Aug. 30, 1927. 1,641,002

L. M. KAPLAN

THERMOSTATIC CONTROL ELECTRICAL HEATER PLUG

Filed Oct. 27, 1926

Fig. 1.

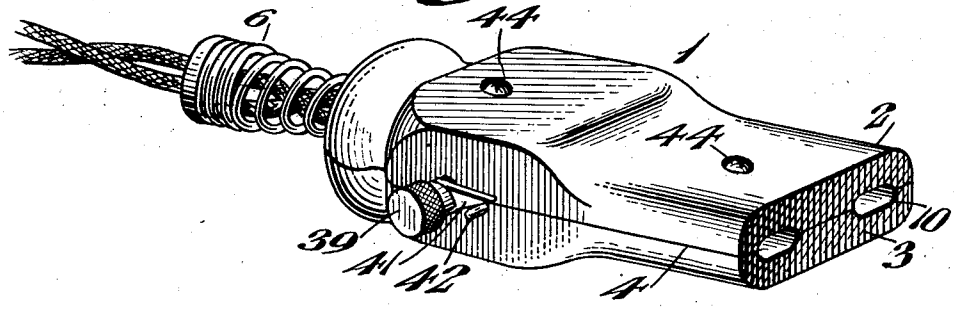


Fig. 2

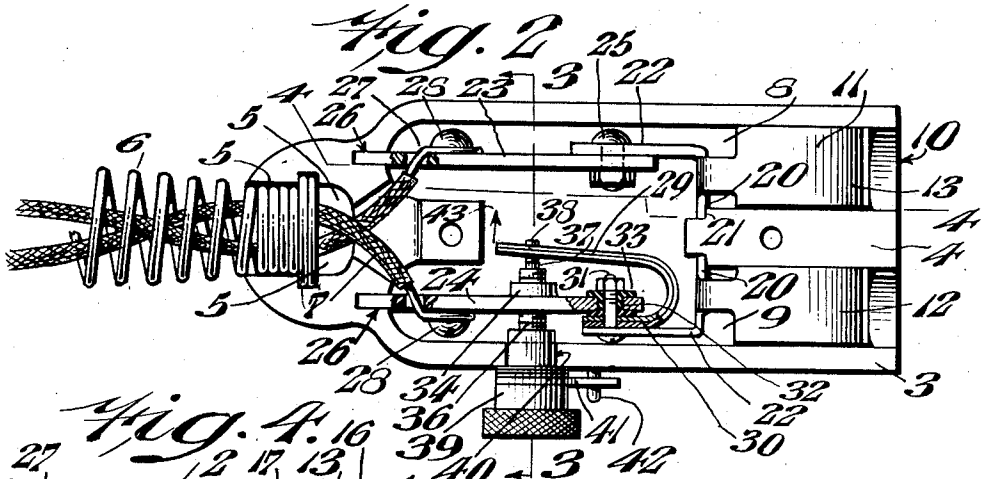


Fig. 4.

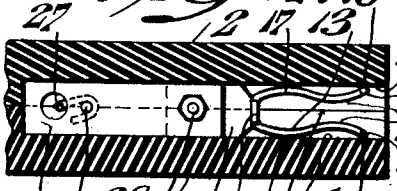
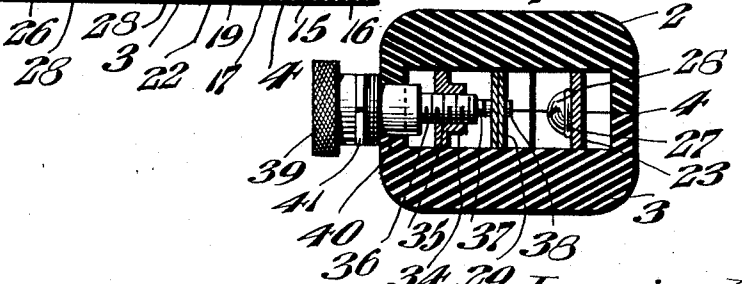


Fig. 3.



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Patented Aug. 30, 1927. 1,641,002

UNITED STATES PATENT OFFICE.

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THERMOSTATIC-CONTROL ELECTRICAL HEATER PLUG.

Application filed October 27, 1926. Serial No. 144,445.

My invention relates to a new and useful improvement in a temperature control electric attachment plug, for electrical heating appliances such as irons, toasters, percolators and the like, and it relates more particularly to a novel construction therein, whereby an easy and quick adjustment of the temperature of the heating appliance may be obtained.

My invention relates more particularly to an electrical attachment or connection plug, adapted for electrical heating appliances such as electrical irons, toasters, percolators, waffle irons and the like, which is provided with a built-in thermostatic control switch, which will automatically break the electrical circuit to the heating appliance, when the temperature of the latter rises above a predetermined point and wherein said switch will automatically close when the temperature of the heating appliance falls below the predetermined point.

