April 12, 1960 L. E. FENN 2,932,716

CIGAR LIGHTER

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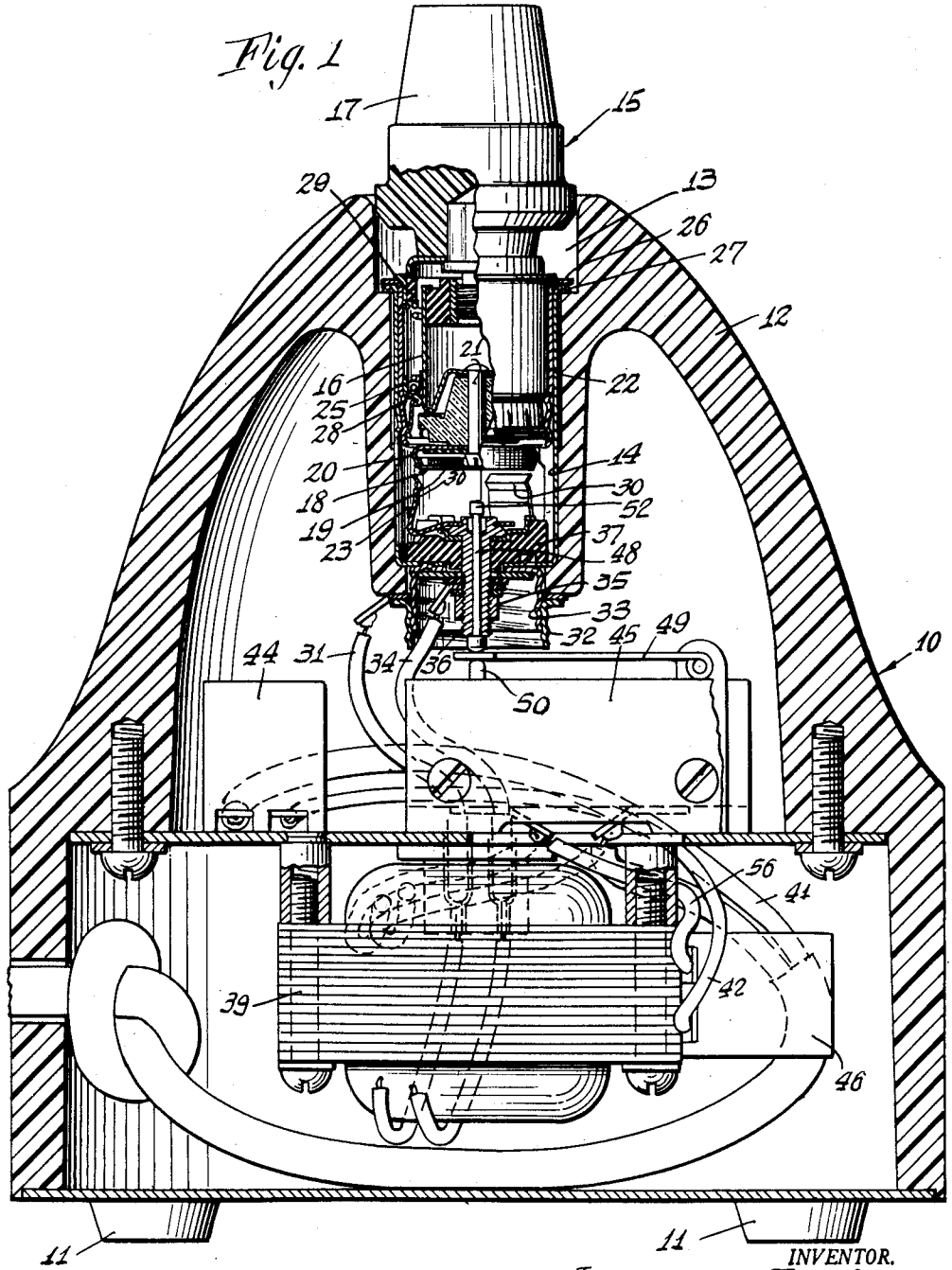
Fig. 1



