

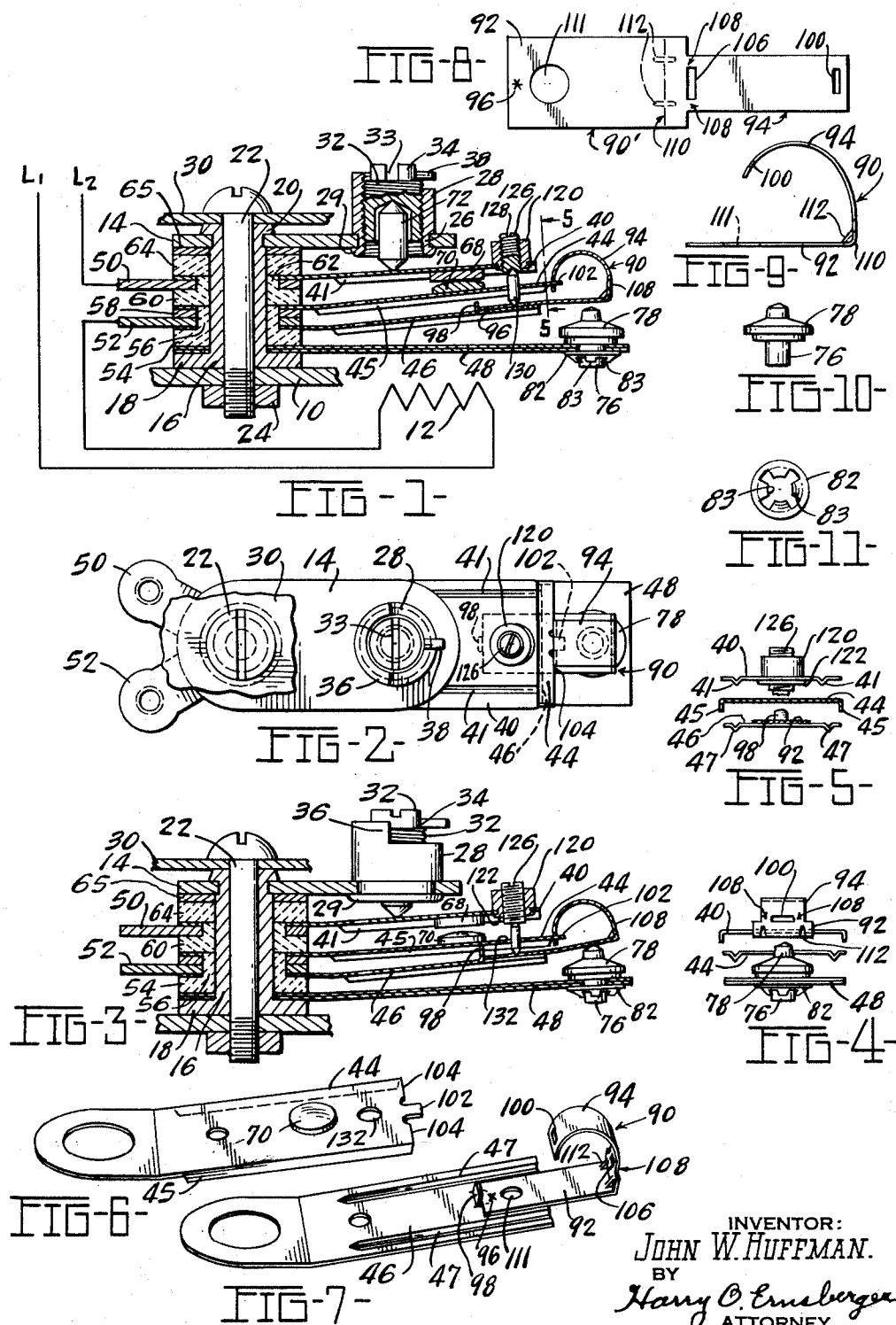
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SNAP SWITCH

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SNAP SWITCH

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This invention relates to snap switches and more especially to a snap action switch construction embodying a resilient element arranged to provide a toggle action for effectively biasing a switch member to circuit making or circuit breaking positions.

Control switches have been utilized wherein an actuating member and a switch member are connected through the medium of an arcuately shaped spring member having pivotal connections with the switch member and the actuating member. In switch mechanisms of this character, the arcuate spring is supported through pivotal engagement with a switch member and an actuating member and is not anchored or secured to either member.

