A thermostatic control and switching apparatus for use with a room air conditioner or the like comprising a switching assembly having at least one contact arm movable toward and away from a stationary contact, and a first housing enclosing the switch assembly. A rotary collar in the first housing is adapted when rotated to actuate the switching assembly to open and close the contacts. This collar carries a cam having a face formation for moving the contact arm in a plane parallel to the axis of the collar. A switch enclosed in a second housing is secured to the first housing and a thermostatic strip is supported on and spaced from the second housing and mechanically linked to the thermostatic switch. This thermostatic strip is responsive to changing ambient temperatures to open and close the switch. Means are provided for adjusting the thermostatic strip to open and close the switch at various preselected temperatures, this adjusting means comprising a shaft coaxial with the collar and projecting therefrom. The first housing is secured in superposed position on the second housing with the thermostatic strip interposed therebetween.
THERMOSTATIC CONTROL AND SWITCHING APPARATUS

BACKGROUND OF THE INVENTION

This invention relates to thermostatic controls and switching apparatus, and more particularly to such apparatus for sensing and controlling room temperature and a mode or function switch for controlling operation of one or more functions (e.g., fan speed etc.) of an air conditioning unit or the like.

In room air conditioners it is necessary that the room air temperature be accurately sensed by the temperature control and the temperature control be sufficiently sensitive to relatively small changes in room temperature (e.g., ±2°F.) so as to maintain the room temperature within a predetermined temperature range. In many air conditioner applications, room air temperature is sensed by a fluid expansion bulb (e.g., a capillary tube) temperature sensor interconnected to a bellows-type switch. This bellows-type switch, however, is expensive, must be correctly positioned in the air conditioner during assembly, and may be damaged during cleaning and servicing of the air conditioner.

Bimetal thermostatic controls are also widely used as room air conditioner controls. Reference may be made to such U.S. Pat. Nos. as 2,074,132, 3,293,875, Re. 26,554, and the coassigned U.S. Pat. No. 3,546,652 for examples of such controls. Generally, these controls include a bimetal thermostatic strip adjustable mounted so as to open or close electrical contacts of a switch to make or break a circuit supplying electrical power to the air conditioner's compressor motor. In the above-mentioned U.S. Pat. Nos. 3,293,875 and 3,546,652 provision is made for directing a flow of room temperature air over the thermostatic strip so that it will accurately sense room temperature, and for adjusting the bimetal strip to open and close the switch contacts within the switch at any desired temperature within a limited operating range.

The trend has been toward providing more and different control function for the user of room air conditioners and this has greatly multiplied the number of different types of controls and mode switches that must be designed and fabricated for supplying the numerous manufacturers, each having various models, with the proper types of control and mode switch apparatus for incorporation therein. While the simpler air conditioner models will require a temperature adjustment and a mode switch to turn the compressor and fan on and off, the more sophisticated units will have additional control functions, such as lock-on (to override the thermostat adjustment and operate the compressor continuously), low fan speed, high fan speed, fan only, etc. In some instances the temperature control must be independent of the operation of the mode switching while in others it should be dependent. Also, the available space for mounting the controls and switches on the units continues to be reduced as more compact units are designed. Generally, the thermostatic and mode or function switches and controls are separate and mounted adjacent each other. In a few instances the thermostatic and mode controls have been ganged to provide a more compact unitary control package. However, the increasing number of different types of switching units that must be made available and the high cost of designing and producing so many different control units have presented growing and unresolved difficulties for the control manufacturer and the air conditioner manufacturer.

SUMMARY OF THE INVENTION

Among the several objects of this invention may be noted the provision of a combination thermostatic control and switching apparatus which accurately senses and controls room temperature and which provides mode control for one or more functions (e.g., low fan, high fan, etc.) for air conditioning apparatus; the provision of such thermostatic control and switching apparatus which is compact in size, thus enabling it to be readily installed in a control panel of a room air conditioner having reduced-size control mounting compartments; the provision of thermostatic control and switching apparatus which performs many different mode functions; the provision of such thermostatic control and switching apparatus which may be conveniently and economically adapted for use with many different types and styles of room air conditioners to supply a wide variety and number of switching functions from simple to complex; the provision of such thermostatic control and switching apparatus in which adjustment of the thermostatic control and operation of the switching apparatus may be made dependent on or independent of one another; the provision of such thermostatic control and switching apparatus in which the temperature range over which it operates, as well as the particular temperature at which its thermostatic switch is actuated, may be conveniently changed and adjusted; and the provision of such thermostatic control and switching apparatus which is of economical construction and which is reliable in operation. Other objects and features will be in part apparent and in part pointed out hereinafter.

