

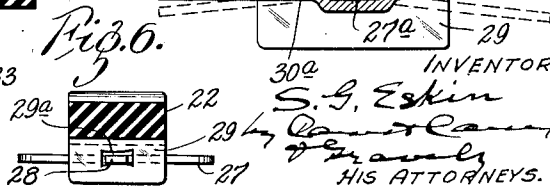
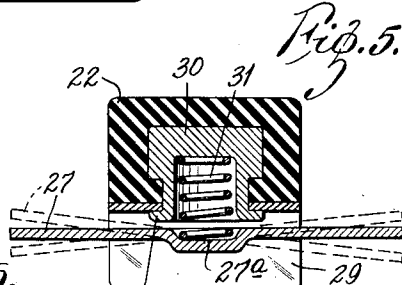
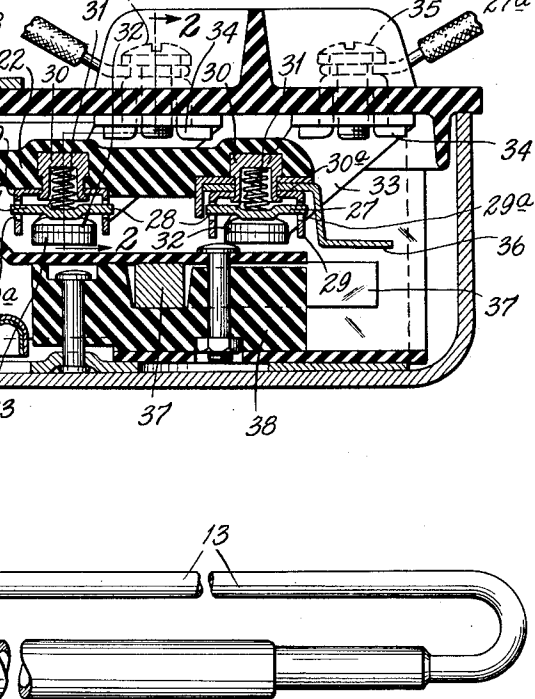
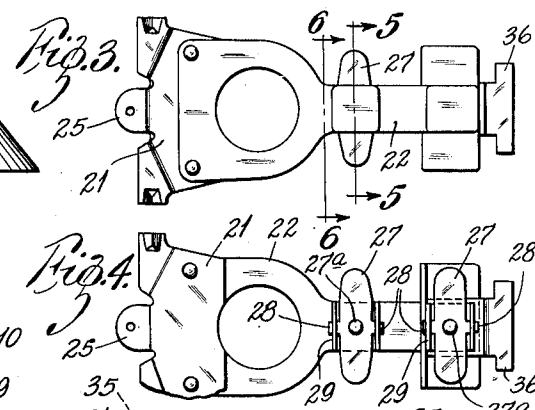
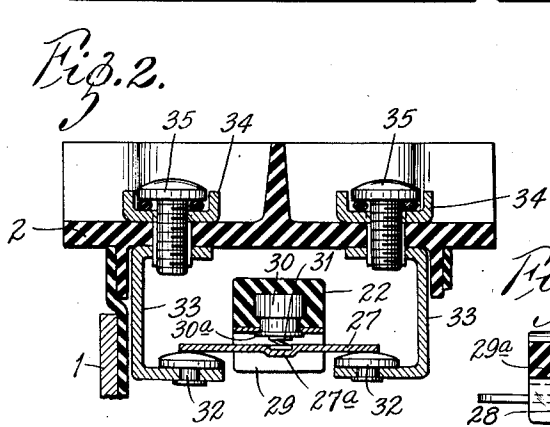
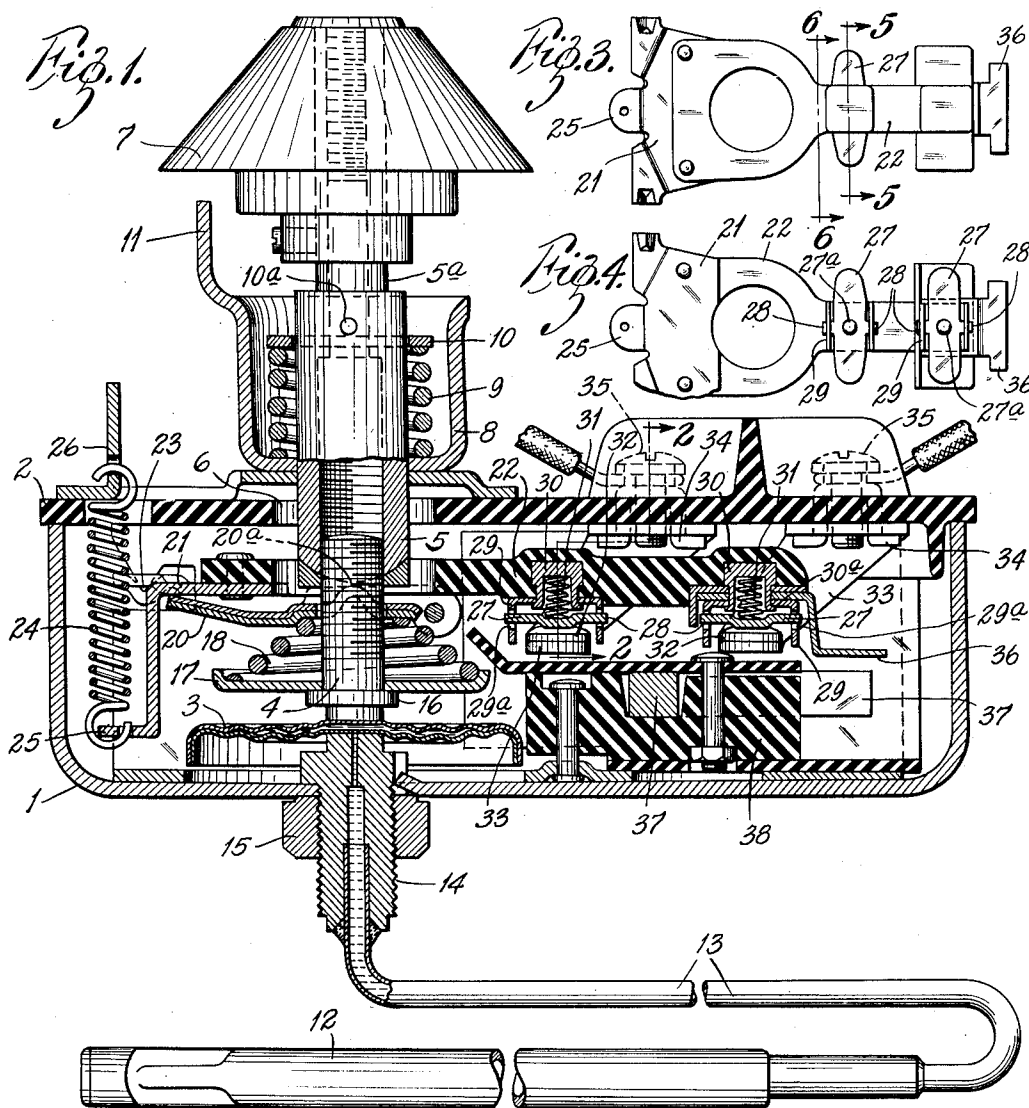
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2,121,079

