June 22, 1937. P. E. ASHTON 2,084,966

ELECTRIC HEATER

Filed March 25, 1936 2 Sheets-Sheet 1

Fig. 1.

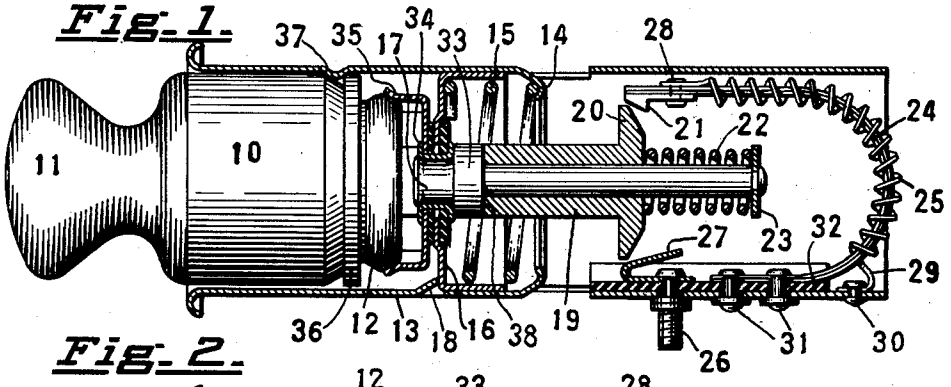


Fig. 2.

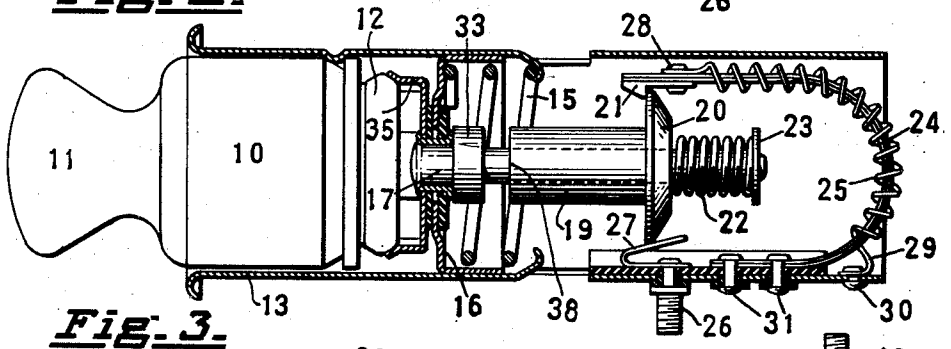


Fig. 3.

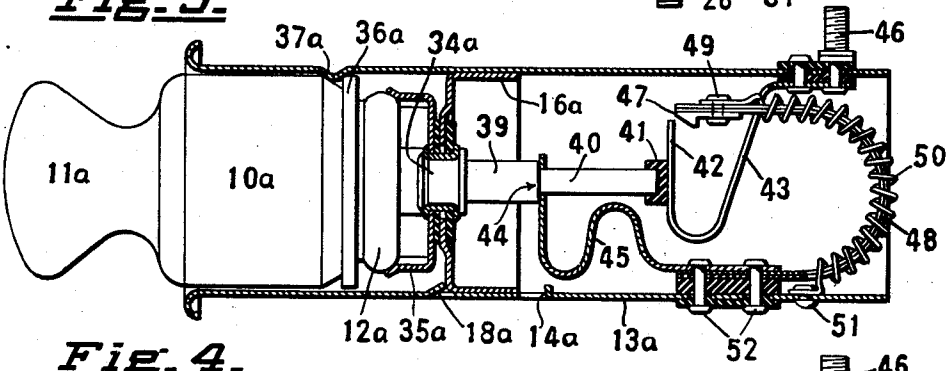
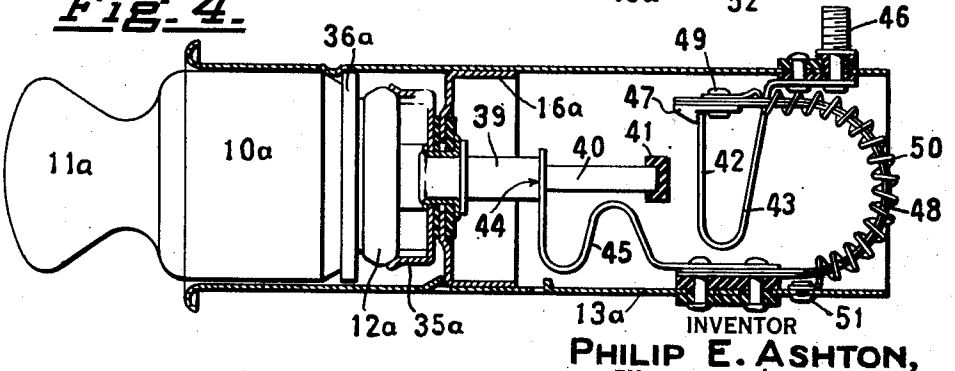


Fig. 4.



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Fig. 5.