Briefly, a thermostatic control and switching apparatus of this invention comprises a switching assembly having at least one contact arm movable toward and away from a stationary contact, and a first housing enclosing this switching assembly. A rotary collar within the first housing is adapted, when rotated to actuate the switching assembly to open and close the contacts. This collar carries a cam having a face formation for moving the contact arm in a plane parallel to the axis of the collar. The apparatus further comprises a switch enclosed in a second housing, a thermostatic strip supported on and spaced from the second housing and operatively connected to the switch. This switch is responsive to changing ambient temperatures to open and close. Means are also provided for adjusting the thermostatic strip to open and close the switch at various preselected temperatures. These adjusting means comprise a shaft coaxial with the collar and project therethrough. The first housing is secured in superposed position on the second housing with the thermostatic switch interposed therebetween.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevation of a thermostatic control and switching apparatus showing a mode switch spaced above a thermostatic switch with a bimetal thermostatic element therebetween and operatively connected to the thermostatic switch for operation of the latter, with some parts broken away to illustrate means for adjusting the bimetal strip.
FIG. 2 is a plan of the FIG. 1 apparatus with the top cover of the switch housing broken away to illustrate details of the mode switch;

FIG. 3 is a right end elevation of the apparatus of FIG. 1;

FIG. 4 is a perspective of the mode switch housing of FIG. 1 with its cover removed;

FIG. 5 is an enlarged section on line 5—5 of FIG. 2;

FIG. 6 is a side elevation of a modified thermostatic control and switching apparatus in which mode selection and adjustment of the thermostatic switch may be performed independently of one another;

FIG. 7 is a plan of the FIG. 6 apparatus with the top cover of the switch housing broken away illustrating details of the mode switch;

FIG. 8 is an enlarged view of a portion of the mode switch housing taken on line 8—8 of FIG. 7 illustrating a cam-operated double-throw single-pole switch;

FIG. 9 is a plan of a rotary mode switch for thermostatic control and switching apparatus, the switch housing being broken away to illustrate details thereof;

FIG. 10 is a vertical section taken on line 10—10 of FIG. 9;

FIGS. 11A—11C are sections taken on lines 11A—11A, 11B—11B, and 11C—11C, respectively, of FIG. 10;

FIGS. 12A—12D are sections of portions of the mode switch assembly taken on lines 12A—12A, 12B—12B, 12C—12C, and 12D—12D, respectively, of FIG. 9 with a rotor of the switch assembly rotated to operating positions at each section line;

FIG. 13 is a plan view of still another mode switch; and

FIG. 14 is a left side elevation of FIG. 13.

Corresponding reference characters indicate corresponding parts throughout the several views of the drawings.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings and particularly the FIGS. 1—5, a thermostatic control and switching apparatus is indicated in its entirety at 1. Briefly, this switching apparatus includes a switching assembly or a mode switch 3 having at least one movable contact arm 5 carrying a contact 7 thereon movable toward and away from a stationary contact 9. The mode switch is contained in a housing 11 molded of phenolic resin or other suitable insulating material. A collar, generally indicated at 13, is mounted within housing 11 for rotation. The collar has a face cam 15 formed thereon the latter having a cam formation 17 engageable with contact arm 5 upon rotation of the collar so as to open and close contacts 7 and 9.