INVENTOR.
Lawrence E. Fenn
BY
Johnson and Kline
ATTORNEYS

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Fig. 2

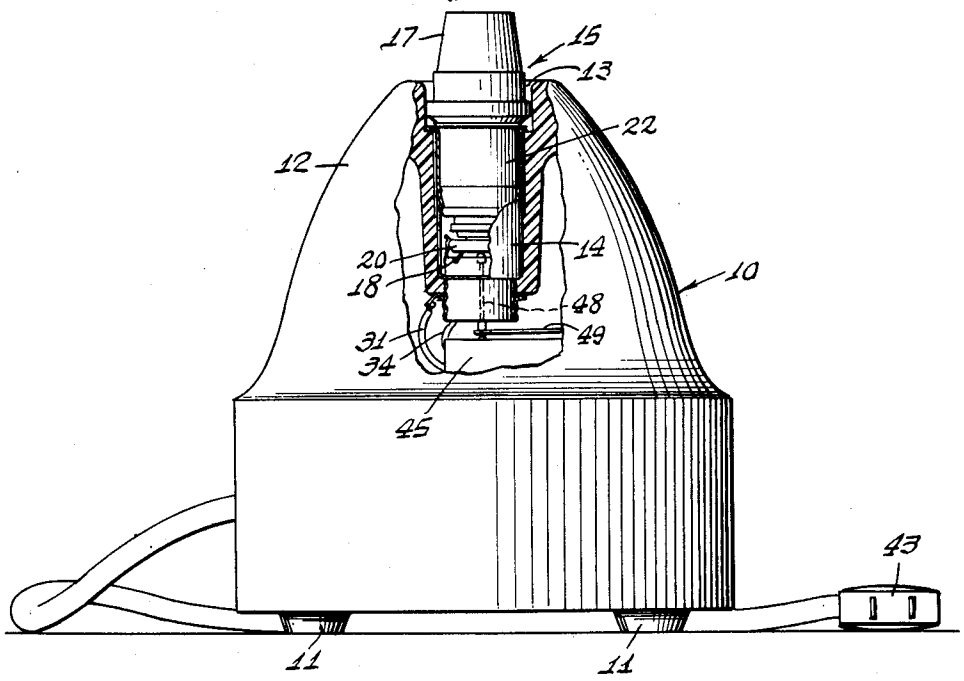

Fig. 3

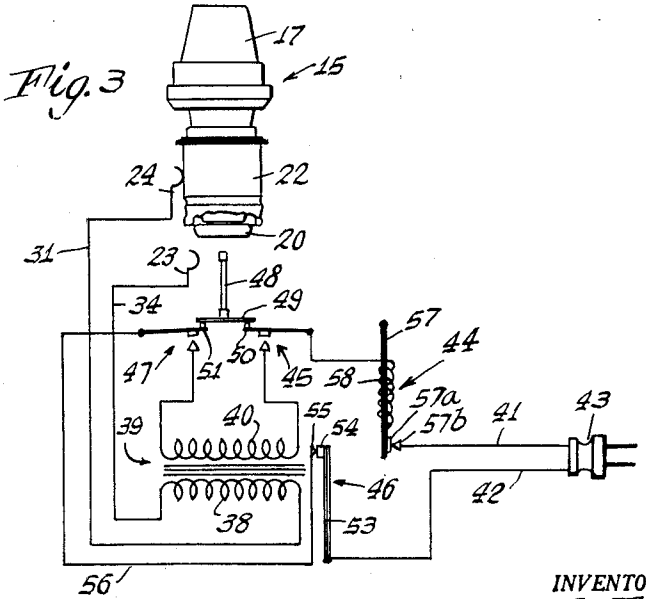

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Fig. 4

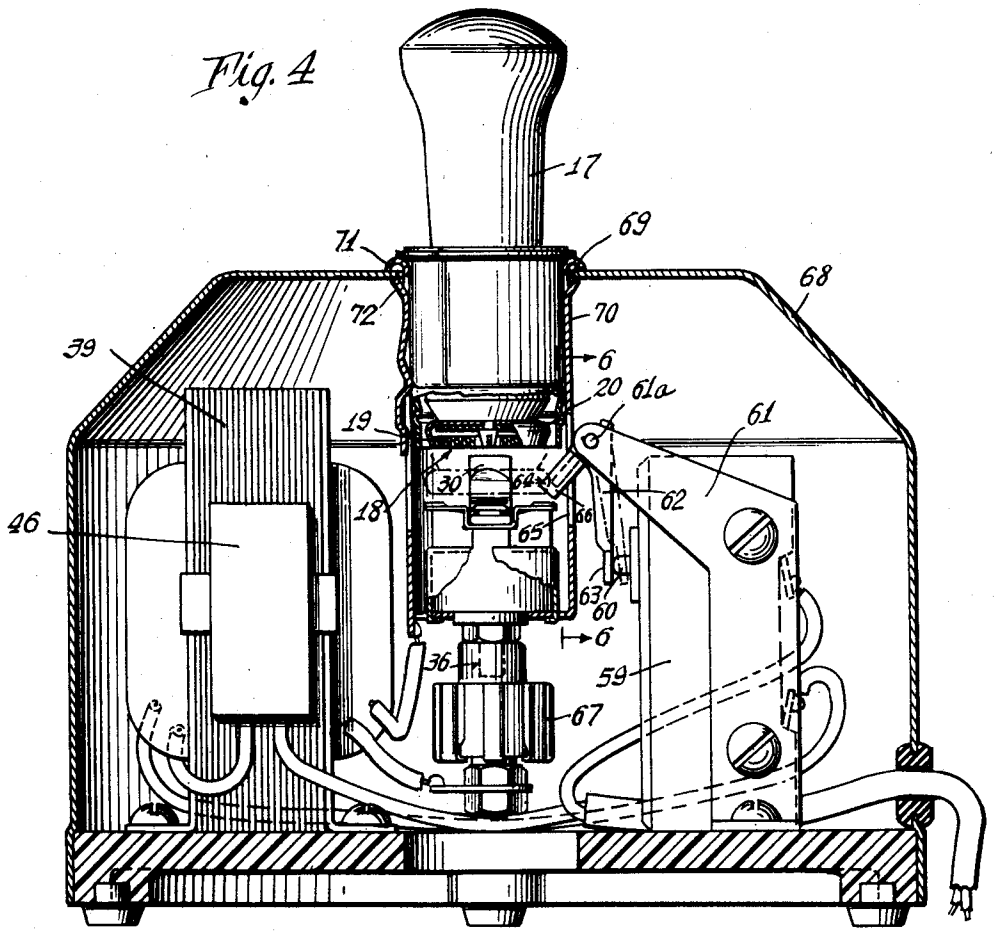


Fig. 5

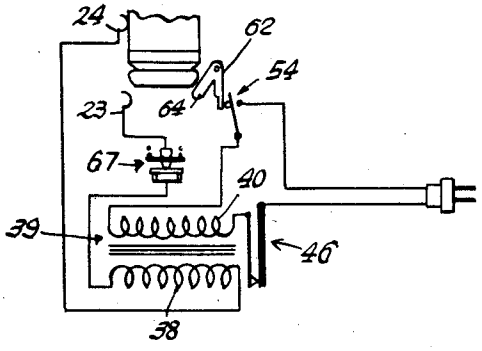
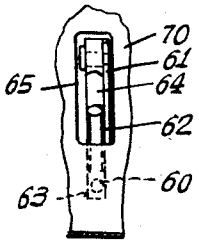


Fig. 6



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Lawrence E. Fenn
BY
Johnson and Kline
ATTORNEYS

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2,932,716

CIGAR LIGHTER

Lawrence E. Fenn, Bridgeport, Conn.

Application April 26, 1956, Serial No. 580,809

5 Claims. (Cl. 219—32)

This invention relates to devices for lighting cigars, cigarettes, etc., which, for brevity, are herein called cigar lighters.

An object of this invention is to provide a cigar lighter for use on tables, desks, etc., which may be operated in electrical systems having voltages suitable for use in homes and offices but utilizing an igniting unit operating on current having a safe low voltage in the order of 12 volts, for instance.