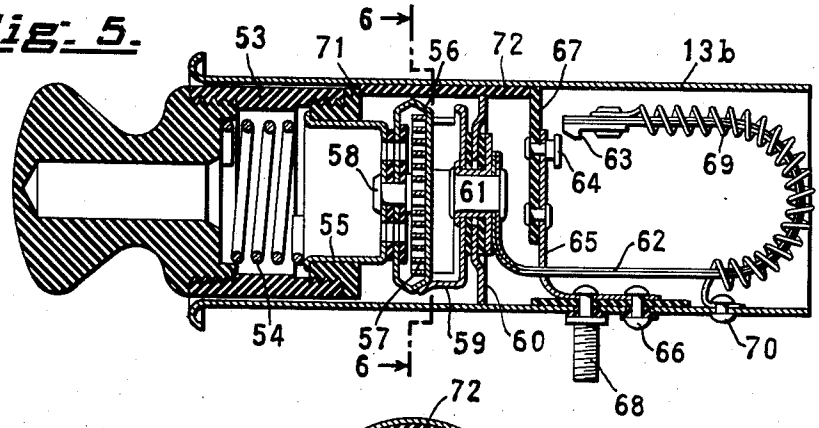


Fig. 6.

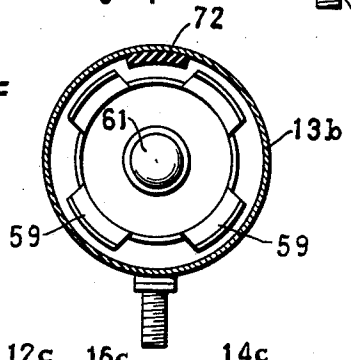
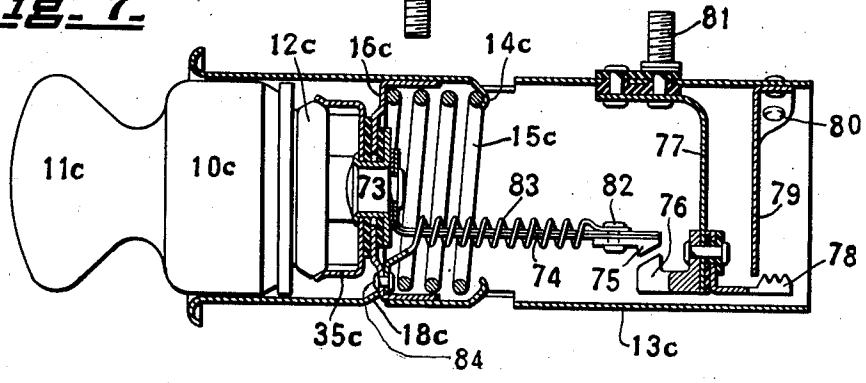


Fig. 7.



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UNITED STATES PATENT OFFICE

2,084,966

ELECTRIC HEATER

Philip E. Ashton, Meriden, Conn., assignor to The Cuno Engineering Corporation, Meriden, Conn., a corporation of Connecticut

Application March 25, 1936, Serial No. 70,779

23 Claims. (Cl. 219—32)

My invention relates particularly to devices for lighting cigars and cigarettes. In plug-in type lighters it has been customary to provide some sort of switch which is held closed manually until the igniter is thought to be ready for use. I propose to provide means for latching a switch to close the circuit through the igniter for a predetermined time, and then automatically unlatching this switch and opening the circuit. In the preferred form this is effected by a thermostatic device heated independently of the igniter. I also provide a signal device for indicating when the circuit is broken.

One object is to provide a simple device of the well known type adapted to be installed in the instrument board of a car or other convenient place.

Referring to the drawings

Fig. 1 is a longitudinal section through one embodiment of this invention.

Fig. 2 is a detail of the switch parts of Fig. 1 with the circuit closed.

Fig. 3 is a longitudinal section of another embodiment of this invention.

Fig. 4 is a detail of the switch parts of Fig. 3 in closed position.

Fig. 5 is a longitudinal section of yet another embodiment of this invention.

Fig. 6 is a cross section on the line 6—6 of Fig. 5.

Fig. 7 is a longitudinal view partly in section of still another embodiment of the invention.

Referring to Figs. 1 and 2 the removable cigar lighter 10 is of the plug type having a handle portion 11 and carrying on its inner end a cup-shaped contact member 12 in which is located the usual spiral resistance element which is heated by electric current until it becomes incandescent. The stationary socket member 13 supports the plug in normal position. Portions of the socket are bent in as shown at 14 to constitute a stop against which the helical spring 15 contacts. The other end of the spring 15 engages the slidable sleeve 16 which shifts or slides within the socket 13, said sleeve being insulated from the central stem 17 by insulating washers shown on each side of the portion of the sleeve 16 around this stem.

Another stop 18 formed by bending in portions of the tubular socket limits outward movement of the sleeve 16 under the action of the spring 15. Slidably mounted on the central stem 17 and in electrical contact therewith is a tubular sleeve 19 having a flange at its inner end portion which constitutes a switch part 20 adapted to be engaged and held by the latch 21 which is released by a thermostatic element. A spring 22 cooperates with the sleeve and with a washer 23 at the inner end of the stem 17. The bimetallic strip or thermostatic element 24 is of general U-shape as indicated and is wound throughout a substantial portion of its length by a resistance wire 25 which is adapted to heat the bimetallic strip 24 a desired amount to release and open the switch parts 20 and 21. The supporting socket 13 is grounded and current is supplied to the ungrounded terminal 26 to which is secured the flexible spring contact member 27 so that upon closing the switch, current passes through the switch parts 20 and 21 to the rivet 28 to which one end of the heating wire 25 is connected. The other end of the heating wire passes through the connected lead 29 to the rivet 30 which is grounded to the socket. The bimetallic strip 24 is insulated from the socket and held therein by the rivets 31 which clamp one end of the strip against the insulating material 32. One portion of the stem 17 is enlarged at 33 to constitute a stop against which the spring 22 presses the sleeve 19.