A thermostatic snap-acting switch assembly as generally indicated at 19, is secured to the bottom of housing 11. This thermostatic switch is actuated at a desired temperature level by the thermal deflection of a bimetal thermostatic strip 21. This thermostatic switch is similar to the switch described in the above mentioned coassigned U.S. Pat. No. 3,546,562. Thermostatic strip 21 is interconnected to thermostatic switch 19 by means of a compression link 23 and other suitable mechanical linkage so as to break or make contacts (not shown) located within a thermostatic switch housing 25 whereby the thermostatic switch is responsive to changes in the ambient temperature condition to open and close the thermostatic switch. Thermostatic switch 19 has electrical terminals 26a, 26b for ready connection to an electrical circuit, such as to the compressor motor circuit of a room air conditioner unit or the like. Means, as indicated at 27, is provided on the bottom face of housing 11 for adjusting the thermostatic strip 21 to open and close thermostatic switch 19 at various preselected temperatures. A shaft 29 is coaxial within collar 13 and projects upwardly therefrom above the top of housing 11 for operating adjustment means 27 in a manner as will appear. As best shown in FIG. 1, housing 11 is secured in superposed position on thermostatic switch housing 25 with thermostatic switch 19 interposed therebetween. The thermostatic control and switching apparatus of this invention is particularly adapted for use with a room air conditioner or the like with mode switch 3 controlling the mode of operation of the unit (e.g., high fan, low fan, off, compressor-low fan, compressor-high fan) and with thermostatic switch 19 controlling energization and deenergization of the unit to maintain room temperature at a preselected level.

More particularly, switch housing 11 has a recess or socket 31 formed therein and has legs 33 extending down from the bottom of the housing to position the socket in the main portion of the housing in spaced relation to thermostatic switch housing 25. Electrical terminals 35 and 37 extend from housing 11 with terminal 35 being electrically connected to contact arm 5 and contact 7 by a rivet 39 and with terminal 37 being electrically connected to stationary contact 9 by means of a rivet 41. As best shown in FIGS. 1 and 4, contact arm 5 has a downward projecting projection or hump 43 formed therein for engagement in cam formation 17 on cam 15 upon rotation of the cam; thus hump 43 constitutes a cam follower.

Collar 13 is preferably molded of a suitable plastic resin and has an upper body portion 45 with a semicircular hole 47 therein extending axially centrally through the collar for reception of shaft 29 so as to key the collar on the shaft for rotation of the collar with the shaft. The collar further has a plurality of generally vertical recesses 49 formed therein constituting detent grooves. A loop-shaped resilient electrically nonconductive detent member 51 formed of a synthetic resin, such as a polycarbonate, is held fixed in recess 31 by means of a locating lug 53 (see FIG. 1) adjacent collar 13, this detent loop having a detent button or projection 55 engageable with detent recesses 490 in body portion 45 of collar 13. The detent button is biased outwardly by the resilient spring action of detent loop 51 thereby to positively engage their detent recesses. With detent button 55 received by a recess 49, the collar 13 and shaft 29 are held at a predetermined angular position corresponding to various operating positions for mode switch 3. With detent button 55 clear of detent recesses 49, shaft 29 may freely be rotated to operate means 27 for adjusting the temperature at which thermostatic switch 19 is opened and closed by thermostatic strip 21. A cover 57 closes the top of recess 32 and housing 11 and an optional thermal barrier, such as shown in the above-mentioned coassigned U.S. Pat. No. 3,546,562, may be positioned between housing 11 and 25 to channel air (e.g., room air) over and around thermostatic strip 21 so as to insure that the strip accurately senses the desired air temperature.
As shown in FIG. 1, a post 59 extends up from housing 25 and projects through a hole (not shown) in thermostatic strip 21. An adjustment screw 61 is threadably carried by housing 25 and serves as a support for one end of the thermostatic strip. Adjustment screw 61 has a head 63 at its upper end on which one end of strip 21 is supported. The strip is notched, as indicated at 65 (see FIG. 2), to receive a locating lug 67 extending up from screw head 63 so as to hold the strip centered with respect to the adjustment screw. Compression link 23 has shoulders 69 formed thereon and a tip 71 extending up from the shoulders. Strip 21 has a cross slot 73 near its other end for reception of tip 71 with shoulders 69 bearing on the undersurface of the strip. Thus, upon downward thermal deflection of strip 21, compression link 23 is forced downwardly to actuate thermostatic switch 19. It will be understood that compression link 23 is biased upwardly from within switch 19 to return the contacts within the switch to their normal position.

