

May 14, 1968

L. D. HUBERT

3,383,494

ELECTRIC POWERED LIGHTER

Filed Oct. 21, 1964

2 Sheets-Sheet 1

Fig. 1

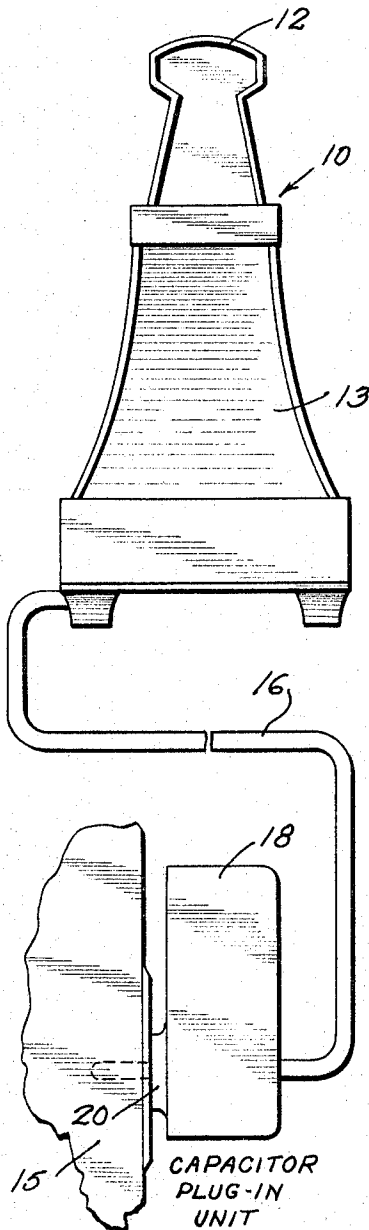


Fig. 2

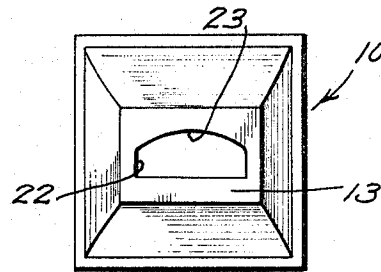
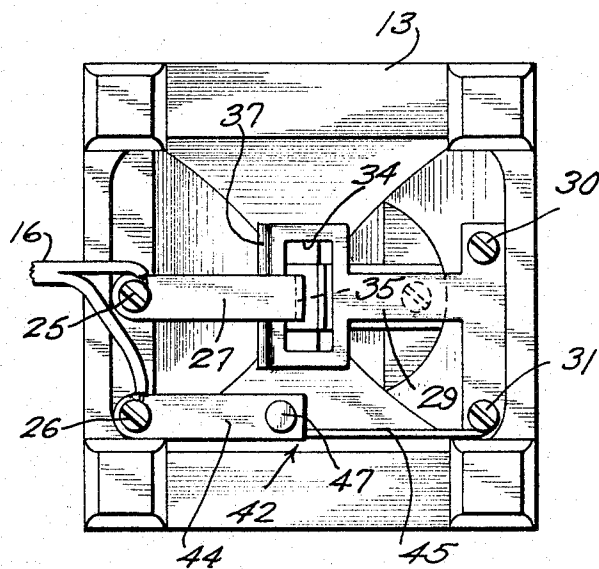