The forward portion of the stem 17 is riveted over and held within the tubular rivet 34 which supports the stem 17 and holds it in electrical contact with the abutment contact 35. This abutment contact is of the usual shape adapted for engagement with the outer or peripheral portion of the cup-shaped member 12. One end of the spiral resistance wire is secured to the cup-shaped member 12, according to the customary practice in this art, and the opposite end of the resistance wire is fastened to a central rivet (not shown) but which extends through the cup member and is insulated therefrom but in electrical contact with the other terminal 36 of the removable member which is adapted to contact with the inner surface of the socket. To insure the contact member 36 being in good electrical engagement with the socket it is customary to have a portion of the socket stamped out as a spring finger as is described, for example, in my copending application Serial Number 747,377, filed October 8, 1934, for Cigar lighter. The end portion 37 of such a spring finger is given a curved form as indicated in the drawings so that the contact member 36 may not only be engaged but also biased and held in a position with the cup-shaped contact member 12 in contact with the abutment contact 35.

Normally the removable plug is carried in an open circuit position with the parts in the position

shown in Fig. 1. To heat the lighter the plug 10 is pushed inwardly into the socket compressing the spring 15 until the switch member 20 is engaged and held in contact with spring contact 27 by the thermostatic latch or switch element 21 when the removable plug may then be manually released.

Upon its release the spring 15 slides the sleeve 16 to the left in Fig. 1 and moves the plug member outwardly until the sleeve 16 is engaged by its stops 18, at the same time compressing spring 22 which is possessed of less strength than the spring 15, to the position shown in Fig. 2. Upon closing the switch parts 20 and 21 current is supplied for heating both the bimetallic strip 24 and the spiral resistance wire within the cup shaped member 12. The current for heating the bimetallic strip 24 passes from the terminal 26 through the contact spring 27, switch member 20, thermostatic latch 21 through the end portion of the thermostatic strip to the rivet 28, thence through the heating coil 25 to the ground connection at 30. The path of the current for heating the cigar lighter is from the terminal 26, through the spring contact 27, through the sleeve 19, rivet 34, abutment contact 35 to the rim of the cup member 12, thence through the spiral resistance wire to the usual central rivet which is insulated from the cup member 12 but contacted with the plug terminal 36 and thence to the grounded socket through the spring finger 37. The resistance wire 25 is so designed that it will heat the bimetallic strip 24 sufficiently to release the switch members 20 and 21 after a predetermined interval of time during which the spiral resistance wire of the cigar lighter has been heated. When the bimetallic strip 24 is heated its free end portion 21 moves upwardly in Fig. 1, until the switch element 20 is released.

Upon release of the switch element 20 the spring 22 pushes the sleeve 19 forwardly until its forward end portion 38 abuts the enlarged portion 33 of the stem 17 giving out sound enough on impact to constitute an audible signal of the cigar lighter being in readiness for use so that the user may withdraw the plug 10 from the socket and light his cigar or cigarette. After use the plug is put back in the socket into the position shown in Fig. 1. The spring finger 37 and its bent end engage the plug contact 36 but do not offer as much resistance to inward movement of the plug as does the spring 15 so that upon inserting the plug in the socket the resistance offered by the spring finger 37 is small and noticeably less than that offered by the spring 15 during movement of the sleeve 16. The cup-shaped member 12 is maintained in engagement with the abutment contact 35 and after manual release of the plug with the switch members 20 and 21 closed, the bent end 37 of the spring finger prevents the plug from being moved out of the socket more than the desired amount and assists in maintaining the circuit closed through the abutment contact 35 and the cup-shaped member 12.

In Figs. 3 and 4 the plug 10*a* has the handle portion 11*a*, cup-shaped contact member 12*a* held as mentioned before within the socket 13*a* in contact with the abutment 35*a* and held in such contact by the bent end 37*a* of the spring finger engaging the contact 36*a*.

As was the case in Figs. 1 and 2 the sleeve 16*a* is shiftable between stops 14*a* and 18*a*, said sleeve 16*a* supporting a central stem 39 from which the sleeve is insulated. The rear end portion of the stem is reduced as shown at 40 and carries an insulating spacer member 41 with which the spring switch arm 42 is adapted to contact, said switch arm being carried by the spring arm conductor 43. A shoulder 44 is provided on the central stem 39 for engagement with the end portion of a leaf spring 45. One terminal 46 is insulated from the tubular socket 13*a*, but in contact with the spring 43 carrying the switch arm 42. The cooperative switch member 47 is shaped to latch the spring switch member 42. Current for heating the bimetallic thermostatic strip 48 is supplied through the heating coil 50, one end of which is in contact with the rivet 49 and the other end of which is grounded to the socket at 51. The thermostatic element is insulated from the socket and held in position by the rivets 52 which are likewise insulated from the socket, such rivets holding both the thermostatic element and the leaf spring 45 in contact. Unlike the embodiment illustrated in Figs. 1 and 2, the device of Figs. 3 and 4 has the current for the cigar lighter passed through the bimetallic element 48 but this thermostatic element is of such low resistance that this current for the cigar lighter does not alone heat the bimetallic strip enough to release the switch elements 42 and 47.