ELECTRIC THERMOSTAT

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2,121,079

ELECTRIC THERMOSTAT

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5 Claims. (Cl. 200—140)

This invention relates to electric thermostats, particularly those used for controlling the temperature of electrically heated ovens. It has for its principal objects to devise a thermostatically controlled double pole switch mechanism that will permit the movable contacts thereof to automatically adjust themselves to the stationary contacts, that will hold the contacts in engagement until the movable supporting arm for the movable contacts has developed sufficient velocity to quickly separate said contacts without flickering or hesitancy. Another object is to eliminate the necessity for special thermostatic devices heretofore used for compensating for the effect of the outside temperature on the main thermostat. Other objects are simplicity and cheapness of construction and compactness of design. The invention consists in the electric thermostat and in the construction, combinations and arrangements of parts hereinafter described and claimed.

In the accompanying drawing, which forms part of this specification and wherein like symbols refer to like parts wherever they occur,

Fig. 1 is a central longitudinal sectional view of an electric thermostat embodying my invention,

Fig. 2 is a transverse section on the line 2—2 in Fig. 1,

Fig. 3 is a plan of the movable contact supporting lever,

Fig. 4 is a bottom view of said lever; and Figs. 5 and 6 are transverse sections on the lines 5—5 and 6—6, respectively, in Fig. 3.