Fig. 3



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Fig. 4

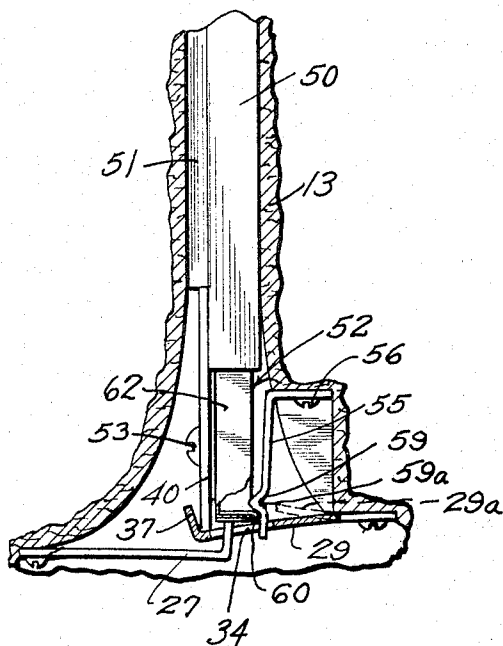


Fig. 5

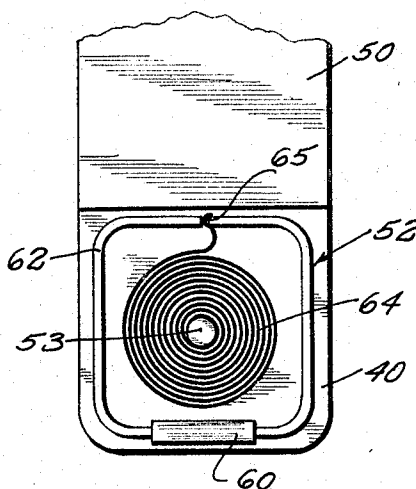


Fig. 6

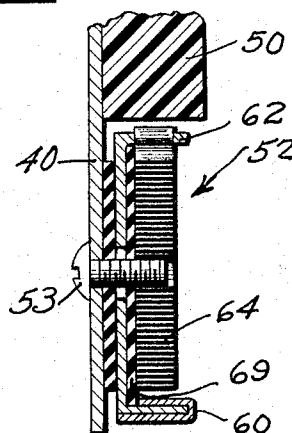
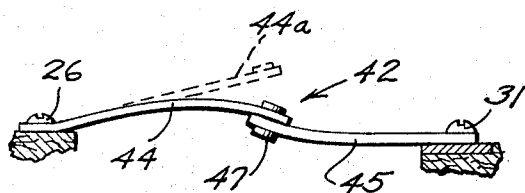


Fig. 7



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3,383,494  
**ELECTRIC POWERED LIGHTER**  
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 Filed Oct. 21, 1964, Ser. No. 405,400  
 15 Claims. (Cl. 219—265)

## ABSTRACT OF THE DISCLOSURE

An electric lighter having a heater unit mounted on a handle and a housing disposed for receiving the heater unit therein. Mounted within the housing are contact members connected to a source of alternating current voltage for engaging the heater unit when the handle is depressed within the housing. One contact member is resilient and supports the heater unit in an unbiased position and removed from the other contact member until the heater unit is depressed to a biased position. A bimetallic strip includes a detent which engages the heater unit in the biased position thereof until sufficient heat is generated to deflect the bimetallic strip and release the heater unit.

## Disclosure

This invention relates generally to electric lighters and more specifically to a cigarette lighter which can be placed on a table or desk top, and which lighter can be completely disconnected from the energizing current source when in use.

Table or desk top lighters generally are old in the art, per se. However, such prior known lighters of the fuel burning type required periodic filling of gas or of fluid fuel. In such fluid operated lighters, however, inadvertent failure to replenish the fluid fuel supply periodically, will cause the lighter to become inoperative.

In addition, the heretofore known electric table or desk top lighters have had inherent in their structures many disadvantages. For instance, one well known type of electric lighter maintains direct electrical connection with the voltage source during its intended use. Such structure is, of course, a safety hazard in that an electrical shock could be derived from the heating element while it is being used to light a cigarette or cigar. Another prior known type of electric lighter employs a step-down transformer connected between standard house voltage and the heating element. This arrangement has the distinct disadvantage of being extremely large, heavy and expensive.

It is therefore an important object of the present invention to provide an electric lighter which can be electrically connected to a base placed on a table top, and which lighter can be removed from the base and completely disconnected from the electric current source when the lighter is in use.

Another object of the present invention is to provide an electric lighter which has a reduced voltage applied to the lighter element.

Another object of the present invention is to provide an electric lighter which will not blow house line fuses should an inadvertent short circuit occur in the lighter or base.

Another object of the present invention is to provide an electric lighter wherein the electric heating element is sufficiently large to retain heat energy for lighting

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cigarettes, while at the same time such a heating element will not draw an excessive amount of current from a house current source.

Yet another object of the present invention is to provide a means for fusing an electric cigarette lighter, whereby the fuse will respond to prolonged short circuits in the cigarette lighter but will not be effected by repeated use of the lighter.

Still another object of the present invention is to provide an electric lighter which cannot be placed in its base holder in a wrong position.

Still another object of the present invention is to provide an electric lighter which cannot be dangerously overheated to cause fire should the lighter be connected to an energizing current source for a prolonged period of time.

A further object of the present invention is to provide an electric lighter which is securely held in a base holder for receiving electric current to heat a lighter element, and after such element is sufficiently heated, the lighter is released by the holder.

A still further object of the present invention is to provide an electric lighter which cannot be overheated by repeated use during a short time interval.

These and other features, advantages and additional objects of the present invention will become manifest to those versed in the art upon making reference to the following detailed description and the accompanying sheets of drawings in which a preferred structural embodiment of an electric lighter is shown by way of illustrative example.