The present invention embraces a switch means arranged for snap action wherein a resilient element is disposed between a contact carrying switch member and a supporting member having a pivotal engagement with one of the members and being secured to the other member whereby a reliable snap action of the switch contacts is attained.

An object of the invention embraces a switch means of the snap action type embodying a resilient element anchored to one member of the switch mechanism and having articulate connection with another member whereby movement of the resilient element in either direction reaches a point wherein the potential energy in the resilient element is effective to instantly move a switch member to engage or separate switch contacts whereby arcing across the contacts is reduced to a minimum.

Another object of the invention resides in a switch mechanism embodying a thermoresponsive means arranged to influence the position of a movable switch member through the medium of a resilient element whereby the contacts of the switch mechanism may be engaged and disengaged by a snap action through the medium of a resilient element whereby a high degree of sensitivity of temperature control is attained.

Still a further object of the invention is the provision of a manually controllable thermoresponsive switch mechanism wherein the sensitivity of operation of the snap action of a movable switch member may be adjusted whereby the switch mechanism is effective to maintain ambient temperatures within extremely small temperature differentials and which is reliable in its operation.

Further objects and advantages are within the scope of this invention such as relate to the arrangement, operation and function of the related elements of the structure, to various details of construction and to combinations of parts, elements per se, and to economies of manufacture and numerous other features as will be apparent from a consideration of the specification and drawing of a form of the invention, which may be preferred, in which:

FIGURE 1 is an enlarged longitudinal sectional view of a form of switch mechanism embodying the invention;

FIGURE 2 is a top plan view of the switch construction shown in FIGURE 1;

FIGURE 3 is a view similar to FIGURE 1 illustrating a movable switch arm with the switch contacts in disengaged relation;

FIGURE 4 is an end view of a portion of the construction shown in FIGURE 3;

FIGURE 5 is a detail sectional view taken substantially on the line 5—5 of FIGURE 1;

FIGURE 6 is an isometric view of a movable switch

2

member forming a component of the switch mechanism; FIGURE 7 is an isometric view illustrating an actuating member and resilient element secured thereto;

FIGURE 8 is a plan view of a metal blank from which the resilient element is formed;

FIGURE 9 is an enlarged elevational view of the resilient element configured from the blank shown in FIGURE 8;

FIGURE 10 is an elevational view of an insulating member forming a component of the construction, and

FIGURE 11 is a plan view illustrating a means for securing the insulating member to a component of the switch mechanism.

The switch mechanism of the invention illustrated is especially adaptable for thermostatically controlling the energization of a heating element, but it is to be understood that the switch mechanism may be utilized for controlling electrical circuits generally and has particular utility in the control of circuits of air conditioning equipment, refrigeration units or for controlling any circuit where it is desirable to obtain a snap action to rapidly make or break a circuit.

Referring to the drawings in detail and initially to FIGURE 1, there is illustrated a frame portion 10 of an electrically heated or electrically controlled appliance or region, as for example, an electric iron, or the frame portion of an air conditioning apparatus. For purposes of illustration, an electrically energizable heating element or component 12 is shown diagrammatically, to which electric energy is supplied through conductors or power lines L-1 and L-2. In the embodiment illustrated, the frame portion 10 provides a support or mounting means for the switch mechanism of the invention, but it is to be understood that any suitable mounting may be employed.

The switch mechanism illustrated in FIGURES 1 through 5 is enlarged to about twice actual size. The switch mechanism is inclusive of a frame construction provided by a plate component 14 and a tubular or sleeve component 16, the plate 14 being formed with an opening to receive an end of the sleeve 16. The sleeve provides a support for several elements of the switch assembly to form a "stacked" switch. An end region of the sleeve 16 adjacent the appliance frame portion 10 is formed with a flange 18.

After assembly of the elements of the switch mechanism and the plate 14 on the sleeve 16, the end region of the sleeve is swaged or staked as at 20 to maintain the parts of the switch in assembled relation. The switch mechanism may be secured to the frame portion 10 by suitable means, and in the embodiment illustrated, is secured thereto by means of a bolt 22 and a securing nut 24 in the manner shown in FIGURE 1.

The form of switch construction illustrated includes manually adjustable means operable within the operating temperature range of the switch for adjusting the position of one of the switch arms or members, a thermoresponsive means being effective to maintain substantially constant the temperature for which the manual means is adjusted. In the embodiment illustrated, the switch frame plate 14 is provided with an opening to receive a tenon portion 26 of a sleeve or fitting 28, the extremity of the tenon portion 26 being swaged or staked as shown at 29 over the adjacent region of the plate 14 to securely fasten the sleeve 28 to the plate.