The operation of the device of Figs. 3 and 4 is substantially like that of the embodiment illustrated in Figs. 1 and 2. Upon pushing in the plug 10*a* the sleeve 16*a* is caused to move to the right against the action of the spring 45 until the switch member 42 is engaged by the thermostatic latch 47. Upon the release of the plug the spring 45 slides the sleeve 16*a* and the plug to the left until the sleeve is engaged by its stop 18*a* and the plug is in contact with the bent end 37*a* of the spring finger which biases the plug member into contact with the abutment 35*a*. When the switch members 42 and 47 are closed, current for heating the thermostat passes from the terminal 46 through the spring 43, switch members 42 and 47 to the rivet 49, and thence through the resistance wire 50 to the grounded contact 51. Current for the cigar lighter passes from the terminal 46 through the spring 43, switch elements 42 and 47, through the bimetallic strip 48 and spring 45 to the central stem 39, thence through the rivet 34*a* to the abutment contacts 35*a*, cup-shaped member 12*a*, thence through the spiral resistance wire in the usual manner to a central rivet which is connected to the plug contact 36*a* and the spring finger 37*a*. Upon release of the switch members 42 and 47, spring 43 causes the switch element 42 to be moved to the left into engagement with the insulating spacer member 41. An impingement of the switch part 42 upon the spacer 41 constitutes an audible signal that the thermostatic element has opened the circuit through the cigar lighter and that the same is ready for use.

The heating wires which are wound around the thermostatic or bimetallic elements in Figs. 1 to 4 must be insulated from the bimetallic strip enough to prevent the current short circuiting through this strip and yet not be thermally insulated from the strip because it is the heat from the resistance wires 25 and 50 which serve to heat up the bimetallic strip to an amount sufficient for it to unlatch the switch element held thereby.

In Figs. 5 and 6 is illustrated another embodiment of this invention. The plug 53 is provided with a spring 54 engaging the plug and a sleeve 55 carrying the cup-shaped contact member 56 at the rear end thereof. The usual spiral

heater wire 57 is in contact with the cup-shaped member 56 and also with a central rivet 58 which is insulated from the base of the cup-shaped member 56 by the insulating washers illustrated. The abutment contacts 59 are supported by but insulated from a stationary wall 60 within the socket which may be welded or otherwise held in place. As shown in the drawings, insulating washers on each side of the stationary wall 60 insulate this wall from a central rivet 61 which clamps the abutment contact as well as the end of a thermostatic element 62 against the wall 60. The other end portion of the bimetallic strip 62 is provided with a latching switch member 63 for engagement with the head of the switch member 64 carried by the spring arm 65 and supported by but insulated from the tubular socket member by the insulated rivets 66.

A strip of insulating material 67 is carried by the spring arm 65 and one terminal 68 is connected with the spring arm 65 as ilustrated. The wire 69 heats the bimetallic strip, being connected at one end to the rivet adjacent the latch 63 and at its other end to the grounded rivets 70. In one preferred construction the contact members 36, 36a, or 71 are made smaller in diameter than the insulating plug member by which it is carried so that it can only make contact with the grounded socket tube through the spring finger 37 or 37a. In this way the circuit through the lighter can only be completed when the plug member has been pressed inward to close the switch and then released allowing it to resume its normal carrying position thus preventing any possibility of continuous heating of the heater wire on the plug member which could occur with the construction shown in Figures 1 and 2 or the intermittent heating that could occur with the construction in Figs. 3, 4, 5, and 6 where the thermostatic switch would continue to make and break the circuit as long as the plug was held in its extreme inward position and the grounded plug contact were in contact with the socket tube. The spring finger also provides a friction means of maintaining the plug in the socket but other frictional means well known in the art may be used. The grounded plug contact is attached to the insulating plug body by any suitable means such as screw threads, moulding as an insert, etc. In another construction the plug body 53 and the grounded plug contact 71 may be formed in one piece from a metallic shell.

A strip 72 which may be of insulating material is shiftable to the right in Fig. 5 by the plug and this strip is movable to the left upon release of the switch elements 63 and 64 by means of the spring arm 65.

With the parts in the normal position indicated in Fig. 5 no current is being supplied to the cigar lighter. Upon moving the plug 53 further into the socket the cup-shaped member 56 is held substantially stationary against the abutment contacts 59 and likewise the sleeve 55 is held substantially stationary but on this inward movement of the plug body the spring 54 is compressed. The inward movement of the plug shifts the strip 72 to the right in Fig. 5 causing the switch elements 63 and 64 to become engaged.

When so engaged current is supplied to the cigar lighter heater unit from the terminal 68 through the spring arm 65, switch elements 64 and 63, bimetallic strip 62, rivet 61, abutment contacts 59 to the cup-shaped contact member 56, thence through the spiral resistance wire to the central rivet 58 which is in contact with the sleeve 55. The socket contact 71 slides with respect to the sleeve 55 so the current passes from the sleeve 55 through the contact 71 to the socket 13b. Current for heating the bimetallic element 62 passes from the terminal 68 to the spring arm 65, the switch elements 64 and 63 to the rivet shown adjacent the latching end 63 of the thermostatic strip and from this rivet through the heating wire 69 to the grounded connection 70.

Upon release of the plug after the switch parts 64 and 63 have been engaged, the spring 54 pushes the main body portion of the plug outwardly inasmuch as the spring 54 presses indirectly upon the stationary abutment contacts 59 by means of the sleeve 55 and the cup-shaped member 56. Upon release of the switch parts 64 and 63 after the thermostatic strip has been heated to the desired amount, the spring arm 65 moves to the left under its inherent resiliency carrying the insulating strip 67 and pushing the strip 72 to the left until it assumes the position shown in Fig. 5, making an audible signal as it strikes the contact 71.