FIGURE 1 is an elevated view of a lighter and base and illustrates diagrammatically the electrical connections thereto;

FIGURE 2 is a plan view showing the top of the base shown in FIGURE 1 with the lighter unit removed;

FIGURE 3 is an enlarged bottom view of the lighter shown in FIGURE 1 which shows a preferred arrangement of electrical contacts, lighter holder and fuse;

FIGURE 4 is a side elevational view of the base and lighter shown in FIGURE 1 with certain parts cut away for clarity;

FIGURE 5 is a partial elevated plan view of the end of the lighter showing the heating element;

FIGURE 6 is a partial elevated profile view in section showing the end of the lighter in FIGURE 5; and

FIGURE 7 is an elevated plan view of the fuse used in FIG. 3.

The preferred embodiment of the electric cigarette lighter assembly of the present invention is shown in FIGURE 1 and designated generally with the reference numeral 10. The cigarette lighter assembly is provided with a handle 12 which is carried by a base 13 and is formed of insulating material. A source of power, which is preferably 115 volts AC house voltage, is applied to the lighter 10 from a receptacle indicated at 15, and therefrom through a two conductor cable 16.

To provide the necessary voltage reduction for a low resistance heating element, a capacitor 18 is interposed between the AC power source 15 and the line 16 in such a manner as to be in series with one of the conductors in the cable 16. The value of capacitor 18 is selected to provide the necessary capacitive reactance to a 60 cycle per second power source to perform as a voltage dropping element in series with the electric heating element. By way

of example, and not by way of limitation, the capacitor 18 may have a preferred value of 180 microfarads.

In the preferred embodiment of the present invention, the capacitor 18 is molded directly to a power plug 20, thereby eliminating the necessity of incorporating the capacitor 18 in the base 13. That is, a plug-in unit is formed by the capacitor 18 and the plug 20 which may be directly mounted in the outlet of the AC power source 15. Such structure allows for a smaller and more compact base 13, thereby providing a more desirable appearance thereto.

Shown in FIGURE 2 is a top view of the lighter 10 showing the top surface of the base 13 as having an irregularly shaped aperture 22. The aperture 22 is preferably provided with an arcuate segment 23 and three straight segments. By so arranging the configuration of aperture 22, the body portion of the lighter assembly can only be placed therein in one position.

The bottom of the base 13 as shown in FIGURE 3, has a pair of terminal screws 25 and 26 for securing respective conductors of cable 16 to current carrying contactors of the base 13. A current contactor 27 is resiliently secured to a peripheral portion of the base 13 and extends therefrom to a somewhat central position of the base 13 which is under the aperture 22. A second resilient contactor 29 is secured to the base 13 preferably at the opposite peripheral portion, and extends therefrom to a somewhat central position of the base 13 under the aperture 22. Screws 30 and 31 are provided for securing the resilient contactor 29 to the base 13. The resilient current contactor 29 has provided therein an aperture 34, which receives an upturned end portion 35 of the resilient contactor 27. A somewhat angular peripheral edge 37 is provided at an end of the contactor 29, which upturned edge will engage a current pick-up plate 40, shown in FIGURE 4.

In the preferred embodiment of the present invention, energizing current is applied to the current contactor 29 through a delaying fuse 42, consisting of a spring steel conductor 44 and a conductor 45 connected thereto by a solder connection 47. To better illustrate the fuse construction shown in FIGURE 3, an elevated profile view of the fuse 42 is shown in FIGURE 7. The spring steel conductor 44 is connected to the conductor 45 in such a manner as to hold the spring conductor in tension. Should the solder connection 47 become overheated due to a short circuit or some other malfunction, the solder will melt causing the spring conductor 44 to retract to its normal unbiased position shown at 44a, thereby disconnecting the power applied to the lighter 10.

As shown in FIGURE 4, the base assembly 13 is cut away, and the resilient current contactor 29 is sectioned for a better understanding of the present invention. The pick-up current plate 40 is secured to an elongated body portion 50 by means of rivets or is otherwise bonded thereto. The elongated body portion 50 has an arcuate surface 51 which corresponds to the arcuate side 23 of the opening 22, shown in FIGURE 2. An electric current heater 52 is secured to the current pick-up plate 40 by means of a screw 53. A bi-metal retainer 55 is secured to the base 13 by a screw 56. The bi-metal retainer 55 has a protuberance 59 which engages a catch 60.

As shown in FIGURE 5, the electric current heater 52 has a rectangularly shaped current pick-up ring 62 to which a coil of resistance wire 64 is secured at a point 65. The ends, or center, of the coil of resistance wire 64 is connected to the current pick-up plate 40 via screw 53.

