A and comprises a switch blade 100 having one end 101 thereof secured to the housing means 22A by a cylindrical rivet 102, FIG. 8, that is electrically interconnected to an external terminal means 62A. The switch blade 100 is electrically interconnected to the switch blade 38 by the resistor means 63A having one of its leads 64A interconnected to the switch blade 100 while the other lead 65A thereof is interconnected to the plate 50A that is electrically interconnected to the snap blade 38A. The other end 103 of the switch blade 100 carries a contact means 104 which is normally disposed in electrical contact with a fixed contact 105 carried by a contact blade 106 secured to the housing means 22A and being interconnected by a cylindrical rivet 107 to an external terminal means 108 that is adapted to be interconnected to one side of the power source 67A of FIG. 8 by a lead 66A. The other side of power source 67A is interconnected to the fixed contact 54A of the snap switch 24A in the manner previously described. The heating means 70A is connected via leads 71A and 72A to terminals 51A and 62A respectively.

Thus, in order for the heating means 70A to be operated by the power source 67A, the switch means 99 must be in a closed position as well as the switch means 24A.

Another insulating rod or pin 109 is disposed in the bore 76A of the cover member 26A and has one opposed end 110 adapted to bear against switch blade 100 and the other opposed end 111 adapted to be alignable with another arcuate tang means 112 of the selector means 28A.

In this manner, only when the selector means 28A of the thermostat 20A shown in FIG. 9 is moved completely to the left as viewed in FIG. 8 will the tank 112 of the selector means 28A act against the end 111 of the plunger means 109 sufficiently to cause the plunger means 109 to move the switch blade 100 to the right in FIG. 9 a distance sufficient to open the contacts 104 and 105 so that no electrical current can flow through the heating means 70A until the selector means 28A shown in FIG. 9 is again moved to the right as viewed in FIG. 8 to permit the switch means 99 to close. If desired, the other tang 96A of the selector means 28A can also cause positive opening of the switch means 24A in the manner previously described for the thermostat 20 at the same time the switch means 99 is being positively maintained in an open position thereof to provide a double pole thermostat.

Therefore, it can be seen that an improved thermostatic device is provided by this invention as well as an improved control system utilizing such a thermostatic device.

While the form of the invention now preferred has been disclosed as required by the patent statutes, other forms may be utilized, all coming within the scope of the claims which follow.

What is claimed is:

1. A thermostatic device having a frame means, electrical switch means carried by said frame means, a U-shaped bimetal member defining a pair of legs interconnected together at adjacent ends thereof by an elbow portion, said elbow portion pivotally mounting said bimetal member to said frame means, plunger means movably carried by said frame means and being disposed between one of said legs of said bimetal member and said switch means to operate said switch means in relation to the position of said one leg relative to said frame means, and cam means movably carried by said frame means and acting on the other leg of said bimetal member to adjust the pivotal position of said bimetal member and, thus, the temperature setting that said thermostatic device will open said switch means, said cam means being movable across the longitudinal axis of said other leg of said bimetal member to adjust the same.

2. A thermostatic device as set forth in claim 1 wherein said cam means comprises part of a manual selector means for said device.

3. A thermostatic device as set forth in claim 2 wherein said manual selector means has means for operatively engaging against said one leg of said bimetal member to directly move said one leg and said plunger means to a position that opens said switch means.

4. A thermostatic device as set forth in claim 3 wherein said means for operatively engaging against said one leg of said bimetal member comprises another cam means.

5. A thermostatic device having a frame means, electrical switch means carried by said frame means, a U-shaped bimetal member defining a pair of legs interconnected together at adjacent ends thereof by an elbow portion, said elbow portion pivotally mounting said bimetal member to said frame means, plunger means movably carried by said frame means and being disposed between one of said legs of said bimetal member and said switch means to operate said switch means in relation to the position of said one leg relative to said frame means, and cam means movably carried by said frame means and acting on the other leg of said bimetal member to adjust the pivotal position of said bimetal member and, thus, the temperature setting that said thermostatic device will open said switch means, said cam means being movable across the longitudinal axis of said other leg of said bimetal member to adjust the same, said cam means comprising part of a manual selector means for said device, said manual selector means having means for operatively engaging against said one leg of said bimetal member to directly move said one leg and said plunger means to a position that opens said switch means, said means for operatively engaging against said one leg of said bimetal member comprises another cam means, said other cam means comprising an arcuately disposed cam tang of said selector means.