Another object of this invention is to provide such a table cigar lighter in which, after being quickly brought to an igniting temperature on a suitable supporting base, the igniting unit may be manually and completely removed from the base to be applied to the tobacco to ignite the same.

A further object is to provide a table lighter of the type referred to above in which, after the heating of the igniting unit has been manually initiated and the igniting unit has been brought to incandescence, the heating is automatically interrupted and the circuits energizing the igniting unit are broken.

A further object is to provide a cigar lighter of the type referred to in which the dangers attendant upon the use of such a device are largely obviated.

And a still further object is to so provide such a cigar lighter that it may be manufactured at low cost, preferably utilizing in combination components which are now manufactured and sold in large quantities.

Other features and advantages will hereinafter appear.

In the accompanying drawing:

Figure 1 is a section showing the structural details of the cigar lighter of the present invention.

Fig. 2 is an elevation partly in section thereof.

Fig. 3 is a schematic diagram of the electrical system of the lighter.

Fig. 4 is a view in section of another embodiment of the cigar lighter.

Fig. 5 is a schematic diagram thereof.

Fig. 6 is a detail taken on the line 6—6 of Fig. 4.

Referring to the drawing, the cigar lighter of the present invention, in the embodiment thereof shown in Figs. 1 to 3, includes a base **10** suitably shaped to be supported on a table or desk and may have feet **11**. For the most part, the base **10** is hollow so as to support and enclose some of the components of the device. The base **10** may be formed of any suitable material, such as metal, plastic or ceramic, and may be molded to have a cylindrical upper portion **12** provided with a recess **13** for receiving the low voltage components of the lighter. These comprise a tubular holding shell or socket **14** and a plug-like igniting unit **15**, the latter being completely separable and removable from the base **10** for use. The igniting unit **15** is preferably of the kind commonly used in low voltage systems such as the 6 or 12 volt systems used in automobiles.

The igniting unit **15** shown includes a tubular body **16** having a handle or knob **17** at one end and at the other end a heating element **18** comprising a coil **19** of resistance wire contained within and having one end connected to a contact cup **20**. The other end of the coil **19** is connected to a stud **21** which is electrically connected to an outer sleeve **22** through the body **16** and intermediate metallic parts. Hence, when the sleeve **22** and the contact cup **20** are connected to a source of current, the coil **19** will be energized and heated to igniting temperature, usually to incandescence.

The socket **14** in the base **10** is made of such diameter as to slidably receive the outer sleeve **22** of the igniting unit and of such depth that, as shown in Figs. 1 and 3, the entire igniting unit, except for a portion of the handle **17** which projects, may be contained and concealed within the base **10** until it is removed for use.

On the socket **14** there are contacts **23** and **24** (shown schematically in Fig. 3) connected to opposite leads of a source of current. When the igniter is placed in the socket as shown in Fig. 3, which is the normally open or nonenergizing position of the igniter, the contact **24** engages the sleeve **22** but the contact **23** is out of engagement with its cooperating contact which is the contact cup **20**. When the heating coil is to be energized, manual pressure is applied to the knob **17** of the igniting unit to push the tubular body and heating coil inwardly, carrying the contact cup **20** into engagement with the contact **23**, thus closing the circuit to the heating coil.

In so moving the igniting unit body, a return spring **25** is compressed so that at the proper time the igniting unit and body may move upwardly and outwardly of the socket from the closed circuit position shown in Fig. 2 to the open circuit position shown in Figs. 1 and 3. The sleeve **22** has a flange **26** which engages a flange **27** on the shell **14** when the igniter is inserted in the socket and the spring **25** is located between another flange **28** on the sleeve **22** and a flange **29** in the tubular body.

In the broader aspects of this invention, the igniting unit may be held in energizing position manually to be released when it is though that the heating coil has reached an igniting temperature. However, so as to assure that the heating coil always reaches an optimum temperature for use and does not overheat, the cigar lighter of the present invention may be thermostatically controlled. For this purpose, the schematic contact **23** may consist of terminal latch portions **30** which engage over the rim of the contact cup **20** and hold the cup and igniting unit body in closed circuit position temporarily. The latch portions **30** are resilient contact fingers made of bimetallic material so that when heated by the rising temperature of the heating coil **19** their pressure on the cup **20** relaxes and they release the cup when the optimum temperature is reached permitting the igniting unit body **15** to be returned to open circuit position by the return spring **25**.