Referring to the accompanying drawing, my invention is illustrated in connection with an electric thermostat for controlling the heat of the oven of an electric stove. Said thermostat comprises a metal casing 1 provided with an insulating cover 2 and containing an expansible disk 3 having a threaded pin 4 projecting axially from one side thereof into the threaded axial bore of a sleeve 5 that extends through an opening 6 provided therefor in said cover and has a pin 5a fixed to its outer end provided with a knob 7 for rotating said sleeve and adjusting it axially. The sleeve 5 is journaled in a suitable housing 8, which is fixed to the cover 2 and has a coil compression spring 9 therein that surrounds said sleeve between the inner end of said housing and a washer 10 that surrounds said sleeve and is retained thereon by means of a pin 10a. The housing is provided with an index arm 11 for indicating the rotary position of the knob 7.

The expansible disk 3 is actuated by expansible

fluid in a bulb 12 and capillary tube 13, which tube communicates with said disk through the axial bore of an exteriorly threaded fitting 14 that is secured to the side of the disk remote from the threaded pin 4. The fitting 14 extends through a hole provided therefor in the casing 1 and is secured to said casing by a nut 15 threaded on said fitting. The threaded pin 4 of the expansible disk 3 is provided with a collar 16 which supports a cupped washer 17 that is sleeved on said pin and forms a seat for one end of a coil compression spring 18 that is also sleeved on said pin. The other end of the spring 18 bears resiliently against an arm 20 having an opening adapted to loosely receive the pin 4 and diametrically opposed ribs 20a that bear against fulcrums on the adjacent end of the axially movable sleeve 5.

Located in the casing 1 between the pivotal arm 20 and the insulating cover 2 is a lever 21 having an opening in the long or contact supporting arm 22 thereof adapted to accommodate the rotary and axially movable sleeve 5. The lever 21 is supported at one end on suitable knife edge pivots 23 provided therefor in the opposite sidewalls of the casing 1 adjacent to the free end of the disk actuated arm 20, whereby said arm is adapted to bear against the contact carrying arm of said lever and swing it in a direction that will open the circuit controlled thereby. The contact lever 21 is urged to circuit closing position by means of a coil tension spring 24 having one end secured to the other or short arm 25 of said lever and the other end anchored to a bracket 26 fixed to the insulating cover 2.

The greater portion of the long contact carrying arm 22 of the lever 21 comprises an insulating section that supports the longitudinally spaced movable contact elements of a double pole switch. Each of these movable contact elements comprises an elongated plate 27 that is disposed crosswise of the contact supporting arm 22 of the lever 21 and is provided midway of the ends of its longitudinal side edges with outstanding lugs 28 that are loosely supported in openings 29a provided therefor in the side flanges of a channel-shaped bracket 29, whose web is rigidly secured flatwise to said arm by means of a metal cup 30 that is embedded in said arm and has an outstanding end flange 30a that overlaps said web. Mounted in the cup member 30 between the bottom thereof and a recess 27a provided therefor in the contact plate 27 is a coil compression spring 31 that tends to force said plate away from said arm 22 as far as the lug receiving

opening 28a in the channel-shaped bracket 29 will permit.

Cooperating with each of the movable contact plates 27 of the double pole switch mechanism is a pair of stationary contact members 32 that are spaced apart longitudinally of said plate in position to be bridged thereby. Each pair of stationary contact members 32 is supported on the free ends of a pair of metal arms or brackets 33 that are secured to the insulating cover 2 one on each side of the contact carrying arm 22 of the lever 21 by U-shaped metal clips 34 adapted to receive screws 35 that form binding posts for the electric wires of the circuit controlled by the switch mechanism. The outer end of the contact carrying arm 22 of the lever 21 is provided with a metal plate 36 adapted in the engaged position of the contacts to cooperate with a magnetic armature 37 in an insulating block 38 in the casing 1 and thus provide a snap action between the opening and closing points of the switch.