6. A thermostatic device as set forth in claim 2 wherein said cam means comprises a cam track on said selector means.

7. A thermostatic device having a frame means, electrical switch means carried by said frame means, a U-shaped bimetal member defining a pair of legs interconnected together at adjacent ends thereof by an elbow portion, said elbow portion pivotally mounting said bimetal member to said frame means, plunger means movably carried by said frame means and being disposed between one of said legs of said bimetal member and said switch means to operate said switch means in relation to the position of said one leg relative to said frame means, and cam means movably carried by said frame means and acting on the other leg of said bimetal member to adjust the pivotal position of said bimetal member and, thus, the temperature setting that said thermostatic device will open said switch means, said cam means being movable across the longitudinal axis of said other leg of said bimetal member to adjust the same, said cam means comprising part of a manual selector means for said device, said selector means having a tang that is to be manually grasped to move said selector means, said tang providing temperature setting and indicating means for said device.

8. A thermostatic device having a frame means, electrical switch means carried by said frame means, a U-shaped bimetal member defining a pair of legs interconnected together at adjacent ends thereof by an elbow portion, said elbow portion pivotally mounting said bimetal member to said frame means, plunger means movably carried by said frame means and being disposed between one of said legs of said bimetal member and said switch means to operate said switch means in relation to the position of said one leg relative to said frame means, and cam means movably carried by said frame means and acting on the other leg of said bimetal member to adjust the pivotal position of said bimetal member, and, thus, the temperature setting that said thermostatic device will open said switch means, said cam means being movable across the longitudinal axis of said other leg of said bimetal member to adjust the same, said one leg of said bimetal member carrying an adjusting member having one end engaging said plunger means.

9. A thermostatic device as set forth in claim 8 wherein said adjusting member is disposed at the free end of said one leg of said bimetal member.

10. A thermostatic device as set forth in claim 9 wherein said manual selector means has means for engaging against the other end of said adjusting member to directly move said one leg and said plunger means to a position that opens said switch means.

11. A thermostatic device having a frame means, electrical switch means carried by said frame means, a U-shaped bimetal member defining a pair of legs interconnected together at adjacent ends thereof by an elbow portion, said elbow portion pivotally mounting said bimetal member to said frame means, plunger means movably carried by said frame means and being disposed between one of said legs of said bimetal member and said switch means to operate said switch means in relation to the position of said one leg relative to said frame means, cam means movably carried by said frame means and acting on the other leg of said bimetal member to adjust the pivotal position of said bimetal member and, thus, the temperature setting that said thermostatic device will open said switch means, said cam means being movable across the longitudinal axis of said other leg of said bimetal member to adjust the same, and another electrical switch means carried by said frame means, said other switch means with said first mentioned switch means permitting said thermostatic device to be connected for double pole operation.

12. A thermostatic device as set forth in claim 11 wherein said cam means comprises part of a manual selector means for said device, said frame means carrying another movable plunger means for operating said other switch means, said selector means having means for engaging and moving said other plunger means to open said other switch means.

13. A thermostatic device as set forth in claim 12 wherein said means for engaging said other plunger means comprises another cam means carried by said selector means.

14. A thermostatic device as set forth in claim 13 wherein said other cam means comprises an arcuately disposed cam tang of said selector means.