A section view of the current heater assembly 52 is shown in FIGURE 6. To prevent the current pick-up ring 62 from contacting the current pick-up plate 40, an insulator 66 is provided therebetween and secured in place by the screw 53. Also, to insure that the successive windings of the coil of resistance wire are not short circuited to the back wall portion of the current pick-up ring 62, an insulator 69 is placed between the back wall portion of the current pick-up ring 62 and the coil of resistance wire 64.

In operation, the elongated body portion 50 is inserted into the base 13 through the opening 22 and pressed downward in such a manner as to bring the current pick-up plate 40 in contact relation with the resilient contactor 29 at the peripheral edge 37 thereof. Also, as the elongated body 50 is pressed downward, the resilient contactor 27 becomes engaged with the current pick-up ring 62 through the catch 60. It is therefore shown, that a source of energizing current is applied to both ends, at point 65 and at the screw 53, of the coil of the resistance wire 64. This will cause sufficient current to flow through the resistance wire thereby creating a large amount of heat energy. As the heat energy continues to increase, the bi-metal retainer 55 is warped to such an extent as to disengage the protuberance 59 from the catch 60, thereby allowing the resilient contactors 27 and 29 to urge the elongated body 50 in an upward direction, whereupon it is removed from the base 13 by the user.

If the operation of the lighter 10 is rapidly repeated to such an extent that a large amount of heat is absorbed by the retainer 55, the bi-metal action of the retainer 55 will warp the protuberance 59 away from the catch 60 to such an extent that the groove 59a becomes engaged with the edge of the aperture 34, in resilient contactor 29, thereby holding the resilient contactor 29 in an upward fixed position as shown in 29a. During such time as the groove 29a is engaged with the edge of aperture 34, the elongated body portion 50 cannot be urged downward to such an extent as to cause contact between the resilient contactor 27 and the current pick-up ring 62.

The many advantages of the present invention can now be readily understood. For instance, if the resistance wire 64 were to be shorted, the capacitor 18 would continue to allow house current to flow through the circuit. Therefore, it is preferable that the conductor 45 be made of resistance wire so that after a sufficient time, the solder connection 47 will break disconnecting the power source from the resistance wire 64. Such disconnection, however, will occur only after a sufficient time lapse required for the resistive conductor 45 to heat sufficiently to melt the solder connection 47. It can also be appreciated that if one were to hold the heater element in its depressed and connected position, the solder connection 47 would eventually melt to disconnect the power source from the heating element.

Another distinct advantage that can be realized from the present invention is the configuration of the opening 22 which is disposed for receiving the heating element. Firstly, opening 22 is of such configuration to allow insertion of the heating element in only one way. Therefore, the heating element cannot be inserted except in its proper and correct fashion. Furthermore, it can be readily realized that the opening 22 may be sufficiently small and the well portion of the housing sufficiently deep to keep foreign objects from shorting out the power supply. In addition, the opening 22 is of sufficiently small size to keep children's fingers from entering therein.

It can also be appreciated that the present invention allows complete disconnection of the heating element from the power source for eliminating hazards and inconvenience. For instance, if the heating element were to break, an electrical shock could be derived across the broken portion thereof. Also, if the power source were connected to the heater element during its use as taught by the prior art, extension wires would be required causing a considerable amount of inconvenience to the user and destroying the appearance of the article.

It can also be appreciated that the capacitor provides a unique function previously unknown in the art. Without some type of voltage reducing element in the circuit, the resistance wire 64 would have to be of extremely small diameter to provide adequate resistance to the circuit to maintain the current flow within a proper range. However, a resistance element formed of such a small diameter wire would not be able to retain sufficient heat

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for lighting a cigarette or cigar. Therefore, the wire is made sufficiently large to retain heat and a capacitor is placed in circuit therewith to drop the voltage.

The principles of the invention explained in connection with the specific exemplifications thereon will suggest many other applications and modifications of the same. It is accordingly desired that, in construing the breadth of the appended claims they shall not be limited to the specific details shown and described in connection with the exemplifications thereof.