The appliance may be provided with a housing, a portion 30 thereof being shown, and the bolt 22 may pass through an opening formed therein as shown in FIGURE 1. The fitting 28 extends through an opening in the housing. The sleeve is interiorly threaded to accommodate a threaded member or shaft 32 which may be manually rotated by a suitable tool that may be inserted in a

slot 33 formed on the portion 34 of the shaft, or the shaft may be equipped with a finger grip or knob (not shown) for rotating the shaft.

The fitting 28 is formed with an abutment portion 36 with which a pin 38 carried by the shaft 32 cooperates, the extent of rotation of the shaft 32 permitted by the pin 38 between the abutment surfaces on the portion 36 defining the limits of the temperature range within which the switch is adapted to operate. The switch mechanism is inclusive of a first switch arm or member 40 and a second switch member 44, an adjustable spring-supporting member 46 and a thermoresponsive means or bimetallic element 48.

The first and second switch members 40 and 44, the spring support member 46, the thermoresponsive member or bimetal element 48 and terminals or connectors 50 and 52 are supported by means associated with the sleeve 16.

The switch member 40 is provided with transversely spaced parallel ridges 41 and the second switch member 44 is provided at its edges with downwardly turned flanges 45 to lend rigidity to these members throughout a major portion of their length. The flanges and ridges terminate at a region spaced from the supporting means to provide a flexing or fulcrum region for each of the members. The member 46 is formed with parallel ridges 47 provided by recesses as shown in FIGURE 7.

The thermoresponsive means or bimetal member 48 is provided with an opening through which the sleeve 16 extends, the bimetal element being positioned by the flange 18. Disposed above the bimetal element on the sleeve 16 is a sleeve 54 of insulating material, such as lava or ceramic material, capable of withstanding high temperatures. The member 46 is provided with an opening and is received on a tenon portion 56 of the sleeve 54, as shown in FIGURES 1 and 3.

A terminal member 52 is also formed with an opening and is received on the tenon 56 which also accommodates a washer 58 of insulating material. The second switch member 44 is provided with an opening and is received on the tenon portion 56 above the spacing washer 58. Also mounted on the sleeve 16 is a second insulating fitting 60 of ceramic or other insulating material and is provided with a tenon 62. A second terminal 50 is received on the tenon 62 and the first switch member 40 is formed with an opening to accommodate the tenon 62.

An insulating washer or member 64 and a metal washer 65 are fitted onto the sleeve 16 between the first switch member 40 and the frame plate 14. The first switch member 40 is in metallic contact with the terminal 50 and the second switch member 44 is in metallic contact with the second terminal 52 through the metal washer 58. The first switch member is provided with a contact 68 which cooperates with a second contact member 70 mounted on the second switch arm 44 to control the circuit of the electrically energizable unit 12.

The relative position of the first switch arm 40 is controlled by the manually rotatable shaft or adjusting member 32. A strut or member 72 formed of insulating material, such as ceramic or lava, is contained in a socket formed in the shaft 32, the lower end of the strut 72 engaging the switch arm 40. The switch arm 40 is inherently flexed or biased in an upward direction toward the strut 72 and thus rotation of the shaft 32 shifts the position of the switch arm 40 upwardly or downwardly dependent upon the direction of rotation of the shaft 32 to predetermine the position of the switch arm in accordance with a temperature to be maintained within the temperature range provided within the limits of rotation of the shaft 32.

The thermoresponsive means 48 in the embodiment illustrated is fashioned of two metals having dissimilar coefficients of expansion whereby variations in the ambient temperature cause flexing or relative movement of the thermoresponsive means 48. The thermoresponsive com-

ponent 48 is provided at its distal end with an opening to accommodate a tenon portion 76 of an insulating member or strut 78 shown in FIGURE 1. The strut 78 is adapted for engagement with a resilient means anchored to the member or arm 46.

The portion of the tenon 76 extending through the opening in the bimetal element 48 is adapted to receive a locking means in the form of a lock washer 82 to secure the insulating strut 78 to the bimetallic element. The lock washer is provided with circumferentially spaced tines 83 which yieldingly engage the tenon 76 and are angularly arranged as shown in FIGURE 1 to securely fasten the strut 78 on the member 48.