15. A thermostatic device having a frame means, electrical switch means carried by said frame means, a U-shaped bimetal member defining a pair of legs interconnected together at adjacent ends thereof by an elbow portion, said elbow portion pivotally mounting said bimetal member to said frame means, plunger means movably carried by said frame means and being disposed between one of said legs of said bimetal member and said switch means to operate said switch means in relation to the position of said one leg relative to said frame means, and cam means movably carried by said frame means and acting on the other leg of said bimetal member to adjust the pivotal position of said bimetal member and, thus, the temperature setting that said thermostatic device will open said switch means, said cam means being movable across the longitudinal axis of said other leg of said bimetal member to adjust the same, said frame means carrying a pivot pin and having tang means disposed adjacent said pivot pin means, said elbow of said bimetal member receiving said pivot pin and being disposed between said tang means and said pivot pin to be pivotally mounted to said frame means.

16. In a control system having a source of electrical current and an electrically operated heating means, the improvement comprising a thermostatic device having a frame means, electrical switch means carried by said frame means and being electrically interconnected to said source and to said heating means to interconnect said source to said heating means when said switch means is closed and to disconnect said source from said heating means when said switch means is open, a U-shaped bimetal member defining a pair of legs interconnected together at adjacent ends thereof by an elbow portion, said elbow portion pivotally mounting said bimetal member to said frame means, plunger means movably carried by said frame means and being disposed between one of said legs of said bimetal member and said switch means to operate said switch means in relation to the position of said one leg relative to said frame means, and cam means movably carried by said frame means and acting on the other leg of said bimetal member to adjust the pivotal position of said bimetal member and, thus, the temperature setting that said thermostatic device will open said switch means, said cam means being movable across the longitudinal axis of said other leg of said bimetal member to adjust the same.

17. In a control system as set forth in claim 16, the further improvement wherein said cam means comprises part of a manual selector means for said device.

18. In a control system as set forth in claim 17, the further improvement wherein said manual selector means has means for operatively engaging against said one leg of said bimetal member to directly move said one leg and said plunger means to a position that opens said switch means.

19. In a control system having a source of electrical current and an electrically operated heating means, the improvement comprising a thermostatic device having a frame means, electrical switch means carried by said frame means and being electrically interconnected to said source and to said heating means to interconnect said source to said heating means when said switch means is closed and to disconnect said source from said heating means when said switch means is open, a U-shaped bimetal member defining a pair of legs interconnected together at adjacent ends thereof by an elbow portion, said elbow portion pivotally mounting said bimetal member to said frame means, plunger means movably carried by said frame means and being disposed between one of said legs of said bimetal member and said switch means to operate said switch means in relation to the position of said one leg relative to said frame means, and cam means movably carried by said frame means and acting on the other leg of said bimetal member to adjust the pivotal position of said bimetal member and, thus, the temperature setting that said thermostatic device will open said switch means, said cam means being movable across the longitudinal axis of said other leg of said bimetal member to adjust the same, said cam means comprising part of a manual selector means for said device, said manual selector means having means for operatively engaging against said one leg of said bimetal member to directly move said one leg and said plunger means to a position that opens said switch means, said means for operatively engaging against said one leg of said bimetal member comprising another cam means.

20. In a control system as set forth in claim 19, the further improvement wherein said other cam means comprises an arcuately disposed cam tang of said selector means.

21. In a control system as set forth in claim 17, the further improvement wherein said cam means comprises a cam track on said selector means.

22. In a control system having a source of electrical current and an electrically operated heating means, the improvement comprising a thermostatic device having a frame means, electrical switch means carried by said frame means and being electrically interconnected to said source and to said heating means to interconnect said source to said heating means when said switch means is closed and to disconnect said source from said heating means when said switch means is open, a U-shaped bimetal member defining a pair of legs interconnected together at adjacent ends thereof by an elbow portion, said elbow portion pivotally mounting said bimetal member to said frame means, plunger means movably carried by said frame means and being disposed between one of said legs of said bimetal member and said switch means to operate said switch means in relation to the position of said one leg relative to said frame means, and cam means movably carried by said frame means and acting on the other leg of said bimetal member to adjust the pivotal position of said bimetal member and, thus, the temperature setting that said thermostatic device will open said switch means, said cam means being movable across the longitudinal axis of said other leg of said bimetal member to adjust the same, said cam means comprising part of a manual selector means for said device, said selector means having a tang that is to be manually grasped to move said selector means, said tang providing temperature setting and indicating means for said device.