What is claimed is:

1. An electric lighter comprising
  - (a) a heater unit having a pair of terminals,
  - (b) a voltage source,
  - (c) resilient means for receiving said heater unit in biased relationship for connecting one of said terminals to one side of said voltage source,
  - (d) a contact member connecting the other of said terminals to the other side of said voltage source in the biased relationship of said heater unit,
  - (e) means electrically isolated from said voltage source responsive to a predetermined amount of heat for releasing said heater unit from the biased relationship with said resilient means and from said voltage source and including means for locking said heater unit in the biased relationship.
2. An electric lighter comprising
  - (a) a heater unit having a pair of terminals,
  - (b) a resilient arm having an opening therein and disposed for actuation to a biased position under influence of said heater unit and for contacting one of said terminals,
  - (c) a contact member extending through the opening in said resilient arm for contacting the other of said terminals in the biased position of said resilient arm,
  - (d) a bi-metal strip having a protuberance thereon disposed for engaging said heater unit in the biased position of said resilient arm, and
  - (e) a voltage source connected between said resilient arm and said contact member.
3. An electric lighter comprising
  - (a) a housing having a well portion,
  - (b) a handle disposed for extending into said well portion,
  - (c) a heater unit secured at one end of said handle and having a pair of terminals,
  - (d) a resilient arm disposed in said housing,
  - (e) a bi-metal strip having an indent therein disposed in said housing, said heater unit being receivable in locked position between said resilient arm and said bi-metal strip, said resilient arm engaging one of said terminals in the locked position, said indent disposed for engaging said resilient arm,
  - (f) a member disposed for engaging the other of said terminals only in the locked position, and
  - (g) a voltage source connected between said resilient arm and said member.
4. The electric lighter as defined in claim 3 wherein the well portion of said housing is of a predetermined cross-section to allow reception of said handle therein in only one position.
5. The electric lighter as defined in claim 4 wherein the well portion has a cross-section of irregular configuration and said handle has a corresponding configuration.
6. The electric lighter as defined in claim 5 wherein the cross-section of the well portion includes one arcuate surface.
7. An electric lighter comprising
  - (a) a heater unit,
  - (b) a housing for receiving said heater unit, and
  - (c) means for receiving said heater unit in locking relation and releasing said unit upon retention of sufficient heat therein, said housing having a predetermined cross-section to allow reception of said heater therein in only one position.

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8. An electric lighter for use with a source of house alternating current comprising

- (a) a heater element having a pair of terminals, and
  - (b) a capacitor disposed for connection between one of said terminals and one side of the source of alternating current, the other of said terminals disposed for connection to the other side of the underlying source of alternating current,
  - (c) means for connecting said heater element to said capacitor and to the source of alternating current for a predetermined time, and
  - (d) a bi-metal strip included in said connecting means having a protuberance thereon disposed for locking said heater element in connected relation with said capacitor and the source of alternating current.
9. The electric lighter as defined in claim 8 wherein said connecting means includes a current contactor, said bi-metal strip including means for engaging said current contactor and preventing said heater element from connecting to the source of alternating current.
10. An electric lighter comprising
- (a) a heater element having a pair of terminals,
  - (b) a first current contactor having an aperture therein and disposed for receiving said heater element in biased relationship and contacting one of said terminals,
  - (c) a second current contactor disposed for extending through said aperture in the biased relationship and contacting the other of said terminals,
  - (d) a bi-metal strip having a protuberance thereon for engaging said heater element in locked relationship in the biased relationship thereof, and
  - (e) a source of house current connected between said first and said second current contactors.
11. The electric lighter as defined in claim 10 wherein said bi-metal strip includes a recess disposed for engaging said first current contactor in an unbiased position thereof.
12. The electric lighter as defined in claim 10 including a capacitor connected between one of said current contactors and said house current.
13. The electric lighter as defined in claim 12 including a fuse element connected between one of said current contactors and said house current, said fuse including a spring member, a conductor, and fusible means for securing said spring member in tension to said conductor.
14. An electric lighter, comprising
- (a) a heater unit having a pair of terminals,
  - (b) a resilient arm disposed for supporting said heater unit in an unbiased position and disposed for actuation to a biased position under influence of said heater unit and for contacting one of said terminals,
  - (c) a contact member positioned for contacting the other of said terminals only in the biased position of said resilient arms, and
  - (d) means electrically isolated from said resilient arm and said contact member for engaging and locking said heater unit in the biased position of said resilient arm and including means responsive to a predetermined amount of heat for releasing said heater unit from the biased relationship with said resilient arm.
15. An electric lighter, comprising
- (a) a heater element having a pair of electrical terminals,
  - (b) a resilient current contactor disposed for receiving said heater element in biased relationship and for contacting one of said terminals,
  - (c) a contact member disposed for engaging the other of said terminals only in the biased relationship of said resilient contactor and said heater element,
  - (d) a bi-metal strip disposed for engaging said heater element in locking relationship therewith in the biased position thereof, and
  - (e) means electrically isolating said bi-metal strip from said resilient contactor and said contact member.

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