The switch construction includes a resilient means 90 associated with the relatively movable switch member or arm 44 and the support member 46 for establishing a snap action effective to open or close the contacts 68 and 70. In the embodiment illustrated, the resilient means or spring is fashioned with a uniplanar or flat portion 92 and a curved or arcuately shaped portion 94 as shown in FIGURE 9. The spring arrangement 90 is formed from a flat blank shown at 90' in FIGURE 8.

The planar portion 92 is spot welded or otherwise joined to the adjustable spring-supporting arm 46 as shown at 96 to securely fasten the planar portion 92 of the spring to the supporting member 46.

The supporting member 46 is formed with a struck-up projection 98 shown in FIGURES 1 and 3 providing a stop means or abutment for limiting downward movement of the second switch arm 44 when the contacts 68 and 70 are disengaged.

The distal end region of the arcuate portion 94 of the spring is provided with a slot or opening 100 into which extends a projection 102 formed on the distal end of the second switch arm or member 44. The end of the switch member 44 provides edges or edge zones 104 which engage the regions of the curved portion at each side of the slot 100. Through this arrangement a pivotal or articulate connection is provided between the curved portion 94 of the spring and the second switch member 44.

Formed in a substantially diametrically opposite region of the arcuate spring portion 94 and adjacent the juncture of the arcuate portion with the planar portion 92 is a similar slot 106 which provides regions 108 at each side of the slot of reduced cross-section as compared with the cross-section of the arcuate portion of the spring. The weakened zone of the spring provided by the areas 108 form a hinge zone about which flexure of the arcuate portion of the spring takes place during movements of the switch arm or member 44 into or out of contact closing positions.

The metal of the spring at the bend 110 joining the planar portion 92 with the arcuate portion 94 is formed with transversely spaced indented zones forming ridges 112 to render the bend of a more rigid character to assure a hinging or flexing action at the weakened regions 108.

It will be apparent that by flexing the planar portion 92 of the spring 90, the position of the weakened zones 108 will be moved upwardly or downwardly, depending upon the direction of flexure, to either side of the plane of the second switch member 44.

In this manner a toggle action is provided imparting movement to the movable switch member 44 through the arcuately shaped portion 94 of the spring to engage or disengage the contacts 68 and 70. The contact closing portion of the components is shown in FIGURE 1 and the position of the components with the contacts 70 disengaged is shown in FIGURE 3.

In the embodiment illustrated, the bimetal element 48 is arranged to be flexed upwardly by increased ambient temperature, engaging the strut 78 with the planar portion 92 flexing the planar portion upwardly to a position wherein the toggle action of the spring moves the

switch member 44 with a snap action to quickly disengage the contacts without appreciable arcing.

When the temperature ambient the bimetal element decreases, the strut 78 moves away from the planar portion 92 of the spring and the inherent stress in the planar portion of the spring flexes the arcuate portion 94 to move the weakened regions 108 below a plane through the switch member 44, thus, moving the switch member upwardly with a snap action to engage contacts 68 and 70 to complete a circuit.

In the embodiment illustrated, the arcuately shaped portion 94 of the spring is of lesser width than the planar portion 92 of the spring as shown in FIGURE 4. This provides a curved portion of lesser cross-section requiring less force for its actuation. The metal of the spring is made comparatively thin usually between three thousandths and seven thousandths of an inch in thickness depending upon the size of switch and the degree of sensitivity required for the spring although the spring may be of other thickness if desired.

The spring may be fashioned of spring steel, stainless steel, beryllium copper, brass or other material, which will withstand the ambient temperature variations and the heat generated through repeated making and breaking of the contacts 68 and 70. The switch construction of the invention embodies means for regulating or controlling the relative sensitivity of the mechanism providing the snap action so that the switch arm 44 may be moved under the influence of minute thermal differentials effective through the bimetal element 48 to actuate the spring 90.

As particularly shown in FIGURES 1, 2 and 3, the distal end region of the switch member 40 is formed with an opening receiving the tenon portion of a fitting 120, a portion 122 of the tenon being swaged over the lower surface of the switch member 40 to secure the fitting to the switch member. The fitting 120 is bored and threaded to receive a threaded member 126 which may be rotated or adjusted by insertion of a suitable tool in a kerf 128 formed in the threaded member 126.