23. In a control system having a source of electrical current and an electrically operated heating means, the improvement comprising a thermostatic device having a frame means, electrical switch means carried by said frame means and being electrically interconnected to said source and to said heating means to interconnect said source to said heating means when said switch means is closed and to disconnect said source from said heating means when said switch means is open, a U-shaped bimetal member defining a pair of legs interconnected together at adjacent ends thereof by an elbow portion, said elbow portion pivotally mounting said bimetal member to said frame means, plunger means movably carried by said frame means and being disposed between one of said legs of said bimetal member and said switch means to operate said switch means in relation to the position of said one leg relative to said frame means, and cam means movably carried by said frame means and acting on the other leg of said bimetal member to adjust the pivotal position of said bimetal member and, thus, the temperature setting that said thermostatic device will open said switch means, said cam means being movable across the longitudinal axis of said other leg of said bimetal member to adjust the same, said one leg of said bimetal member carrying an adjusting member having one end engaging said plunger means.

24. In a control system as set forth in claim 23, the further improvement wherein said adjusting member is disposed at the free end of said one leg of said bimetal member.

25. In a control system as set forth in claim 24, the further improvement wherein said manual selector means has means for engaging against the other end of said adjusting member to

directly move said one leg and said plunger means to a position that opens said switch means.

26. In a control system having a source of electrical current and an electrically operated heating means, the improvement comprising a thermostatic device having a frame means, electrical switch means carried by said frame means and being electrically interconnected to said source and to said heating means to interconnect said source to said heating means when said switch means is closed and to disconnect said source from said heating means when said switch means is open, a U-shaped bimetal member defining a pair of legs interconnected together at adjacent ends thereof by an elbow portion, said elbow portion pivotally mounting said bimetal member to said frame means, plunger means movably carried by said frame means and being disposed between one of said legs of said bimetal member and said switch means to operate said switch means in relation to the position of said one leg relative to said frame means, and cam means movably carried by said frame means and acting on the other leg of said bimetal member to adjust the pivotal position of said bimetal member and, thus, the temperature setting that said thermostatic device will open said switch means, said cam means being movable across the longitudinal axis of said other leg of said bimetal member to adjust the same, and another electrical switch means carried by said frame means, said other switch means being electrically interconnected in series between one side of said source and one end of said electrically operated heating means and said first-named switch means being electrically interconnected in series between the other side of said source and the other end of said electrically operated heating means.

27. In a control system as set forth in claim **26**, the further improvement wherein said cam means comprises part of a manual selector means for said device, said frame means carrying another movable plunger means for operating said other switch means, said selector means having means for engaging and moving said other plunger means to open said other switch means.

28. In a control system as set forth in claim **27**, the further improvement wherein said means for engaging said other plunger means comprises another cam means carried by said selector means.

29. In a control system as set forth in claim **28**, the further improvement wherein said other cam means comprises an arcuately disposed cam tang of said selector means.

30. In a control system having a source of electrical current and an electrically operated heating means, the improvement comprising a thermostatic device having a frame means, electrical switch means carried by said frame means and being electrically interconnected to said source and to said heating means to interconnect said source to said heating means when said switch means is closed and to disconnect said source from said heating means when said switch means is open, a U-shaped bimetal member defining a pair of legs interconnected together at adjacent ends thereof by an elbow portion, said elbow portion pivotally mounting said bimetal member to said frame means, plunger means movably carried by said frame means and being disposed between one of said legs of said bimetal member and said switch means to operate said switch means in relation to the position of said one leg relative to said frame means, and cam means movably carried by said frame means and acting on the other leg of said bimetal member to adjust the pivotal position of said bimetal member to adjust the pivotal position of said bimetal member and, thus, the temperature setting that said thermostatic device will open said switch means, said cam means being movable across the longitudinal axis of said other leg of said bimetal member to adjust the same, said frame means carrying a pivot pin and having tang means disposed adjacent said pivot pin means, said elbow of said bimetal member receiving said pivot pin and being disposed between said tang means and said pivot pin to be pivotally mounted to said frame means.

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