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THERMOSTATIC SWITCH FOR SMALL ELECTRICAL APPLIANCES

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Fig. 1.

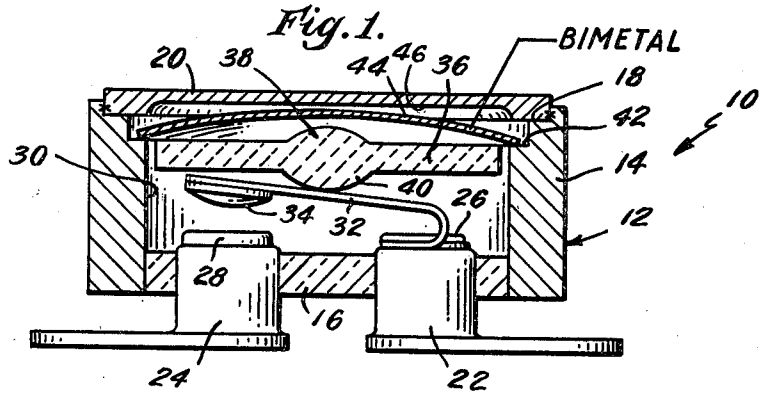


Fig. 2.

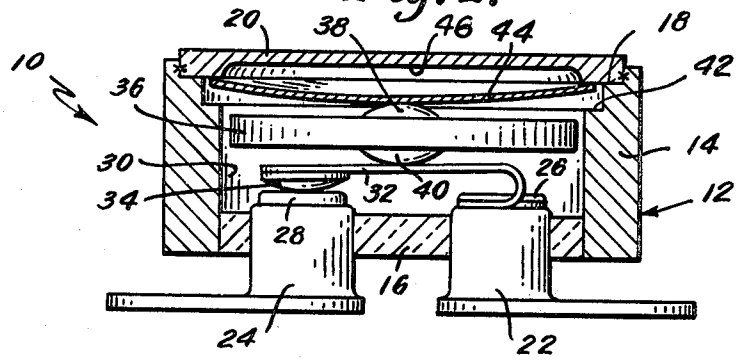
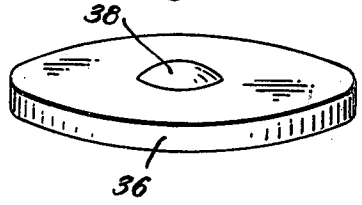


Fig. 3.



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THERMOSTATIC SWITCH FOR SMALL ELECTRICAL APPLIANCES

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ABSTRACT OF THE DISCLOSURE

A thermostatic switch having a housing in which a bimetallic element is located, a disc-type actuating member being located in floating relation in the housing and being responsive to movement of the bimetallic element to force a movable contact into engagement with a stationary contact.

Background of the invention

The present invention relates to thermostatic switches of the type that are applicable in a variety of electrical appliances wherein control of an electrical circuit is required by the temperature of the environment in which the switch is located. Prior to the instant invention, such switches had normally included terminals that were located in spaced relation in a housing and that were adapted to be bridged by a spring contact arm. A bimetallic disc also located in the housing and responsive to the temperature of the environment surrounding the housing was operative to move an actuating pin into engagement with the contact arm for establishing electrical communication between the terminals. Although these prior known thermostatic switches generally accomplished the purpose and were controlled by the temperature of the environment surrounding the switch, they did include a number of parts; and because of the use of an intermediate actuating pin, the control for moving the spring contact arm was not as sensitive as desired. Further, the number of parts required in this type of switch necessarily increased the cost of manufacture thereof; and because the ship of the parts was also necessarily increased.

Summary of the invention

The present invention includes a thermostatic switch having a housing in which spaced contacts are located and that are adapted to be bridged by a spring contact arm. Locted in the housing in floating relation therein is an actuating member that is disposed in contact with the spring contact arm. Mounted in the housing is a bimetallic element that is responsive to the temperature of the environment surrounding the switch and that is adapted to be snapped through an over-center position into engagement with the actuating member for moving the actuating member toward the spring contact arm, thereby causing the actuating member to force the spring contact arm into bridging engagement with the spaced contacts. The actuating member is constructed such that the central portion thereof is formed with projections on both sides, one of the projections engaging the spring contact arm and the other of the projections being adapted to be engaged by the bimetallic element when it is operated by a change in temperature of the environment surrounding the switch. The actuating member is formed of a non-conducting material, thereby insuring that proper electrical communication is established between the spaced contacts when the spring contact arm is forced into bridging relation with respect thereto.