As best shown in FIG. 1, means 27 for adjusting the thermostatic strip 21 comprises a face cam 75 secured to the lower end of shaft 29 and rotatable therewith. A cam follower projection 77 is struck from strip 21 to extend upwardly toward cam 75 for engagement thereby. Cam 75 has a cam face 79 on its bottom face engageable with cam follower 77. The cam follower is positioned intermediate the ends of strip 21 and cam face or formation 79 is inclined so that upon rotation of shaft 29, the cam face applies a varying force to the end of strip 21 supported by compression link 23 thereby to alter the temperature range over which the strip 21 will actuate switch 19. Adjustment screw 61 conveniently alters the temperature range over which the strip 21 will actuate switch 19.

Referring now to FIGS. 6–8, an alternate construction of collar 13 is illustrated, this modified collar being indicated in its entirety at 13a. More particularly, collar 13a has a tubular extension or outer hollow shaft 81 protruding from housing 11. This hollow shaft surrounds shaft 29 and is rotatable independently thereof for operation of mode switch 3 independent of rotation of cam 75. Thus, mode selection and temperature adjustment of thermostatic control and switching apparatus 1 of this invention may be performed independently of one another. It will be understood that shafts 29 and 81 may have appropriate knobs (not shown) secured thereto for independent rotation of the shafts. As best shown in FIG. 7, collar 13a has a series of equally spaced detent recesses 49a spaced at equal angular intervals therearound for engagement by detent button 55 loop 51 so as to establish a plurality of operating positions between which collar 13a may be rotated so as to selectively actuate contact arm 5 to open and close contacts 7 and 9 at preselected positions.

In FIG. 7 it will be further noted that a double-throw single-pole switch generally indicated at 82 is provided within housing 11 on the opposite side of collar 13a from single-throw single-pole contacts 7 and 9. As shown in FIG. 8, this double-throw single-pole switch 82 includes a flexible contact arm 83 cantilevered from housing 11 and carrying an outer contact 85 on its upper face and an inner contact 87 on its opposite or lower face spaced intermediate the free and fixed ends of the contact arm. Outer contact 85 is engageable with a mating stationary contact 89 mounted in housing 11 by means of an offset bracket 91. Inner contact 87 is engageable with a mating stationary contact 93 positioned in housing 11. Contact arm 83 is secured to housing 11 and is in electrical contact with an electrical terminal 95 (see FIG. 7) by a rivet 97. Bracket 91 is held secured to housing 11 and in electrical contact with a terminal 99 by means of a rivet 101. Contact 93 is constituted by the head of a rivet 103, the latter being electrically connected to a third terminal 105.

Contact 87 serves a dual function as an electrical contact and as a cam follower engageable by cam 15a of collar 13a so as to move contact arm 83 in a plane parallel to shafts 29 and 81 thereby to move contacts 85 and 87 into and out of engagement with their respective stationary contacts 89 and 93. More particularly, cam 15a has a cam formation 17a similar to cam formation 17a heretofore described for actuation of contact arm 5 and a second cam formation 107 for engagement with contact 87 so as to actuate contact arm 83. Cam formation 17a is spaced radially inwardly of and above cam formation 107 with cam formation 17a adapted for engagement with cam follower projection 43 of contact arm 5 and with cam formation 107 adapted for engagement with intermediate contact 87 on contact arm 83. The provision of two cam formations 17a and 107 permits rotation of collar 13a through 360° without cam formation 17a actuating contact arm 83 and without cam formations 107 actuating contact arm 5.

More particularly, cam formations 107 include a first or lower cam formation 107a (see FIG. 8) so that upon alignment with contact 87, contact arm 83 resiliently biases contact 87 downwardly into engagement with its mating contact 93. It will be understood that with contact 87 in engagement with its mating contact 93, cam formation 107a may be spaced below contact 87. An intermediate cam formation 107b causes contact arm 83 to move upwardly relative to contact 87 to a neutral position (as shown in FIG. 8) in which contacts 85 and 87 are clear of their respective mating contacts 89 and 93. A third or upper cam formation 107c causes contact arm 83 to move upwardly from its neutral position and to force contact 85 into engagement with its mating contact 89.