Upon return of the igniting unit to open circuit position it may be removed from the socket **14** by means of the knob **17** to apply the heating coil to the tobacco to ignite the same, after which the igniting unit is returned to its normal open circuit position on the base shown in Fig. 1.

The schematic contact **24**, in the instant embodiment, is the holding shell or socket **14** and current is supplied thereto by a lead **31** connected under a clamping shell **32** threaded on the end portion **33** of the shell **14**. The portions of the shell **14** which form the contact **24** are preferably in the form of one or more fingers forming an integral part of the shell **14** and are biased inwardly to resiliently engage the sleeve **22** of the igniter. Another lead **34** conducting current to the schematic contact **23** and the cigar lighter is secured under a nut **35** in contact with a stud **36** to which the resilient contact fingers **30** are secured, the fingers and stud being insulated from the shell **14** by a block **37** of insulating material.

It will be noted that when the igniting unit is removed from the socket, the current-carrying portions of the socket, namely the socket 14 and the resilient contact fingers 30, are uncovered and may be engaged jointly by a person's finger inserted in the socket or by some metal object, such as a coin which might be dropped in the well, by a child, for instance.

According to the present invention, however, when the igniter is out of the well, no portions of the socket 14 carries current which would result either in personal injury or in creating a fire hazard, and to obtain this result the present invention provides means for completely disconnecting the leads 31 and 34 from the source of current, when the igniter is removed from the socket.

According to the present invention, the leads 31 and 34 are connected to a secondary winding 38 (see Fig. 3) of an isolating transformer 39, having a primary winding 40. The primary winding 40 is energized by wires 41 and 42 connected to an attachment plug 43 which may be inserted in a receptacle outlet for house or other high voltages in the order of 120 volts. The transformer 39 is preferably of the step-down type so that the secondary voltages will be of a low order as compared to the primary voltage.

As shown in Fig. 3, the wire 41 is connected to one end of the primary winding 40 through a normally closed current responsive thermostatic switch 44 and a normally open switch 45, while the wire 42 is connected to the other end of the primary winding 40 by a normally closed heat responsive thermostatic switch 46 and a normally open switch 47. Hence, it is only when the switches 45 and 47 (which may be microswitches) and the switches 44 and 46 are all closed that current can be conducted to the primary of the transformer 39.

The switches 45 and 47 are operated to a closed position when the igniting unit 15 is depressed to its energizing position and in accomplishing this, there is provided a plunger 48, the lower end of which engages a lever 49, to operate control buttons 50 and 51 of the switches 45 and 47 respectively. The plunger 48 is mounted to slide in the stud 36 at the base of the socket 14 and has its upper end 52 positioned to be engaged by the heating element 18, more particularly by the stud 21 thereof, when the igniting unit 15 is pressed inwardly to close the switches 45 and 47. When the heating element reaches the desired temperature and snaps up by reason of spring 25, the plunger 48 permits the normally open switches 45 and 47 to open.

In operation of the cigar lighter of the present invention, the primary winding 40 of the transformer is normally open and is only energized when it is desired to heat the igniting plug 15. Since only a short time is needed to bring the heating coil 19 to incandescene, i.e., a mere matter of seconds, the transformer 39 has a rating less than that which may be safely utilized for sustained energization. However, it is large enough so that it can easily carry the normal intermittent energizations of the heating element without becoming dangerously heated. When through ignorance or accidentally, the igniting plug is held in closed circuit position irrespective of the fact that the latches 30 no longer restrain the outward movement of the lighter to its open circuit position, the transformer will become overheated and irreparably damaged. To obviate such a condition, which may create a fire hazard, the normally closed heat responsive thermostatic switch 46 is placed so that its heat sensitive element is in good heat conducting relation with the transformer 39 and thus is responsive to the temperature of the transformer. The switch 46 is preferably composed of a bimetallic strip 53 having a contact 54 carried on one end thereof. A stationary contact 55 is mounted for cooperation with the contact 54 and a lead 56 connects it to the switch 47. By such an arrangement, the strip 53 is responsive to the temperature of the transformer 39 and prevents dangerous overheating thereof, thus permitting usage of a small size and more economical transformer.