By the arrangement described, the temperature within the oven will cause the fluid in the bulb 12 therein to expand and thus expand the disk 3 and shift the pin 4 axially. The motion imparted to the pin by the expansible disk is transmitted through the spring 18 to the pivoted arm 20, whose free end presses against the lever 21 and swings the contact carrying arm 22 thereof in a direction that will disengage the movable contact plates 27 from the two pairs of stationary contact members 32 and thus open both sides of the circuit controlled by said thermostat. When the expansible disk 3 contracts the pin 4 moves in the opposite position, thereby permitting the spring 24 to swing the lever 21 in a direction that will bring the movable contact plates 27 into engagement with the stationary contact members 32 of the double pole switch and thus close both ends of the circuit. The spring 31 associated with each contact plate 27 serves to hold the same in contact with the pair of stationary contact members 32 bridged thereby, until the contact carrying arm 22 of the lever 21 has developed sufficient velocity to break with a snap action and thus prevent flickering of the current. These springs also insure contact between the contact plate at the outer end of the contact supporting arm of the lever by permitting the innermost contact plate to yield after making contact. The loose mounting of the contact plates in their channel-shaped supporting brackets 27 permits said plates to rock or tilt endwise thereof and seat on stationary contact members.

The arm 20, which actuates the lever 21, is made of bimetal, that is, two superimposed strips of metal having different coefficients of expansion, whereby said arm, when subjected to heat from an exterior burner, will move away from said lever and thus overcome any tendency for the arm to move in a direction that will cause the contacts to separate and break the circuit. Thus, this bimetallic arm of the switch mechanism performs the additional function of a compensating device, thereby eliminating the necessity for special compensating devices.

What I claim is:

1. An electric thermostat comprising a casing, a cover therefor, a switch mechanism in said casing and an expansible operating member therefor responsive to the temperature of an oven or the like, said switch mechanism including a lever actuated by said expansible member,

a contact plate loosely supported on the casing bottom opposing side of said lever, a pair of spaced stationary contact members disposed between said contact plate and the bottom of said casing and adapted to be bridged by said loosely supported contact plate, a coil compression spring interposed between said lever and said plate midway of the ends of the latter, and a pair of brackets fixed to said cover for supporting said pair of stationary contact members, whereby said stationary contact members are attachable to and detachable from said casing with said cover as a unit.

2. An electric thermostat comprising a switch mechanism and an expansible operating member therefor responsive to the temperature of an oven or the like, said switch mechanism including a lever actuated by said expansible member, a contact plate loosely supported on one arm of said lever, and a pair of spaced stationary contact members adapted to be bridged by said loosely supported contact plate, a coil compression spring interposed between said arm and said plate midway of the ends thereof, a casing for said switch mechanism, said contact plate being supported on the casing bottom opposing side of said lever, and an insulating cover for said casing, said stationary contact elements comprising brackets disposed on opposite sides of said contact carrying arm with one end secured to and sustained by said insulating cover and with the other end left free and disposed between said arm and the bottom of said casing.

3. An electric thermostat comprising a switch mechanism and an expansible operating member therefor responsive to the temperature of an oven or the like, said switch mechanism including a lever actuated by said expansible member, a bracket having a base portion secured to said lever and side flanges with openings therein having longitudinally convex edges, a contact plate disposed in said bracket and having outstanding lugs thereon midway of its ends loosely supported in the openings in the side flanges of said bracket, a coil spring interposed between said lever and said contact plate midway of the ends of the latter, and a pair of spaced stationary contact members adapted to be bridged by said loosely supported contact plate.

4. An electric thermostat comprising a switch mechanism and an expansible operating member therefor responsive to the temperature of an oven or the like, said switch mechanism including a lever actuated by said expansible member, and having an insulating arm, a cup embedded in said insulating arm, a bracket having a perforated base portion adapted to receive the outer end of said cup, which is flanged over said base portion around the perforation therein, and side flanges with openings therein, a contact plate disposed in said bracket and having lugs thereon midway of its ends loosely supported in the openings in the side flange of said bracket, a coil spring mounted in said cup with one end seated on the bottom thereof and with the other end bearing against said contact plate, and a pair of spaced stationary contact members adapted to be bridged by said loosely supported contact plate.

5. An electric thermostat comprising a switch mechanism and an expansible operating member therefor responsive to temperature of an oven or the like, said switch mechanism including co-operating contact members, a lever for supporting one of said contact members for movement

into and out of engagement with the other contact member, a pin fixed to said expansible operating member, a spring seat on said pin, a pivoted arm loosely sleeved on said pin, and a spring sleeved on said pin with one end seated on said spring seat and the other end bearing against said arm to engage the free end thereof with

said lever, said arm being made of bimetal whereby said arm is adapted to swing away from said lever under the influence of temperature outside of said oven and thus prevent separation of said cooperating contact members.

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