The opposite end of the threaded member 126 is formed with a recess to accommodate a strut or member 130 of ceramic or other insulating material which extends through a clearance opening 132 in the switch member 44, the lower end engaging the upper surface of the spring supporting member 46. An opening 111 is formed in the uniplanar portion 92 of the spring 90 through which the strut 130 extends, the walls of this opening preventing dislodgement of the strut 130.

By rotating the member 126 relative to the fitting 120, the distance between switch member 40 and the spring supporting arm 46 may be regulated or varied. This adjustment varies the maximum spacing between the contacts 68 and 70 in disengaged relation and directly controls or regulates the sensitivity of the toggle action of the spring 90. By way of example, if it is desired that the spring operate to open or close the contacts with a minute change or differential in the ambient temperature, the member 126 is adjusted to a position with the contacts just out of engagement.

If it is desired that the snap action of the spring be less sensitive under the influence of a greater temperature differential, then the member 126 is rotated to provide increased space between the contacts when in disengaged relation. The abutment or stop member 98 functions to limit the downward movement of the second switch member or arm 44 in contact disengaging position.

In the operation of the switch mechanism in controlling an appliance or region of varying temperature, the contacts and switch components are illustrated in circuit closing position in FIGURE 1 to energize the unit 12. When the ambient temperature increases by heat from the energized unit, the bimetal element 48 is flexed upwardly as viewed in FIGURE 1, moving the strut 78 up-

wardly causing the latter to engage the uniplanar portion 92 of the spring flexing the same upwardly until the weakened regions 108 are moved above a plane through the second switch member 44.

When this occurs, the arcuate portion 44 of the spring is rocked or hinged about the weakened regions 108, influencing the switch member 45 to be moved downwardly to the position shown in FIGURE 3, disengaging the contacts and interrupting the energizing circuit. This cycle of movements continues under the influence of small variations in ambient temperature to maintain a substantially constant temperature.

The member 126 may be rotated or adjusted to secure a desired degree of sensitivity of operation of the curved portion 94 of the spring. Through the switch arrangement of the invention, an instantaneous make and break of the switch contacts is attained and arcing between the contacts reduced to a minimum whereby the contacts are capable of long life and dependable operation. It will be apparent that the relative movement of the arcuate portion 94 of the spring is slight, and the wear upon the spring is negligible.

As shown in FIGURE 9, the spring 90 is initially fashioned with the curved portion 94 of a greater radius than that of its assembled position so as to establish a potential force in the spring in assembled position, shown in FIGURES 1 and 3, to provide a toggle action. The curved portion 94 is thus tensioned or stressed so that in either "over center" position of the weakened regions 108 relative to the plane of the switch member 44, the biasing force of the spring is effective to move the switch arm 44 into or out of circuit closing position.

The operating temperature range may be regulated by adjusting the position of the threaded member 32 to change the initial setting or position of the switch member 40. A calibrated dial (not shown) may be provided for cooperation with a knob on the threaded member or shaft 32 to indicate positions at which the thermoresponsive means will maintain substantially constant the temperature of a region ambient the same.

The action of the spring means in the maintenance of a desired temperature is automatic and the only deviation from a constant temperature is the thermal differential or temperature difference required to flex the spring 90 to modify the direction of the biasing force of the curved portion 94 acting on the switch member 44.

The switch means is particularly adapted for controlling air-conditioning apparatus. To adapt the switch for such purpose the bimetallic element is reversed so that an increase in temperature adjacent the bimetallic element causes it to flex in a direction to close the contacts and energize the circuit of a cooling unit of air-conditioning apparatus, and to flex in the opposite direction when the temperature is reduced to effect a separation of the contacts and interruption of the circuit of the cooling unit.

It is apparent that, within the scope of the invention, modifications and different arrangements may be made other than as herein disclosed, and the present disclosure is illustrative merely, the invention comprehending all variations thereof.

I claim:

1. Switch mechanism, in combination, a relatively movable current conducting member provided with a contact, a second contact, means supporting the second contact, said current conducting member being movable to positions engaging and disengaging said contacts, a support member, a resilient element formed with an arcuate portion, the end region of the arcuate portion having pivotal engagement with one of said members, another portion of said element being fixedly secured to the other of said members, the arcuate portion being provided with a region of reduced cross-section forming a hinge zone for said arcuate portion, said pivotal connection and the hinge zone being disposed with respect to the movable current conducting member whereby flexure of the resilient

element causes relative movement of the arcuate portion to effect snap action movements of the current conducting member to engage or disengage the contacts.