The embodiment illustrated in Fig. 7 contemplates the usual plug 10c having the handle portion 11c, cup-shaped contact 12c for engagement with the abutment contacts 35c.

The abutment contacts are carried by but insulated from a sleeve 16c within which is a coil spring 15c, one end of the spring being in contact with bent-in stops 14c and the other end of the spring in contact with the slidable sleeve 16c. A stop 18c limits outward movement of the sleeve 16c. The central rivet 73 clamps the abutment contacts 35c against the sleeve 16c and also against a bimetallic thermostatic strip 74 which is carried by the sleeve 16c. The rear end portion of the thermostatic strip 74 carries a latching member 75 for cooperation with the switch parts 76 carried by the spring arm 77 which is secured to but insulated from the socket as indicated.

Also carried by the spring arm 77 but insulated therefrom is a rasp 78 adapted for engagement with the free end portion of a diaphragm 79 which is secured at 80 to the socket 13c. The ungrounded terminal 81 supplies current through the spring arm 77 when the switch parts 75 and 76 are closed, through the rivet 82 and thence through the heating wire 83 for the thermostatic element to the rivet 84 in the sleeve 16c, said sleeve being grounded and in contact with the socket 13c. When the switch parts 75 and 76 are closed, current for the cigar lighter passes from the terminal 81 through the spring arm 77, switch parts 76 and 75, through the bimetallic strip 74 to the rivet 73, abutment contacts 35c, cup-shaped member 12c and thence through the spiral resistance wire to the other plug contact and socket as was described in connection with Figs. 1 and 3.

Upon pushing the plug 10c inwardly the spring 15c is compressed and the latch 75 engages the switch element 76. Upon release of the plug the spring 15c slides the sleeve 16c and the plug outwardly or to the left to some extent flexing the spring arm 77, which possesses less strength than does the spring 15c. In moving the switch element 76 to the left in Fig. 7, the insulated rasp 78 likewise moves to the left under the influence of the spring 15c, causing the rasp teeth 78 to be moved over the diaphragm 79. Upon release of the switch parts 75 and 76 the spring arm 77 returns the switch element 76 to the position shown in Fig. 7 and in doing so some of the teeth

of the rasp 78 are again caused to quickly slide over the diaphragm 79 giving an audible signal and advising the operator that the cigar lighter is in readiness for use.

If desired the rasp may be replaced by a small hammer and the diaphragm by a gong or other device whereby percussion will give an audible signal. In another construction the rasp is not insulated from the spring arm 77 and a contact connected to a signal lamp is substituted for the diaphragm 79 so that the rasp, instead of creating an audible signal creates a visual signal by making and breaking the circuit through the signalling lamp. It will also be clear that a combined visual and audible signal can be obtained by insulating the diaphragm 79 from the socket tube, electrically connecting the rasp 78 to the spring arm 77 and allowing the diaphragm to serve both in the creation of an audible signal and as a contact connected to a signal lamp so that both types of signal are available to indicate to the operator that the thermostat has broken the circuit through the cigar lighter and that it is ready to use.

In the device of Figs. 3, 5, and 7 the bimetallic strip is of low enough resistance so that the current passing through it to the cigar lighter does not heat up this bimetallic strip sufficiently to cause the switch parts which are latched or held thereby to be released.

In Figs. 1 to 7 inclusive the wire which is wound around the bimetallic strip for heating the same should be electrically insulated therefrom. If desired, this heating wire may be bare and maintained out of electrical contact with the bimetallic strip by means of an open or perforate insulating sleeve so that convection currents of air passing from the heating wire may cause the heating of the bimetallic strip to augment the direct action of the coils 25, 50, 69 or 83. Heat from the igniter coil alone, however, is not as positive nor possessed of some of the mechanical and electrical advantages present when the heater for the thermostat is independent of or in addition to the heater for the cigar or cigarette.

In the embodiment shown in Figs. 1 to 4 the spring fingers 37 and 37*a* engage the plug contact 36 and 36*a* only when the plug is in normal position. When the plug is pushed in to a position closing the thermostatic switch the circuit is open through the contacts 36 or 36*a* and 37 or 37*a*. In this way the circuit through the heater is not closed until after the plug has been returned to its normal position shown in Fig. 1 after the thermostatic switch has been closed. This is the preferred manner of operation for the devices of Figs. 1 to 4. In other words, the thermostatic switch does not close the circuit through the heater because at that time the heater circuit is open through the spring finger 37 or 37*a* being out of contact with the plug. The thermostatic switch, however, does open the heater circuit. The use of two switches in the heater circuit both of which close only after the plug has been moved inwardly and then moved outwardly by the spring, makes these forms of the invention safe against a user accidentally holding the plug in a pressed-in position.

Since many of the commercial cigar lighters on the market previously have required an operator to hold the plug pushed in to a circuit closing position, the present construction provides a safe way of educating the operator out of his previous habit, because no matter how long the plug of Figs. 1 to 4 may be held in a pressed-in position closing the thermostatic switch, the heater does not have its circuit closed until after the plug has subsequently been moved outwardly so that the contact 36 or 36*a* may engage the spring finger 37 or 37*a*.

I claim:

1. A cigar lighter comprising a removable member and a stationary member for supporting said removable member, a heater carried by the removable member, a thermostatic switch carried at least in part by one of said members and adapted to be closed by movement of said removable member beyond its normal position, circuit connections for supplying electric current for said heater through said thermostatic switch, a spring carried by said removable member for cooperation with said stationary member for moving said removable member longitudinally of the stationary member after closing said switch and a second switch in the heater circuit open only when the removable member is moved inwardly beyond its normal position.