My invention relates further to a thermostatic control electrical heater plug of the character stated, in which the temperature limit may be adjusted or varied at will, between suitable limits, by the mere manual turning of an adjustment knob or handle on the exterior of the plug, which may be easily manipulated by any one.

For the purpose of illustrating my invention, I have shown in the accompanying drawings, forms thereof which are at present preferred by me, since they will give in practice, satisfactory and reliable results, although it is to be understood that the various instrumentalities of which my invention consists can be variously arranged and organized and that my invention is not limited to the precise arrangement and organization of these instrumentalities as herein shown and described.

In the accompanying drawings,

Figure 1 represents a perspective view of a thermostatic control electrical heater plug embodying my invention.

Figure 2 represents a plan view of the device shown in Fig. 1, the upper half of the housing being removed.

Figure 3 represents a section on line 3—3 of Figure 2.

Figure 4 represents a section on line 4—4 of Figure 2.

Referring to the drawings, in which like reference characters indicate like parts, 1 designates the outer longitudinally divided two part insulating housing of the electrical heater plug of my novel construction, comprising the two similar halves 2 and 3, having the contiguous inner surfaces 4, abutting each other. The upper or rear end of the housing is provided with an axial opening 5, for the reception of the helical spring coil cord support 6, and for the passage into the housing of the electrical cord or wire 7.

A pair of substantially parallel longitudinal chambers or recesses 8 and 9 are provided in the housing 1, equally divided between the upper and lower halves 2 and 3 thereof, and opening at the lower end 10 of the housing, while terminating within the housing, near the upper end thereof. In the recesses or contact chambers 8 and 9, corresponding contact members 11 and 12 respectively are positioned, adapted to engage the contact pins of an electrical heating appliance, and to make electrical contact therewith.

Each of the contact members 11 and 12 is generally U shaped, as shown particularly in Figure 4, and comprises two limbs or prongs 13. The limbs or prongs 13 are each bowed and diverge towards their outer ends 14, and bear against the corresponding surfaces 15 of the upper and lower housing members at the two points 16 and 17 respectively.

Upon inserting the contact pins of the electrical heating appliance between the prongs 13 of the electrical contact members 11 and 12, the contact is made substantially at the center or bowed portion 18 of said limbs 13, and the contact is maintained by the resiliency of the limbs 13, said limbs or prongs 13 being slightly bowed at the central portions 18 thereof, and the prongs 13 being supported by the housing, at the two points 16 and 17, as mentioned hereinbefore. By this novel construction of the contacting members the strain is relieved at the web 19 connecting the two limbs 13, and is borne entirely by the bowed portions 18 of said limbs.

The connecting web 19 of each contact member 11 and 12, is provided with a transversely extending anchor member 20, formed integrally therewith, and adapted to interlock with a ledge or shoulder 21 formed in the body of the housing, thereby to prevent the longitudinal movement of said contact members 11 and 12. A longitudinal exten-

sion 22 is also formed integrally with each of the connecting webs 19, of the contact members 11 and 12, extending longitudinally of said contact members and rearwardly thereof, to which suitable contact plates 23 and 24 are secured, by a bolt, rivet, or other fastening means 25 and 31 respectively, as shown particularly in Figure 2. Each of the contact plates or strips 23 and 24, extends rearwardly substantially parallel to each other and the free terminals thereof are enclosed in suitable recesses 26, thereby to anchor the contact members 11 and 12, against any rearward longitudinal movement thereof.

Each of the contact strips or plates 23 and 24 is provided with an aperture 27, therein, through which one of the two wires of the electrical cord 7 is adapted to pass, and is also provided with a binding screw 28, threaded into said contact plates 23 and 24, adapted to secure the terminals of the lead wires.

A thermostatic element 29, comprising a coupling of two dissimilar metals, such as iron and brass, and of generally U shape, is provided, with a shorter limb 30 thereof interposed between the contact strip 24 and the longitudinal member 22 of the contact member 12, as shown particularly in Figure 2. The shorter limb 30 of the thermostatic element 29 is thus in direct contact with the member 22 of the contact member 12 and is also secured by the common bolt or screw 31, while an electrical insulating bushing 32 and insulating washers 33 are provided, intermediate the screw 31 and the contact plate 24 and the limb 30 of the thermostatic element 29 and said contact member 24 respectively, electrically to insulate the contact plate 24 from both the thermostatic element 29 and from the contact element 12.

The contact plate 24 carries a boss or lug 34, through which a threaded opening 35 is provided, which is adapted to receive an adjustment screw 36. The inner end of the adjustment screw carries a contact point 37 of a suitable heat resisting metal or alloy such as tungsten, silver, platinum or the like, and a corresponding contact point 38 is carried by the thermostatic element 29, in operative alignment with the contact point 37. To the outer end of the adjustment screw 36, an operating handle or knob 39 is secured, which projects through an opening 40 in the side walls of the two housing members 2 and 3, and extends to the exterior, as shown particularly in Figure 2. The knob 39 also carries a pointer or finger 41, while the housing carries a fixed stop 42. By this means the rotary movement of the adjustment screw 36 is limited.