It will be understood that with contacts 85 and 87 spaced longitudinally along contact arm 83 and with fixed contacts 89 and 93 spaced from one another within housing 11 as shown in FIG. 8, contact arm 83 may bow or flex without causing permanent yielding or deformation of the contact arm or of bracket 91. More specifically, if contact 89 is too closely vertically spaced relative to cam formation 107c, upward movement of contact arm 85 by cam formation 107c may cause excessive force to be applied thereby resulting in yielding or deformation of either contact arm 83 or bracket 91 and in improper engagement of the contacts with one another. However, because contact arm 83 will bow or flex, cam formation 107c may be so formed as to insure positive mating of contacts 85 and 90 under a wide range of manufacturing tolerances. Also, with contacts 85 and 87 and their respective mating contacts displaced from one another as shown in FIG. 8, terminals 95, 99 and 105 may be conveniently spaced one from another distances sufficient to satisfy generally recognized safety standards, such as those established by Underwriters Laboratories and NEMA.

Referring now to FIGS. 9–12A, a rotary multimode switch, indicated in its entirety at 201, is shown installed (FIGS. 9 and 10) in thermostatic control and
switching apparatus. This last-mentioned switching apparatus is indicated in its entirety at 203 so as to distinguish it from apparatus 1 heretofore described. Rotary mode switch assembly 201 is generally similar in function to mode switch 3, and has a thermostatic switch 205 secured to its bottom in superposed position, with switch 205 being essentially identical to thermostatic switch 19 heretofore described. It will be understood that parts common to both switching apparatus 1 and 203 have corresponding reference characters.

More particularly, mode switch 201 includes a housing 207, generally similar to housing 11, having a recess 209 therein with a plurality of conductive segments and insulating segments generally indicated at 211 and 213, respectively, stacked one on top of the other in recess 209. These conductive and insulating segments are so shaped as to define a socket 215 having a generally cylindrical inner interior surface. As will be specified, each conductive segment 211 has a generally arcuate contact surface extending around at least a portion of the interior surface of socket 215, these conductive segments being arranged in parallel spaced layers extending perpendicularly to the cylindrical axis of socket 215.

A rotor, generally indicated at 217, is nested within socket 215 and is rotatable about the cylindrical axis of the socket. The rotor carries a pair of cylindrical contacts 219a, 219b movable in a generally circular path around the interior surface of the socket. These contacts are adapted to bridge two spaced arcuate contact surfaces of two vertically adjacent conductive segments 211 for a portion of its range of rotary movement. As shown, contacts 219a, 219b are held by contact arm 221 and thus slide on conductive and insulative segments 211 and 213. It will be understood that contacts 219a, 219b may be mounted fixedly in arm 221 or so as to permit rolling on the segments thereby sequentially exposing the entire side surfaces of contacts 219a and 219b and minimizing the effects of contact erosion. The rotor includes a main body portion 220 and a resilient contact carrying arm 221 biased radially outwardly for resiliently maintaining contact 219 in engagement with the conductive surfaces, the contact being biased radially outwardly by the resilience of contact arm 221 and also by compressible O-rings 223 compressed between the main body of the rotor and the inner surface of the contact arm to apply proper contact pressure. Housing 207 has a circular groove 224 in its bottom and rotor 217 has a lug 225 adapted for reception in groove 224 so as to locate the rotor relative to the cylindrical axis of the rotor.

A cover 226 overlies the top of housing 207. As shown in FIGS. 10 and 11A, first and second conductive segments, specifically identified at 227 and 228, are disposed within recess 209 at the bottom thereof, each of these segments having respective generally circular shaped contact surfaces 227a and 228a, and respective terminals 227b and 228b protruding from housing 207. An insulative layer 229 (see FIG. 10) of phenolic resin or the like is placed on segments 227 and 228 and a common conductive segment 231 extending generally around the socket is supported on insulative layer 229 and spaced above the conductive segments therebeneath. Insulative layer 229 has an inner surface 229a constituting a portion of socket surface 215 and has notches 229b formed therein at spaced angular positions around the socket, these notches being in register with various rotary operating positions of rotor 217.