2. A cigar lighter comprising a removable member and a stationary member for supporting the removable member, circuit connections to said stationary member, contacts carried by the removable member for engaging contacts carried by the stationary member, a heater on said removable member and connected to its contacts, temperature responsive means carried by said stationary member for opening the circuit through the heater after the same has been closed, a heater contact on the inner end portion of said removable member, one of the contacts of the stationary member being an abutment for engaging said heater contact and against which said heater contact is adapted to be pressed, a switch in said heater circuit carried by the stationary member and adapted to be opened by said temperature responsive means, said switch being constructed for closure on inward movement of at least a substantial portion of said removable member, a spring cooperating with the stationary and removable members and carried by one of said members for sliding said removable member outwardly after closing said switch and upon manual release of the removable member, detent means for holding said heater contact in engagement with said abutment, one of the contacts carried by said removable member being in front of and insulated from said heater contact but in electrical circuit therewith through the heater, said detent means serving as a contact whereby the heater circuit may be completed only when said detent means is in engagement with said contact carried by the removable member in front of the heater contact.

3. A cigar lighter comprising a removable member and a stationary member for supporting the removable member, circuit connections to said stationary member, contacts carried by the removable member for engaging contacts carried by the stationary member, a heater on said removable member and connected to its contacts, temperature responsive means carried by said stationary member and constructed for opening the circuit through the heater after the same has been closed, a heater contact on the inner end portion of said removable member, one of the contacts of the stationary member being an abutment for engaging said heater contact and against which said heater contact is adapted to be pressed, a switch in the heater circuit, carried by the stationary member and adapted to be opened by

said temperature responsive means, said switch being closed on inward movement of at least a substantial portion of said removable member, a spring cooperating with the stationary and removable members and carried by one of said members for sliding said removable member outwardly after closing said switch and upon manual release of the removable member, means for holding said heater contact in engagement with said abutment, one of the contacts carried by said removable member being in front of and insulated from said heater contact but in electrical circuit therewith through the heater, and a spring cooperating with said switch parts and carried by said stationary member and of such strength as to be adapted for opening said switch when the switch is released by said temperature responsive means without disengaging the heater contact from said abutment contact.

4. A cigar lighter comprising a removable member and a stationary member for supporting the removable member, circuit connections to said stationary member, contacts carried by the removable member for engaging contacts carried by the stationary member, a heater on said removable member and connected to its contacts, temperature responsive means carried by said stationary member for opening the circuit through the heater, a heater contact on the inner end portion of said removable member, one of the contacts of the stationary member being an abutment for engaging a portion of said heater contact and against which said heater contact is adapted to be pressed, a switch carried by the stationary member and adapted to be opened by said temperature responsive means, said switch being closed on inward movement of at least a substantial portion of said removable member, a spring carried by one of said members for sliding said removable member outwardly after closing said switch and upon manual release of the removable member, means for holding said heater contact in engagement with said abutment, another contact carried by said removable member in front of and insulated from said heater contact but in electrical circuit therewith through the heater, a spring carried by said stationary member for opening said switch when the switch is released by said temperature responsive means without disengaging the heater contact from said abutment contact, a support for said abutment contact slidably mounted in said stationary member, and stops for limiting the movement of said abutment contact and its support, said spring for sliding the removable member outwardly being in cooperation with said stationary member and said support for the abutment contact.

5. A cigar lighter comprising a removable member and a stationary member for supporting the removable member, circuit connections to said stationary member, contacts carried by the removable member for engaging contacts carried by the stationary member, a heater on said removable member and connected to its contacts, temperature responsive means carried by said stationary member for opening the circuit through the heater, a heater contact on the inner end portion of said removable member, one of the contacts of the stationary member being an abutment for engaging a portion of said heater contact and against which said heater contact is adapted to be pressed, a switch carried by the stationary member and adapted to be opened by said temperature responsive means, said switch being closed on inward movement of at least a substantial portion of said removable member, a spring carried by one of said members for sliding said removable member outwardly after closing said switch and upon manual release of the removable member, means for holding said heater contact in engagement with said abutment, another contact carried by said removable member in front of and insulated from said heater contact but in electrical circuit therewith through the heater, a spring carried by said stationary member for opening said switch when the switch is released by said temperature responsive means without disengaging the heater contact from said abutment contact, a support for said abutment contact slidably mounted in said stationary member, and stops for limiting the movement of said abutment contact and its support, said spring for sliding the removable member outwardly being in cooperation with said stationary member and said support for the abutment contact, said temperature responsive switch having a shiftable element carried by said support for the abutment contact and movable relative thereto, said spring for actuating said switch cooperating with said shiftable switch element and with said support for the abutment contact, the first mentioned spring being stronger than the second mentioned spring.