2. Switch mechanism, in combination, a relatively movable current conducting member provided with a contact, a second contact, means supporting the second contact, said current conducting member being movable to positions engaging and disengaging said contacts, a support member, a resilient element formed with an arcuate portion and a planar portion, the end region of the arcuate portion pivotally engaging one of said members, the planar portion of said element being anchored to the other of said members, the arcuate portion being provided with a region of reduced cross section providing a hinge zone for said arcuate portion, said region of pivotal engagement and the hinge zone being disposed with respect to the movable current conducting member whereby slight flexure of the planar portion of the resilient element causes movement of the arcuate portion to effect snap action movements of the current conducting member to engage or disengage the contacts.

3. Switch mechanism, in combination, a relatively movable current conducting member provided with a contact, a second contact, means supporting the second contact, said current conducting member being movable to positions engaging and disengaging said contacts, a second member, a resilient element formed with an arcuate portion and a planar portion, the distal end region of the arcuate portion being in pivotal engagement with an end of one of said members, the planar portion of said element being fixedly secured to the other of said members, said resilient element being formed with a weakened section forming a hinge zone for said arcuate portion, the region of pivotal engagement of the element with one member and the hinge zone being disposed with respect to the movable current conducting member whereby flexure of the planar portion causes rocking movement of the arcuate portion about the hinge zone to effect snap action movements of the current conducting member to engage or disengage the contacts, and thermoresponsive means arranged to control the position of a region of the planar portion of the element for effecting movement of the arcuate portion under the influence of ambient temperature variations.

4. Switch mechanism, in combination, a relatively movable current conducting member provided with a contact, a second contact, means supporting the second contact, said current conducting member being movable to positions engaging and disengaging said contacts, a support member, a resilient element formed with an arcuate portion and a planar portion, the distal end region of the arcuate portion having pivotal engagement with an end of one of said members, the planar portion of said element being fixedly secured to the other of said members, said resilient element being formed with a hinge zone for said arcuate portion, the region of pivotal engagement of the element with one member and the hinge zone being disposed with respect to the movable current conducting member whereby flexure of the planar portion causes rocking movement of the arcuate portion about the hinge zone to effect snap action movements of the current conducting member to engage or disengage the contacts, and a thermoresponsive bimetallic bar supported at one end, the distal end of the bar being disposed to influence the position of a region of the planar portion of the element for effecting flexure thereof to cause rocking movement of the arcuate portion under the influence of ambient temperature variations.

5. Switch mechanism of the character disclosed, in combination, a pair of relatively movable current conducting members, a support member, cooperating contacts carried by said current conducting members, thermoresponsive means, manually operable means for adjusting the relative position of one of said current conducting members, a resilient element formed with a substantially

planar portion and an arcuate portion, an end of one of said relatively movable members being formed with a projection, the arcuate portion of the resilient element being formed with an opening arranged to accommodate the projection providing an articulate connection, the planar portion of the element being secured to the support member, the region of the arcuate portion adjacent the planar portion being of reduced cross-section providing a hinge zone for the arcuate portion, said thermoresponsive means being arranged to flex the planar portion of the resilient element under the influence of ambient temperature variations.

6. Switch mechanism of the character disclosed, in combination, a pair of relatively movable current conducting members, a support member, cooperating contacts mounted on the current conducting members, a resilient element having a portion secured to the support member, said resilient member having a curved portion in pivotal engagement with one of said current conducting members, said resilient element having a weakened region spaced from the pivotal connection and forming a hinge zone whereby flexure of a portion of said element moves said hinge zone relative to the pivotal connection with one of the current conducting members whereby to effect a snap action movement of the current conducting member engaged by the element in directions to engage or disengage said contacts, thermoresponsive means arranged to influence the position of one of the current conducting members, and a strut of insulating material disposed between the thermoresponsive means and the current conducting member controlled thereby.

7. Switch mechanism of the character disclosed, in combination, a pair of relatively movable current conducting members, a support member, cooperating contacts mounted on the current conducting members, a resilient element having a portion secured to the support member, said resilient member having a curved portion in pivotal engagement with an end of one of said current conducting members, said resilient element having a weakened region spaced from the region of pivotal engagement and forming a hinge zone whereby flexure of a portion of said element moves said hinge zone relative to the pivotal connection with one of the current conducting members whereby to effect a snap action movement of the current conducting member engaged by the element in directions to engage or disengage said contacts, means for manually adjusting the position of the other of said current conducting members, and thermoresponsive means arranged to engage and actuate a portion of said resilient element to cause the snap action movement of said movable current conducting member having pivotal connection with the resilient element.

