

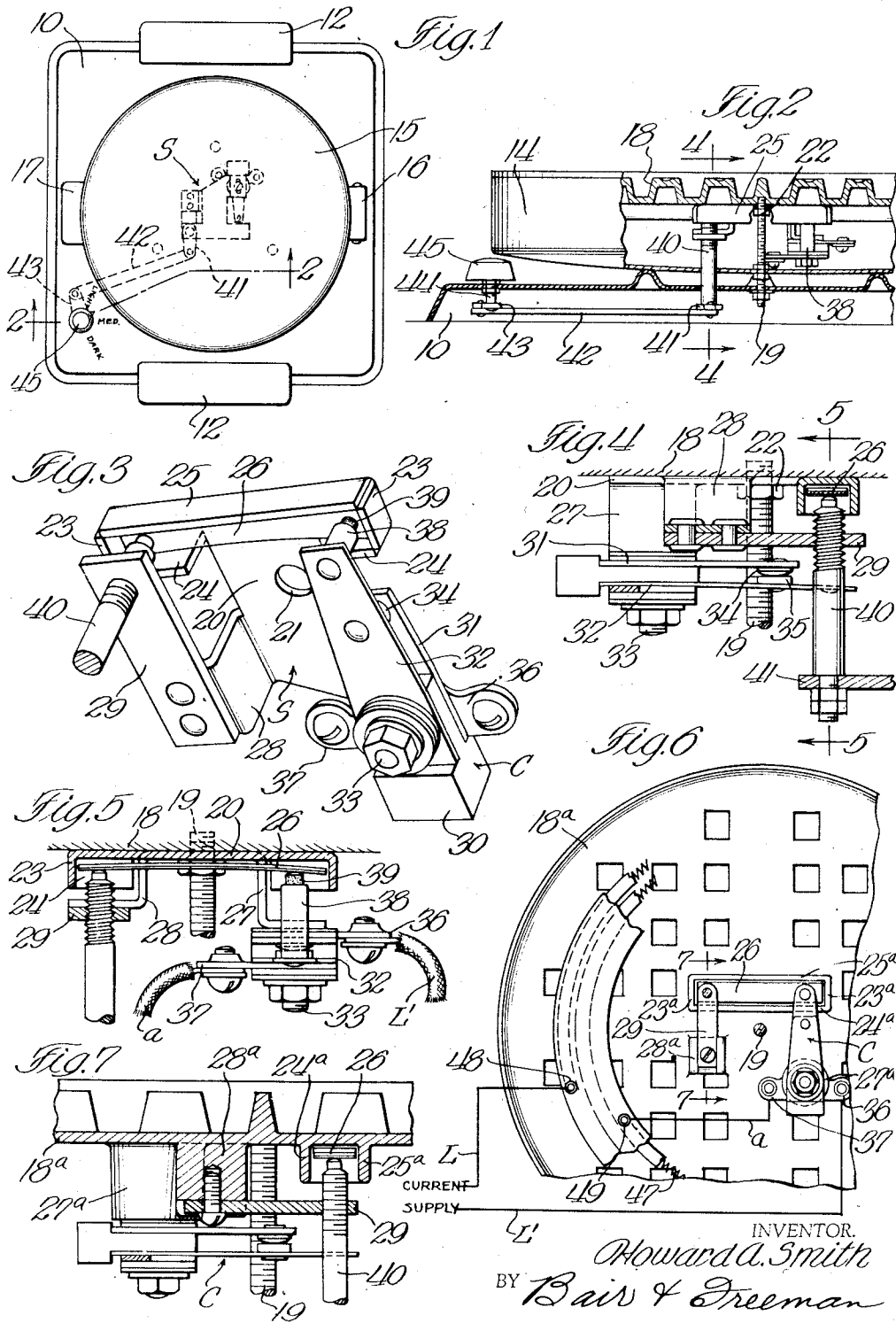
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THERMOSTAT

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THERMOSTAT

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An object of my present invention is to provide a thermostat of simple and inexpensive construction particularly adapted for mounting on waffle iron grids and the like so that it is responsive to the heat thereof.