6. A cigar lighter comprising a removable member and a stationary member for supporting the removable member, circuit connections to said stationary member, contacts carried by the removable member for engaging contacts carried by the stationary member, a heater on said removable member and connected to its contacts, temperature responsive means carried by said stationary member for opening the circuit through the heater, a heater contact on the inner end portion of said removable member, one of the contacts of the stationary member being an abutment for engaging a portion of said heater contact and against which said heater contact is adapted to be pressed, a switch carried by the stationary member and adapted to be opened by said temperature responsive means, said switch being closed on inward movement of at least a substantial portion of said removable member, a spring carried by one of said members for sliding said removable member outwardly after closing said switch and upon manual release of the removable member, means for holding said heater contact in engagement with said abutment, another contact carried by said removable member in front of and insulated from said heater contact but in electrical circuit therewith through the heater, a spring carried by said stationary member for opening said switch when the switch is released by said temperature responsive means, without disengaging the heater contact from said abutment contact, a support for said abutment contact slidably mounted in said stationary member, and stops for limiting the movement of said abutment contact and its support, said spring for sliding the removable member outwardly being in cooperation with said stationary member and said support for the abutment contact, said temperature responsive switch having a shiftable snap element carried by said stationary member for conducting current to the heater and temperature responsive means, said snap element being carried by said second mentioned spring and said first mentioned spring being stronger than said second mentioned spring, and electrically in series therewith.

7. A cigar lighter comprising a removable

member and a stationary member for supporting the removable member, circuit connections to said stationary member, contacts carried by the removable member for engaging contacts carried by the stationary member, a heater on said removable member and connected to its contacts, temperature responsive means carried by said stationary member for opening the circuit through the heater, a heater contact on the inner end portion of said removable member, one of the contacts of the stationary member being an abutment for engaging a portion of said heater contact and against which said heater contact is adapted to be pressed, a switch carried by the stationary member and adapted to be opened by said temperature responsive means, said switch being closed on inward movement of at least a substantial portion of said removable member, a spring carried by one of said members for sliding said removable member outwardly after closing said switch and upon manual release of the removable member, means for holding said heater contact in engagement with said abutment, another contact carried by said removable member in front of and insulated from said heater contact but in electrical circuit therewith through the heater, a spring carried by said stationary member for opening said switch when the switch is released by said temperature responsive means, without disengaging the heater contact from said abutment contact, a support for said abutment contact slidably mounted in said stationary member, and stops for limiting the movement of said abutment contact and its support, said spring for sliding the removable member outwardly being in cooperation with said stationary member and said support for the abutment contact, said temperature responsive means being carried by and movable with said support for the abutment contact, and a rasp and a diaphragm both carried by the stationary member for actuation by said temperature responsive means.

8. A cigar lighter comprising a removable member and a stationary member for supporting the removable member, circuit connections to said stationary member, contacts carried by the removable member for engaging contacts carried by the stationary member, a heater on said removable member and connected to its contacts, temperature responsive means carried by said stationary member for opening the circuit through the heater, a heater contact on the inner end portion of said removable member, one of the contacts of the stationary member being an abutment for engaging a portion of said heater contact and against which said heater contact is adapted to be pressed, a switch carried by the stationary member and adapted to be opened by said temperature responsive means, said switch being closed on inward movement of at least a substantial portion of said removable member, a spring cooperating with said stationary and removable members and carried by one of said members for sliding said removable member outwardly after closing said switch and upon manual release of the removable member, means for holding said heater contact in engagement with said abutment, another contact carried by said removable member in front of and insulated from said heater contact but in electrical circuit therewith through the heater and a spring carried by said stationary member and of such strength as to be adapted for opening said switch when the switch is released by said temperature responsive means without disengaging the heater contact from said abutment contact, said first mentioned spring being carried by said removable member and said abutment being mounted in a fixed support in said stationary member but insulated therefrom, said temperature responsive means at one end thereof being also supported by said fixed support, and a shiftable element between said removable element and switch, adapted to be moved in one direction by said removable member and in the opposite direction by said second mentioned spring.

9. A cigar lighter comprising a stationary member and a removable member carried by said stationary member, a heater on said removable member, contacts on the removable member connected to said heater and normally engaged with contacts on the stationary member, a thermostatic switch on one of said members, said switch being constructed to be closed on inward movement of said removable member, a spring cooperating with said stationary and removable members for moving said removable member outwardly upon manual release of said removable member and a second spring cooperating with said switch parts and of such strength as to be adapted to open said switch without substantially affecting the position of said removable member.

10. A cigar lighter comprising a stationary member and a removable member carried by said stationary member, a heater on said removable member, contacts on the removable member connected to said heater and normally engaged with contacts on the stationary member, a thermostatic switch on one of said members, said switch having a member carried thereby and being closed on inward movement of said removable member, a spring for moving said removable member outwardly upon manual release of said removable member, an audible signal means, a shiftable part carried by the stationary member, and a second spring adapted to open said switch without substantially affecting the position of said removable member, said second mentioned spring causing said member carried by the switch to engage a shiftable part carried by the stationary member and actuate said audible signal means.

11. A cigar lighter comprising a removable member, a stationary member for supporting said removable member, a heated member carried by the removable member, a circuit for supplying energy to said heated member, a switch for controlling said circuit, a bimetallic strip carried by one of said members for releasing said switch, another circuit for heating said strip upon closure of said switch by movement of said removable member with respect to the stationary member, and a spring for moving said switch to open the first circuit upon its release by the action of said bimetallic strip, and another spring for moving said removable member after its movement to close said switch.

12. A cigar lighter comprising a removable plug, a socket for supporting the plug, a heated member carried by the plug, a switch carried at least in part by said socket for controlling the supply of energy to said heated member, an abutment in said socket against which the plug is adapted to be held when in said socket, a bimetallic strip extending in rear of said abutment and adapted when heated to release said switch, and spring means for sliding the plug forward-

ly after its manual release and a second spring means cooperating with said switch parts for opening said switch after its release by said strip and while said abutment and plug are in contact.