8. Switch mechanism of the character disclosed, in combination, a pair of relatively movable current conducting members, a support member, cooperating contacts mounted on the current conducting members, a resilient element having a portion secured to the supporting member, said resilient element having a curved portion in pivotal engagement with one of said current conducting members, said resilient element having a weakened region spaced from the pivotal connection and forming a hinge zone whereby flexure of a portion of said element moves said hinge zone relative to the pivotal connection with one of the current conducting members, means for manually adjusting the position of the other of said current conducting members, adjustable means carried by said other current conducting member for regulating the maximum opening movement of said contacts, and thermoresponsive means arranged to engage and actuate a portion of said resilient element to effect snap action movement of said movable current conducting member having pivotal connection with the resilient element.

9. In combination, switch mechanism including a support, first and second switch arms formed of flexible ma-

terial, one end of each of said switch arms being secured to the support, cooperating contacts carried by said switch arms for controlling a circuit, an elongated member having one end secured to the support, a resilient element fixedly secured to the member, said resilient element being formed with a curved portion, the distal end of the curved portion of the resilient element having pivotal engagement with the second switch arm, an intermediate region of said resilient element being of reduced cross-section providing a hinge zone, said hinge zone and the region of pivotal engagement of the curved portion with the second switch arm being spaced whereby flexure of the resilient element relative to the elongated member effects a change in the direction of a biasing force transmitted through the curved portion of the resilient element to the second switch arm to effect a snap action movement of the switch arm for engaging or disengaging the contacts, means for manually adjusting the position of said first switch arm, a bimetallic element having one end secured to the support, and a strut of insulating material secured to the distal end of the bimetal element, said strut being arranged to engage and flex the resilient element responsive to movement of the bimetal element under ambient temperature variations.

10. In combination, switch mechanism including a support, first and second switch arms formed of flexible material, one end of each of said switch arms being secured to the support, cooperating contacts carried by said switch arms for controlling a circuit, an elongated member having one end secured to the support, a resilient element secured to the member, said resilient element being formed with a curved portion, the distal end of the curved portion of the resilient element having pivotal engagement with the second switch arm, an intermediate region of said resilient element being of reduced cross-section providing a hinge zone, said hinge zone and the region of pivotal engagement of the curved portion with the second switch arm being arranged whereby flexure of the resilient element relative to said elongated member effects a change in the direction of a biasing force transmitted through the curved portion of the resilient element to the second switch arm to effect a snap action movement of the switch arm to engage or disengage the contacts, a thermoresponsive means mounted by the support, a strut of insulating material secured to the distal end of the thermoresponsive means, said strut being arranged to

engage the resilient element and to flex the resilient element responsive to movement of the thermoresponsive means under the influence of ambient temperature variations, and manually operable means for adjusting the position of the first switch arm to predetermine a temperature at which the ambient environment is to be substantially maintained by movement of the thermoresponsive means set up by temperature variations.

11. In combination, switch mechanism including a support, first and second switch arms formed of flexible material, one end of each of said switch arms being secured to the support, cooperating contacts carried by said switch arms for controlling a circuit, an elongated member having one end secured to the support, a resilient element formed with a planar portion secured to an end of the member, said resilient element being formed with a curved portion, the distal end of the curved portion of the resilient element having pivotal engagement with the second switch arm, an intermediate region of said resilient element being of reduced cross-section providing a weakened zone, said weakened zone and the region of pivotal engagement of the curved portion with the second switch arm being arranged whereby flexure of the planar portion of the resilient element effects a change in direction of a biasing force transmitted through the curved portion of the resilient element to the second switch arm to effect a snap action movement of the switch arm to engage or disengage the contacts, a bimetallic element having one end secured to the support, a strut of insulating material secured to the distal end of the bimetal element, said strut being arranged to engage and flex the planar portion of the resilient element responsive to movement of the bimetal element under ambient temperature variations, manually operable means for adjusting the position of the first switch arm to predetermine a temperature at which the ambient environment is to be substantially maintained, and means for adjusting the extent of separation of the current conducting switch arms to regulate the sensitivity of the snap action effected through the resilient element.

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