A further object is to provide a thermostat which includes a bi-metal element loosely mounted in a pocket of the thermostat without means of rigid connection for the bi-metal element, the usual anchorage by means of screws or the like being eliminated from my construction whereby strains and permanent set resulting from such type of anchorage and the attendant variations in setting of the thermostat after it has operated for some time are entirely eliminated.

Another object is to provide a thermostat assembly consisting of a stamping which may be secured to a waffle iron grid or the like and which includes flanges bent away from the frame thereof to provide a pocket to loosely receive a bi-metal bar, an adjusting screw and a circuit breaker being arranged to engage opposite ends of the bar whereby warping of the bar to engage the adjusting screw and the circuit breaker will effect operation of the circuit breaker upon further warpage of the bi-metal bar due to a further increase in temperature.

Still another object is to provide a modified form of my construction in which the pocket may be cast on the grid and the adjusting screw and the circuit breaker mounted on bosses projecting from the grid, whereby the adjusting screw and the circuit breaker may properly overhang the loosely mounted bi-metal bar in the pocket to effect operation of the circuit breaker therefrom.

Other objects, purposes and characteristic features of the present invention will be in part obvious from the accompanying drawings and will be better pointed out as the description of the invention progresses. In describing the invention in detail, reference will be made to the accompanying drawing wherein like reference characters designate corresponding parts throughout the views and in which:

Figure 1 is a plan view of a waffle iron with my thermostat mounted in the base thereof and shown in dotted lines in this figure.

Figure 2 is an enlarged sectional view on the line 2-2 of Figure 1.

Figure 3 is a perspective view of my thermostat assembly looking at it from the underneath surface thereof.

Figure 4 is a vertical sectional view on the line 4-4 of Figure 2.

Figure 5 is a sectional view on the line 5-5 of Figure 4.

Figure 6 is a bottom plan view of a modified form of structure; and

Figure 7 is an enlarged sectional view thereof on the line 7-7 of Figure 6.

My thermostat can be applied to different electrical appliances and by way of example I have shown a waffle iron comprising a base 10 having handles 12 and lower and upper casings 14 and 15. The casing 14 is hinged to the casing 15 at 16 in the usual manner and is provided with handles for opening the waffle iron. The lower casing 14 includes a grid 18 retained in position as by screws 19.

My thermostat assembly shown in Figure 3 consists of a stamping 8 having a bottom plate 20 provided with an opening 21 to receive the screw 19. A nut 22 serves to retain the stamping 8 in position against the grid 18.

The bottom plate 20 has a pair of opposed upturned flanges 23 and another pair of upturned flanges 24 opposed by an upturned flange 25. The flanges 23, 24 and 25 constitute a pocket for a bi-metal element 26.

The element 26 is a strip or bar of bi-metal of slightly less length than the distance between the flanges 23 and slightly less width than the flanges 24 and 25 so that it is loosely mounted in the pocket and is therefore free to warp in response to temperature changes affecting it without any possibility of binding within the pocket. This is a very important feature of my invention.

The bottom plate 20 is provided with upstruck brackets 27 and 28 adapted to support a circuit breaker C and an adjusting screw support 29 respectively. The circuit breaker C comprises a block of insulation 30 having contact blades 31 and 32 mounted thereon and the circuit breaker is then mounted by a bolt 33 on the bracket extension 27. The circuit breaker includes contacts 34 and 35 carried by the blades 31 and 32 respectively. The blade 31 is relatively heavy and inflexible while the blade 32 is a leaf spring blade so that it can be sprung to separate the contact 35 from the contact 34. Terminals 36 and 37 are provided for the blades 31 and 32 respectively.

The circuit breaker C is arranged to have the leaf spring 32 overhang one end of the pocket for the bi-metal element 26 and is provided with a projection 38 terminating in an insulating button 39 adapted to be engaged at times by the bi-metal bar 26. The adjusting screw support 29 overhangs the other end of the pocket for the bi-

metal element 36 and an adjusting screw 40 is threaded therein.