In order to protect the coil 19 of the heating element from being burned out by prolonged energization, the normally closed current responsive thermostatic switch 44 is positioned in the circuit of the primary winding 40 of the transformer 39 to cause the energization thereof to cease after a predetermined flow of current through the transformer and the coil 19 which condition may result if the igniter is accidentally maintained for too long a period in its energized position. This switch is thus, in effect a time-control switch and in the embodiment shown, may consist of a bimetallic strip 57 which is heated by alternating magnetic flux produced by a coil 58. The switch 44 has contacts 57*a* and 57*b*, normally in engagement, but upon a predetermined current passing through the coil 58, the bimetallic strip becomes heated causing a flexing thereof to open the contacts 57*a* and 57*b*.

In the preferred embodiment illustrated, the switch 44 and switch 46 operate independently of each other and either is capable of deenergizing the transformer. The switch 44, while primarily protecting the transformer 39, also serves in an auxiliary fashion to protect the transformer 39 and the coil 19 respectively since the amount of heat in the transformer is generally related to the amount of current in the coil 19. Thus, if one switch should malfunction the other will perform a dual role. Furthermore, the switch 46 also protects against frequent successive energizations of the plug while the switch 44 additionally protects against a prolonged energization of the plug.

Referring to the embodiment shown in Figs. 4 to 6 inclusive, wherein like reference numerals are given to elements identical to those in the embodiment disclosed in Figs. 1 to 3, inclusive, there is shown a single microswitch 59 for closing the circuit to the primary winding 40 upon depression of the igniter plug into its energizing position in the holding shell or socket. The switch 59 preferably is a normally open microswitch having a control button 60 resiliently biased outwardly. A support link 61 is mounted on the microswitch and carries a pivot pin 61*a* for pivotally mounting an elbow crank 62. One leg 63 of the elbow crank engages the control button to actuate it while a shorter leg 64 projects through a slot 65 formed in the side of the holding socket 14. An insulated sleeve 66, preferably of ceramic, plastic, etc., which may have properties of heat resistance and electrical insulation covers the shorter leg 64 where it may be in contact with the plug 15. In operation of this embodiment where the plug is shown in its full line position in Fig. 4 as being in its normally open position, the switch 59 is open. Upon depression of the plug, the exterior of the contact cup 20 engages the sleeve 66 to pivot the elbow crank 62 into the dotted line position which causes closing of the switch 59 and consequent energization of the primary winding. The secondary winding through the heating coil is closed similar to that described for the schematic contacts 23 and 24 in the prior embodiment.

To protect against prolonged operation, either by successive energizations or by a single extended energization of the heating coil 19, a current responsive switch 67 is screwed onto the stud 36. Current can flow through the switch 67 to the fingers 30 and then to the heating coil 19. The switch 67 is preferably of the type that has a thermoplastic material which upon being heated by the passage of a predetermined amount of current through the switch, deforms to open the switch and is thus a time-control switch.

The exterior cover 68 of the cigar lighter in the embodiment shown in Figs. 4 to 6, preferably is formed of thin sheet material, which may be metal and is provided with an opening 69 to receive a socket 70 of the type shown in the prior embodiment. The socket 70 has a

flange 71 at its entrance cooperating with resilient lanced tabs 72 for maintaining the socket 70 in position. The flange and the tabs are adapted to resiliently grasp the portions of the cover 68 surrounding the opening 69.

There has thus been set forth according to the present invention a cigar lighter of the type having a removable plug for igniting tobacco which is suitable for use in a home, office or the like and which may be placed on a table or desk, etc. The lighter incorporates a novel circuitry which enables use of a relatively high domestic electrical current but employs a low safe voltage for bringing to incandescence the igniting coil. Furthermore, there are incorporated time control and temperature control devices which eliminate risks of mishap which may be caused by abnormal usage of the device either intentionally or accidentally. In addition thereto, any attempt to energize the device when the plug is removed, as for example by children, is largely obviated by the construction and arrangement of the elements as heretofore set forth.