Accordingly, it is an object of the invention to provide a thermostatic switch having a housing in which a floating actuating member is located, the actuating member being movable by a bimetallic element for engaging a spring contact arm, thereby moving the spring contact arm into bridging relation with the spaced contacts mounted in the switch housing.

Another object of the invention is to provide a non-metallic actuating member that is disposed in floating relation in a switch housing and that is movable in response to actuation of a bimetallic element to provide for bridging of switch contacts located within the housing.

Other objects, features and advantages of the invention will become apparent as the description thereof proceeds when considered in connection with the accompanying illustrative drawings.

Description of the drawing

In the drawing which illustrates the best mode presently contemplated for carrying out the present invention:

FIG. 1 is a sectional view of the thermostatic switch embodied in the present invention and showing the switch contacts located in the switch housing being disposed in the open position;

FIG. 2 is a view similar to FIG. 1 showing the switch contacts in the closed position thereof after actuating of the bimetallic element; and

FIG. 3 is a perspective view of the actuating member that is disposed in floating relation in the switch housing.

Description of the invention

Referring now to the drawing and particularly to FIGS. 1 and 2, the thermostatic switch embodied in the present invention is illustrated and is generally indicated at **10**. As shown, the thermostatic switch **10** is of the type that includes a bimetallic element therein and is adapted to be employed in an appliance wherein temperature control of the environment therein is required. Examples of such appliances are cooking units, coffee percolators, and similar devices.

As shown in FIGS. 1 and 2, the thermostatic switch **10** includes a housing generally indicated at **12** that is defined by an annular wall **14** formed of a metallic material, and a base **16** that is joined to the lower end of the annular wall **14** nd that is formed of a non-conducting glass material. The glass base **16** is fixed to the annular wall **14** at the lower end thereof by the well-known glass-to-metal sealing process. The uppermost end of the annular wall **14** is formed with a shoulder **18** on which a cap **20** is received, the cap **20** being fixed to the annular wall **14** by welding or the like.

Mounted in the base **16** are terminals **22** and **24** that are adapted to be electrically connected to suitable electrical conductor leads, the terminals **22** and **24** being spaced from each other and thus being insulated by the non-metallic glass base **16**. Mounted on the innermost ends of the terminals **22** and **24** are fixed contacts **26** and **28**, the contacts **26** and **28** being disposed within the housing **12** and in a chamber **30** as defined by the annular wall **14**, base **16** and cap **20**. Secured to the uppermost end of the terminal **22** and disposed in electrical communication with the fixed contact **26** is a spring arm **32**, on the free end of which a movable contact **34** is mounted. It is seen that when the movable contact **34** is moved into engagement with the fixed contact **28**, electrical communication is established between the contacts **26**, **28** and their respective terminals **22** and **24**. A circuit is then completed between the terminals **22** and **24** and the leads to which they are connected.

Located in floating relation within the chamber **30** of the housing **12** is a disc-like circular actuating member **36** that is formed of a non-conducting material, such as ceramic; and, as shown in FIGS. 1 and 2, the circular actuating member is formed with opposed projections **38** and **40**. The opposed projections **38** and **40** are formed

centrally of the actuating member **36** and thus are disposed in coaxial relation with respect to the chamber **30**. The projection **40** engages that portion of the spring arm **32** that is located in axial alignment with the axis of the chamber **30**, and thus the projection **40** makes point contact with the spring arm **32** at that position which is most effective to force the spring arm **32** downwardly in response to movement of the actuating member **36**.