According to my novel construction, the thermostatic element 29 is composed of any two metals having different coefficients of expansion, such as an inner strip or layer of brass and an outer layer of iron, and said thermostatic element is so adjusted that it will normally maintain the contact point 38 in mechanical and electrical contact with the contact point 37 carried by the set screw 36.

In use, the plug 1 is applied to the terminal pins or contact points of the electrical heating appliance. As the temperature of the heating appliance rises above a predetermined point, the contact elements 11 and 12, being in direct mechanical contact with the contact pins of the electrical appliance, also rise in temperature and the heat is transmitted through the element 22, to the thermostatic element 29. The thermostatic element 29, due to the rise in temperature, buckles or is deflected outwardly in the direction indicated by the arrow 43. This deflection of the thermostatic element 29 separates the two contact points 37 and 38, thereby breaking the electrical connection and hence the electrical circuit, through the heating appliance. As the temperature of the heating appliance drops again, and the temperature of the contact member 12 and of the thermostatic element 29 also drops, said thermostatic element 29 is deflected in the opposite direction and thus again establishes contact between the two points 37 and 38, thereby reestablishing the electrical circuit through the electrical heating appliance. This action is entirely automatic both in opening and closing the circuit.

In order to adjust the plug 1 to any desired temperature, within the limits of the device, it is merely necessary to turn the knob 39. Thus, if it is desired to set the device for a relatively low temperature, that is, so to set the same that the electric circuit will be broken when a certain predetermined, relatively low temperature has been reached, it is merely necessary to turn the knob 39 in a counterclockwise direction thereby lessening the pressure of the adjustment screw 36 against the contact point 38 of the thermostatic element 29. In this position, a relatively small amount of heat or degree of temperature will be enough to deflect said thermostatic element away from the contact point 37 on said adjustment screw 36 sufficiently to break the circuit. On the other hand if it is desired to set the device for a relatively high temperature, the knob 39 is turned in a clockwise direction thereby pressing the adjustment screw 36 inwardly against the contact point 38 of the thermostatic element 29 in which position a greater degree of heat or temperature is required to deflect said thermostatic element 29 sufficiently to separate the contact points 37 and 38 to break the circuit.

In Figures 1 and 2 the knob is shown in the position of the highest temperature adjustment.

The two halves 2 and 3 of the housing are secured to each other by any suitable means such as the screws 44 and corresponding nuts.

It will now be apparent that I have devised a novel and useful thermostatic control electrical heater plug, which embodies the features of advantage enumerated as desirable in the statement of the invention and the above description, and while I have, in the present instance, shown and described preferred embodiments thereof which will give in practice, satisfactory and reliable results, it is to be understood that such embodiments are susceptible of modification in various particulars without departing from the scope or spirit of the invention or sacrificing any of its advantages.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a device of the character stated, a longitudinally divided two part housing of insulating material, having a pair of parallel longitudinal recesses therein, open at one end of said housing, pin receiving spring contact members disposed within said recesses each comprising a pair of resilient coacting spring prongs, a terminal contact plate, secured to one of said spring contact members in electrical contact therewith, a thermo-sensitive element secured to the other of said spring contact members and in electrical and mechanical contact therewith, a second terminal contact plate secured to said last spring contact member and electrically insulated therefrom and from said thermo-sensitive element, an adjustment screw extending through the wall of said insulating housing and through said second terminal contact plate, threadedly engaging the latter, a contact point carried by the inner end thereof, a second contact point carried by the thermo-sensitive element in operative alignment with and normally in contact with said first contact point, said thermo-sensitive element being adapted to deflect upon a predetermined rise in temperature, thereby breaking the contact between said two contact points, said adjustment screw being adapted to be turned manually from without the plug, thereby to vary the temperature at which said contact points are separated.

2. In a device of the character stated, a longitudinally divided two part housing of insulating material, having a pair of parallel longitudinal recesses therein, open at one end of said housing, pin receiving spring contact members disposed within said recesses each comprising a pair of resilient coacting spring prongs, a terminal contact plate secured to one of said spring contact members in electrical contact therewith, bent thermo-sensitive element secured to the other of said spring contact members and in electrical and mechanical contact therewith, a second terminal contact plate secured to said last spring contact member and electrically insulated therefrom and from said thermo-sensitive element, terminal binding screws carried by said terminal contact plates, an adjustment screw extending through the wall of said insulating housing and through said second terminal contact plate, threadedly engaging the latter, a knob carried by the outer end of said adjustment screw, a contact point carried by the inner end thereof, a second contact point carried by the thermo-sensitive element in operative alignment with and normally in contact with said first contact point, said thermo-sensitive element being adapted to deflect upon a predetermined rise in temperature, thereby breaking the contact between said two contact points, and said adjustment screw being adapted to be turned manually from without the plug, thereby to vary the temperature at which said contact points are separated.

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