Variations and modifications may be made within the scope of the claims and portions of the improvements may be used without others.

I claim:

1. An electrical cigar lighter comprising an open-ended socket adapted to be mounted in a base having an aperture; an igniting unit supported in the socket and removable therefrom for use and including a low voltage heating coil mounted within a retainer cup on its inner end, said unit being slidable in the socket for movement between an inner position in which said heating coil is energized and an outer storage position in which said heating coil is not energized; a transformer mounted in the base; a first circuit, including a switch, connecting the primary of said transformer to a source of current of relatively high voltage and a switch operating arm having a portion projecting into the socket and positioned to be actuated by the retainer cup upon movement of the unit to an energizing position; and a second circuit including cooperating contacts in the socket and on the retainer cup for connecting the heating coil to the secondary of the transformer when the igniting unit is in said coil energizing position in which said cooperating contacts are brought into engagement, one of said cooperating contacts being a heat responsive latch for detaining said igniting unit in coil energizing position until the coil reaches an igniting temperature; and means operating upon the release of said heat responsive latch for returning the igniting unit to the not energized position; whereby the movement of the igniting unit to energized position and from deenergized position closes and opens respectively said switch in said first circuit.

2. The invention as defined in claim 1 in which the heat responsive latch has cup engaging portions located nearer the open end of the socket than the switch arm portion whereby the switch arm portion is actuated by the cup to energize the primary circuit after engagement between the cooperating contacts and deenergizes the primary circuit prior to disengagement between the cooperating contacts.

3. The invention as defined in claim 1 in which there is a socket for receiving the igniting plug and in which the socket has a slot formed therein; in which the switch arm is an elbow crank having one leg portion projecting into the slot for operation by the retainer cup; and in which the other leg portion of the crank operates the said switch in the primary of the transformer.

4. An electrical cigar lighter comprising an open-ended socket adapted to be mounted in a base having an aperture; an igniting unit supported in the socket and removable therefrom for use and including a low voltage heating coil mounted within a retainer cup on its inner end, said unit being slidable in the socket for movement between an inner position in which said heating coil is energized and an outer storage position in which said heating coil is not energized; a transformer mounted in the base; a first circuit, including a switch, connecting the primary of said transformer to a source of current of relatively high voltage and a switch actuating member pivotally mounted on the base and having one arm projecting into the socket to be pivoted by the movement of the retainer cup and a second arm integral to and extending at an angle from the first and pivoting therewith to close the switch; and a second circuit including cooperating contacts in the socket and on the retainer cup for connecting the heating coil to the secondary of the transformer when the igniting unit is in said coil energizing position in which said cooperatng contacts are brought into engagement, one of said cooperating contacts being a heat responsive latch for detaining said igniting unit in coil energizing position until the coil reaches an igniting temperature; and means operating upon the release of said heat responsive latch for returning the igniting unit to the not energized position; whereby the movement of the igniting unit to energized position and from deenergized position closes and opens respectively said switch in said first circuit.

5. A table-type cigar lighter comprising a base having a recess open at the top; an igniting unit supported in the recess and removable therefrom for use and including a low voltage heating coil on its inner end, said unit being mounted on the base for vertical movement between an inner position in which said heating coil is energized and an outer storage position in which said heating coil is deenergized; a transformer mounted in the base; a first circuit, including a switch, connecting the primary of said transformer to a source of current of relatively high voltage; and a second circuit including cooperating contacts in the recess and on the igniting unit for connecting the heating coil to the secondary of the transformer when the igniting unit is in said coil energizing position in which said cooperatng contacts are brought into engagement, one of said cooperating contacts being a heat responsive latch for detaining said igniting unit in coil energizing position until the coil reaches an igniting temperature; means operating upon the release of said heat responsive latch for returning the igniting unit to deenergized position; means responsive to the movement of the igniting unit to energized position and from deenergized position for closing and opening respectively said switch in said first circuit, and in which the said switch in the circuit of the primary of the transformer is operated by a rod mounted in the base for vertical movement to be engaged and operated by the end of the igniting unit when the latter is moved to coil energizing position.

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