It will be noted that portions of surfaces 229a between notches 229b extend inwardly into the socket for purposes as will appear. Common segment 231 (see FIG. 11B) has a terminal 231b and a generally circular contact surface 231a. A second insulative layer 233 (see FIG. 11C) is disposed on top of common segment 231 and a fourth conductive segment 235 is disposed above insulative layer 233. Like insulative layer 229, layer 233 has inner contact engaging surfaces 233a and notches 233b positioned in register with notches 229b at the various operating positions of rotor 217. Conductive segment 235 has a contact surface 235a and a terminal 235b. Segments 227, 228 and 235 extend only partially around the interior surface of socket 215, preferably as shown in FIGS. 11A and 11C.

More particularly, a rotary mode switch 203 is a four mode switch adapted, for example, to supply the operating current to the compressor motor and to the two speed fan motor of a room air conditioner unit or the like. More particularly, rotor 217 is shown to have four operating positions as indicated by the various notches 229b and 233b, and an off position. For example, with contacts 219a, 219b positioned as shown in FIG. 9 (this position being referred to as a high fan position) and with the rotor rotated clockwise, the contacts move in turn to a low fan position, thence to an off position, thence to a compressor on-low fan position, and finally to a compressor on-high fan position. In FIG. 10 with contacts 219a, 219b in their high fan position, contact 219a is shown as making contact with contact surfaces 228a and 231a thereby to energize terminal 228b so as to initiate operation of the high speed fan. Contact 219a is shown in engagement with common contact surface 231a and insulative surface 233a. FIGS. 12A-12B illustrate the contact surfaces in engagement with contacts 219a, 219b when the contacts are in their low fan, off, compressor on-low fan, and compressor on-high fan positions, respectively.

It will be particularly noted that the inner cylindrical surfaces 229a and 233a of insulative layers 229 and 233, respectively, bow inwardly somewhat toward rotor 217 between the various notches 229b and 233b so as to flex contact arm 221 inwardly and to thus insure that contacts 219a, 219b remain clear of any contact surfaces as they are moved from one operating position to another. Upon moving into a notch 237, contact arm 221 springs radially outwardly to move contact 19 firmly into engagement with its respective contact surfaces. Rotor 217 has a hollow shaft 241 extending outwardly from housing 207 with shaft 29 coaxial therewithin. Thus, shafts 29 and 241 may be rotated independently of one another so that the mode selection and adjustment of thermostatic strip 21 may be carried out independently of one another.

The provision of split contacts 219a, 219b which are movable relative to one another and a common conductive segment 231 eliminates any possible misalignment problems as may be experienced if one contact were used to bridge three contact surfaces, as occurs when contacts 219a, 219b are at their compressor-on/high-fan position (see FIG. 12D) in which the contact surfaces 228a, 231a and 235a are simultaneously bridged by contacts 219a, 219b.

Referring now to FIGS. 13 and 14, a second embodiment of a rotary mode switch is indicated in its entirety at 243. This mode switch has a first pair of generally co-
planar contact segments 245 and 247 disposed in the upper portion of housing 207, each having inner cylin-
dric contact surfaces 245a, 247a, respectively, and re-
spective terminals 245b, 247b, and a lower pair of gen-
erally coplanar similar conductive segments 249 and
251 each having a contact surface 249a, 251a and a
terminal 249b and 251b. The upper and lower coplanar
pairs of conductive segments are spaced vertically from
one another with an insulative layer 253 therebetween,
the inner surfaces forming a cylindrical socket 215. An-
other insulative layer 253 is disposed between the
spaced contact layers. As shown in FIG. 13, the con-
ductive segments of each pair are disposed on opposite
sides of shaft 241 and the ends of these segments are
separated by increased-thickness portions 255 of insu-
lative layer 253 which extend toward the bottom of re-
cess 209. These portions 255 also extend radially in-
wardly into socket 215 somewhat beyond the contact
surfaces of the conductive segments to provide an
abrupt contact-making and breaking action.