Also formed in the annular wall **14** is a shoulder **42** that is annular in configuration and that is adapted to receive the peripheral or marginal edge of a bimetallic disc **44**. The bimetallic disc **44** is normally bowed outwardly, as illustrated in FIG. 1, and in this position the peripheral or marginal edges thereof are received on the shoulder **42**. In order to accommodate the bimetallic disc **44** in this position the cap **20** is formed with a recess **46**, the bowed portion of the disc **44** being received in the recess **46** as shown in FIG. 1. In this position, the actuating member **36** is located in a non-depressed position and the spring arm **32** due to the spring action thereof is located such that the movable contact **34** is maintained out of engagement with the fixed contact **28**. When the atmosphere or environment surrounding the switch **30** reaches the predetermined temperature that causes the bimetallic disc **44** to deflect or flex inwardly to the position illustrated in FIG. 2, the inward bowing of the disc **44** causes the portion thereof that is coaxial with respect to the actuating member **36** to engage the projecting portion **38** at a point that is also aligned with the axis of the actuating member **36**. The actuating member **36** is then moved inwardly by the deflecting action of the bimetallic disc and by so doing forces the spring arm **32** to a closed position, as illustrated in FIG. 2. In this position, the movable contact **34** engages the fixed contact **28**, thereby establishing electrical communication between the fixed contacts **26** and **28** and their respective terminals **22** and **24**. It is understood that when the atmosphere or environment in which the switch **10** is located returns to a temperature that will cause the bimetallic disc **44** to spring outwardly to the position illustrated in FIG. 1, the spring arm **32** will then move the floating actuating member **36** upwardly, and electrical communication between the movable contact **34** and the fixed contact **28** will be broken.

As illustrated and described, the thermostatic switch **10** is formed of relatively few parts, yet is extremely effective in producing the required electrical communication between the terminals **22** and **24** when the conditions so require that a circuit exist between these terminals and the leads to which they are attached. By employing the actuating disc **36** in the manner as illustrated, a much more simple construction is produced, and the axial length of the housing **12** is also materially decreased so as to enable the switch **10** to be employed in devices that require miniaturization. All of the parts employed in the switch are durable and insure efficiency in operation yet are relatively inexpensive, thereby resulting in a switch that may be constructed and assembled with a minimum of cost.

While there is shown and described herein certain specific structure embodying the invention, it will be manifest to those skilled in the art that various modifications and rearrangements of the parts may be made without departing from the spirit and scope of the underlying inventive concept and that the same is not limited to the particular forms herein shown and described except insofar as indicated by the scope of the appended claims.

What is claimed is:

1. In a thermostatic switch, a housing defined by an annular side wall and a base joined to said side wall, a pair of contacts fixed to said base in spaced relation and being insulated from each other, a spring contact arm located in said housing in electrical communication with one of said contacts and being normally located out of engagement with the other of said contacts, a bimetallic disc mounted in said housing and being responsive to a change in temperature of the environment surrounding the housing to deflect in an axial direction, an actuating member located in said housing between said bimetallic disc and said spring contact arm and being formed of a non-conducting material in a disc configuration, the diameter of said actuating member being slightly less than the diameter of said annular side wall, wherein said actuating member is mounted for floating axial movement in said housing between said bimetallic disc and spring contact arm and is guided in the axial movement thereof by said annular side wall, said actuating member having raised central portions projecting axially outwardly from both sides thereof, one of said raised portions making continuous point contact engagement with said spring arm and the other raised portion being engageable with said bimetallic disc upon deflection thereof, said bimetallic disc being responsive to a temperature change to deflect in a direction toward said actuating member to axially move said actuating member and the contact arm in engagement therewith in a direction toward said contacts, wherein said contact arm is moved sufficiently to engage said other contact to complete a circuit through said contacts, and a cap overlying said bimetallic member and enclosing said housing.

2. In a thermostatic switch as set forth in claim **1**, said contact arm bridging the space between said contacts such that it extends for a portion of a diametrical line through said housing, wherein a portion of said contact arm is located in alignment with the axis of said housing, the raised central portion of said actuating member that is directed toward said contact arm thereby engaging said contact arm at a point that is located along the axis of said housing.

3. In a thermostatic switch as set forth in claim **2**, the diameter of said bimetallic disc being slightly greater than the diameter of said annular side wall, said wall having a shoulder adjacent its upper end defining a peripheral space for receiving said bimetallic disc, said cap and said shoulder cooperating to maintain said bimetallic disc in its propery assembled position.

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