13. A cigar lighter comprising a tubular socket, a plug removably carried in said socket, a heater on the inner end portion of said plug, a transverse, sliding wall intermediate the ends of said socket, a delay action switch within the socket in rear of said transverse wall, a heater contact carried by said wall and adapted to cooperate with said heater when the same is adjacent said wall, said wall and socket being adapted to shield said switch against the transmission of heat by radiation or convection from the heater.

14. A cigar lighter comprising a stationary member, a removable member, a heater carried by said removable member, a delay action switch carried by one of said members for automatically opening an electric circuit through said heater after the same has been closed by inward movement of said removable member, an abutment on the stationary member, a spring cooperating with said abutment and with at least a substantial portion of the removable member and adapted to move at least said substantial portion of the removable member outwardly upon release of the removable member after closing said switch, and a second spring in cooperation with said switch parts and adapted to separate the parts of said switch after their release and without substantially affecting the position of said removable member, and a signal responsive to the release of said second spring from a position in which said second spring is stressed when the switch is closed.

15. A cigar lighter comprising a stationary member, a removable member carried by the stationary member, a heater carried by the removable member, a switch carried by the stationary member and adapted to be closed by movement of the removable member with respect to the stationary member, a spring for returning said removable member to its normal position after closing said switch, means for holding said switch closed, delay action means for opening said switch, and another switch closed only when the removable member is in its normal position, both of said switches being in the heater circuit, whereby current is not supplied to the heater until after the removable member has been returned to its normal position after closing the first mentioned switch.

16. A cigar lighter comprising a stationary member, a removable member adapted to be carried by said stationary member, a heated member on the removable member, two switches controlling an electric circuit for said heated member, one of them being adapted to be closed on inward movement of said removable member beyond its normal supported position, a spring cooperating with said stationary and removable members for moving said removable member outwardly upon release of the removable member, another of said switches adapted to be closed by such removable member only when the same is in its normal supported position on said stationary member, and delay action means for opening one of said switches.

17. A cigar lighter comprising a stationary member, a removable member carried by the stationary member, a heated member secured to the removable member, a switch controlling an electric circuit for said heated member and adapted to be closed on inward movement of said removable member beyond its normal supported position, a spring cooperating with said stationary and removable members for moving said removable member outwardly upon release of the removable member, delay action means for opening said switch and the circuit through said heated member, and means for opening the circuit through the heated member during inward movement of said removable member.

18. A cigar lighter comprising a stationary member, a removable member carried by the stationary member, a heated member secured to the removable member, a switch controlling an electric circuit for said heated member and adapted to be closed on inward movement of said removable member beyond its normal supported position, a spring cooperating with said stationary and removable members for moving said removable member outwardly upon release of the removable member, delay action means for opening said switch and the circuit through said heated member, and means for opening the circuit through the heated member during inward movement of said removable member regardless of whether said switch be open or closed.

19. In a cigar lighter the combination with a stationary member, of a removable member, an igniter carried by one of said members, electric current contacts for each of the members, a switch carried by one of them in addition to said contacts, means for closing said switch on movement of the removable member from normal position with respect to the stationary member, means for returning the removable member to normal position, and a delay action means for opening the switch while the removable member is maintained in its normal position with its contacts engaged with those of the stationary member.

20. An electric lighter comprising a socket constituting a contact, a contact mounted to slide in the socket but insulated therefrom, a slidable support for said contact, a rod carried by said slidable support, a spring for sliding said rod and its associated contact forwardly, a switch member slidable on said rod, a spring for moving said switch member on said rod, a latch for holding said switch member, a heater for moving said latch to release said switch member, said socket being adapted to receive an igniter with a coil and circuit contacts, one of the latter contacts being adapted to engage the socket and the other circuit contact being adapted to engage the slidable contact when the plug is in the socket.

21. In a cigar lighter the combination with a stationary member, of a removable member, an igniter carried by one of said members, electric current contacts for each of the members, a switch carried by one of them in addition to said contacts, means for closing said switch on movement of the removable member from normal position with respect to the stationary member, means for returning the removable member to normal position, and a delay action means for opening the switch while the removable member is maintained in its normal position with its contacts engaged with those of the stationary member, the circuit being opened through the igniter when the removable member is held in front or behind its normal position.

22. In a cigar lighter, a socket having two circuit contacts one of which is insulated from the other, one of the contacts constituting a latch, a plug removably supported in the socket and hav-

ing a contact normally electrically connected to one of the socket contacts and a second contact, an igniter element connected between the two contacts of the plug, two contacts electrically connected together and movable in the socket between the latch and the plug, one of which is movable with respect to the other and one of which is adapted to interlock with the latch, one of the said latter contacts being adapted to be engaged by a contact of the plug when the plug is moved inwardly in the socket, a spring moving one of the interior socket contacts to close a circuit between the plug and the socket when pressure on the plug is released and a spring moving the other interior contact to break the circuit when the latch is released and delay action means for releasing the latch to permit one of the springs to act and break the circuit.

23. In a cigar lighter the combination with a stationary member, of a removable member, an igniter carried by one of said members, electric current contacts for each of the members, a switch carried by one of them in addition to said contacts, means for closing said switch on movement of the removable member from normal position with respect to the stationary member, means for returning the removable member to normal position, and a delay action means for opening the switch while the removable member is maintained in its normal position with its contacts engaged with those of the stationary member, the delay action means being independent of and substantially unaffected by the temperature of said igniter.

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