The adjusting screw 40 may be provided with any convenient means to rotate it to secure different degrees of adjustment for the thermostat. By way of illustration, I show an arm 41 extending from the adjusting screw and connected by a link 42 to an arm 43. The arm 43 is mounted on a shaft 44 journaled in the base 10 and provided with an adjusting knob 45 on top of the base.

In Figures 6 and 7 I show a modified construction in which a grid 18a has walls or flanges 23a, 24a and 25a cast thereon. These walls form a pocket for the bi-metal element 46, while the circuit breaker C and the adjusting screw support 29 are mounted on bosses 27a and 28a formed on the grid.

In Figure 6 I have shown the circuit connections to a heating element H which includes the usual resistance wire 47. The terminals of the resistance wire are indicated at 48 and 49. Current supply wires L and L' supply current to the terminals 48 and to the terminal 36 of the circuit breaker. The other terminal 37 of the circuit breaker is connected by a wire a to the terminal 49. Thus the circuit breaker is connected in series with the heating element H in the usual manner.

Practical operation

Referring to Figure 5 it will be noted that the bi-metal bar 26 is resting on the adjusting screw 40 and the insulating button 39 of the circuit breaker C. Since the bi-metal element is loose in its pocket and the pocket is inverted, this is the position it will normally assume. Upon an increase in temperature the center of the bar will warp upwardly and finally strike the bottom plate 20 of the bi-metal element pocket. Thereafter further warping will result in the button 39 being depressed and the circuit breaker thereby operated to open the circuit to the heating element H. Obviously with the adjusting screw 40 at different elevations, the circuit breaker C will be operated at different temperatures.

The stamping S provides a convenient arrangement for pre-fabrication of the thermostat assembly, which can then be tested and adjusted before being mounted on the waffle iron. The nut 22 serves as a convenient means for mounting the stamping S against the grid 18 in such manner that the heat of the grid is effectively transmitted by the stamping to the bi-metal bar within the pocket thereof. For this purpose the stamping may be made of brass, aluminum or the like so as to facilitate conduction of the heat.

The form of invention shown in Figure 6 operates in a similar manner but does not lend itself to pre-fabrication of the thermostat.

My type of thermostat in which the bi-metal element is "floatingly" mounted eliminates the strain of an anchorage as usually provided for bi-metal elements. When one end of the element is anchored, the strains set up in the metal sometime result in a permanent set to the element which causes inaccurate operation of the thermostat thereafter. All possibility of such undesirable operation is eliminated with my construction in which the bi-metal element is free to operate without restriction from an anchorage or other means rigidly connected with the bi-metal element.

In accordance with the provisions of the pat-

ent statutes I have described my invention and also the principle of operation thereof. On my drawing I have illustrated what I consider to represent the best embodiments thereof but desire to have it understood that the structure disclosed is illustrative only and that the invention may be carried out by other means within the scope of the appended claims.

I claim:

1. In a thermostat for a grid or the like heated by an electric heating element, a pocket on said grid, an adjusting screw projecting into said pocket, a loose bi-metal element located therein and of smaller size than said pocket to permit free movement of the bi-metal element in the pocket upon being warped by response to increased temperature, said bi-metal element being unconnected with said pocket and a circuit breaker for controlling the circuit of the heating element, said circuit breaker being operated to open circuit position by said bi-metal element only after a predetermined degree of warping thereof in said pocket sufficient to cause simultaneous engagement of three spaced points of said bimetal element with one point of said pocket, with said adjusting screw, and with said circuit breaker respectively.
2. In a thermostat, a grid or the like, a pocket on said grid, a free bi-metal element loosely mounted therein, a circuit breaker engaged by one portion of said bi-metal element upon warpage thereof to a predetermined position of said portion under the influence of an increase in temperature of said grid and an adjusting element engageable with another portion of said bi-metal element and movable to various distances from the bottom of said pocket to vary said predetermined position at which said bi-metal element operates said circuit breaker, the portion of said bi-metal element intermediate said two first mentioned portions thereof engaging said bottom of said pocket to effect operation of said circuit breaker upon warpage to said predetermined position.
3. In a thermostat for a grid or the like, a pocket member, a free bi-metal element loosely mounted therein, a circuit breaker engaged by one portion of said bi-metal element upon warpage thereof to a predetermined position of said portion under the influence of an increase in temperature of the grid and a pair of abutments for two other portions of said bi-metal element to engage upon such warpage, one of said pair of abutments constituting a range adjusting device for said thermostat.
4. In a thermostat, an element to be heated, a pocket thereon, a loose bi-metal element mounted in said pocket for free movement therein, a circuit breaker engaged by said bi-metal element upon warpage thereof to a predetermined position under the influence of an increase in temperature of said grid, and an adjusting element directly engageable with another portion of said bi-metal element and movable to various positions to vary the point at which the adjusting element is engaged by said bi-metal element and thereby varying said predetermined position at which said bi-metal element operates said circuit breaker, said bimetal element being engaged with a wall of said pocket upon such warpage to said predetermined position.
5. A thermostat comprising a stamping for mounting on a device to be heated, said stamping being formed with a pocket, a loose bi-metal element received in said pocket, said element being

of less diameter than said pocket, a circuit breaker supported by said stamping and adapted to be engaged by one point on said bi-metal element and thereby operated by said bi-metal element as the element warps in said pocket to a predetermined position under the influence of heat conducted to the pocket by said stamping and an adjusting member supported by said stamping and variable relative thereto, said member being arranged to form an abutment for another point of said bi-metal element to engage and thus predetermine the position with relation to the heat affecting said pocket at which said bi-metal element engage the pocket at a third point and said circuit breaker is engaged and operated by the bi-metal element.

6. A thermostat comprising a stamping for mounting on a grid or the like, said stamping having a pocket formed therein, a free bi-metal element loosely received in and unconnected with said pocket, a circuit breaker supported by said stamping and adapted to be engaged and operated by said bi-metal element as it warps in said pocket to a predetermined position under the influence of heat from the grid being conducted to the pocket by said stamping, said bi-metal element thereupon engaging, at two spaced points thereon, with a point of said pocket and with said circuit breaker and an adjusting screw supported by said stamping and variable relative thereto, said screw being arranged to form an abutment for a third point of said bi-metal element to engage simultaneously with the engagement of said two points and thus predetermine the position at which said circuit breaker is operated.

7. A thermostat comprising a stamping having flanges bent away from the plane thereof to form

an elongated pocket, a loose bi-metal bar mounted in said pocket and of slightly smaller size than the distance between said flanges whereby to permit free movement of the bi-metal element in the pocket due to warpage thereof resulting from the temperature of the pocket increasing, a circuit breaker supported by said stamping and over-hanging said pocket, an adjusting screw support on said stamping also over-hanging said pocket, said circuit breaker and adjusting screw support being adjacent opposite ends of said pocket, an adjusting screw carried by said adjusting screw support, the center of said bi-metal element being engageable with said pocket, and the respective ends of said bi-metal element being engageable with said adjusting screw and with said circuit breaker whereby simultaneous engagement of the bi-metal element with the pocket, the screw and the circuit breaker, and thereafter further warping of the bi-metal element in response to a further increase in heat, will operate said circuit breaker.

8. A thermostat comprising a stamping having flanges bent away from the plane thereof to form an elongated pocket, a free bi-metal bar loosely mounted in said pocket to permit free warpage of the bi-metal element therein, a circuit breaker supported by said stamping and over-hanging said pocket, an adjusting element supported by said stamping and also overhanging said pocket, the ends of said bi-metal element being engageable with said adjusting element and said circuit breaker whereby simultaneous engagement with the two and with said pocket intermediate the ends of the bi-metal element, and thereafter further warping of the bi-metal element will operate said circuit breaker.

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