A rotor 257 has a pair of resilient contact arms 259a
and 259b, each carrying a respective contact 261a and
261b of sufficient length to bridge the contact surfaces
of the two layers of conductive segments. Each contact
arm is resiliently biased to move its respective
contact outwardly into engagement with the contact
surfaces of conductive segments 245, 247, 249 and
251. With rotor 257 in its off position, as shown in FIG.
13, the contacts 261a, 261b are in engagement with
insulative portions 255 and are thus clear of the conduc-
tive segments. Upon rotating the rotor in either direc-
tion, the contacts move from insulative portion 255 and
abruptly move outwardly for engagement with the con-
ductive surfaces. With the contacts in engagement with
the contact surfaces, and upon rotation of rotor 257 to
its off position, the insulative portions 255 cause the
contacts to lift clear of the contact surfaces, thus break-
ing their respective circuits. The two contacts are of
sufficient size so as to carry relatively high current
loads. Also, the provision of two contacts movable with
rotor 257 enables simultaneous making and breaking of
two circuits, and in effect provides a double-pole sin-
gle-throw switch.

In view of the above, it will be seen that the several
objects of the invention are achieved and other advan-
tageous results attained.

As various changes could be made in the above con-
structions without departing from the scope of the in-
vention, it is intended that all matter contained in the
above description or shown in the accompanying draw-
ings shall be interpreted as illustrative and not in a lim-
iting sense.

What is claimed is:

1. Thermostatic control and switching apparatus
comprising:

a switching assembly having at least one contact arm
movable toward and away from a stationary
contact;
a first housing enclosing said switch assembly;
a rotary collar adapted when rotated to actuate said
switching assembly to open and close said contacts,
said collar carrying a cam having a face formation
for moving said contact arm in a plane parallel to
the axis of said collar;
a switch enclosed in a second housing;
a thermostatic strip supported on and spaced from
said second housing and mechanically linked to
said switch, said strip being responsive to changing
ambient temperatures to open and close said switch;
means for adjusting the thermostatic strip to open
and close said switch at various preselected tem-
peratures, said adjusting means comprising a shaft
coaxial with said collar and projecting there-
through; and
said first housing being secured in superposed posi-
tion on said second housing with said thermostatic
strip interposed therebetween.

2. Apparatus as set forth in claim 1 wherein the ad-
justing means includes cam means on said shaft devel-
ed and is rotate independently of the second shaft.

3. Apparatus as set forth in claim 1 which further in-
cludes a support for the strip extending from said sec-
ond housing and engageable by one end of the strip, the
mechanical linkage between the switch and strip being
constituted by an operating member for the switch en-
gaging the other end of the strip, the adjusting means
being engageable with the strip intermediate said sup-
port and member on the side of the strip opposite said
support and member to apply varying force to the strip
intermediate its ends to change the temperature at
which said strip will actuate the switch, said support
being adjustable to apply varying force to said end of
the strip in the opposite direction from that applied by
the last said means thereby to alter the temperature
range over which said strip can be adjusted to actuate
said switch.

4. Apparatus as set forth in claim 1 in which said col-
lar has a tubular extension protruding from the housing
and is rotate independently of the second shaft.

5. Apparatus as set forth in claim 4 in which the
switch assembly includes two contact arms each
mounted generally in a plane perpendicular to the axis
of said shaft and carrying respective contacts on the
free ends thereof and movable in planes generally par-
allel to said axis toward and away form respective mat-
ing stationary contacts, said cam having at least two an-
grily spaced face formations adapted respectively to
actuate the respective contact arms.

6. Apparatus as set forth in claim 5 wherein the face
formations are spaced radially outwardly different dis-
tances from the rotational axis of said shaft.

7. Apparatus as set forth in claim 6 wherein the col-
lar has a plurality of angularly spaced recesses, and which
further includes detent means engageable with said re-
cesses thereby to establish a plurality of positions be-
tween which said collar may be rotated so as to selec-
tively actuate said collar arms to open and close the re-
spective contacts at preselected positions.

8. Apparatus as set forth in claim 7 wherein the de-
tent means is a spring segment comprising a loop of resil-
ient material.

9. Apparatus as set forth in claim 1 in which the
switch assembly includes a contact arm mounted along-
side the shaft for movement in a plane generally par-
allel to the axis thereof and carrying a first contact on
one surface of the free end thereof for engagement with
a mating stationary second contact, said contact arm
carrying on its opposite surface a third contact spaced
inwardly from the free end thereof for engagement with
a mating stationary fourth contact whereby said
contact arm and contacts constitute a double-throw
switch.