

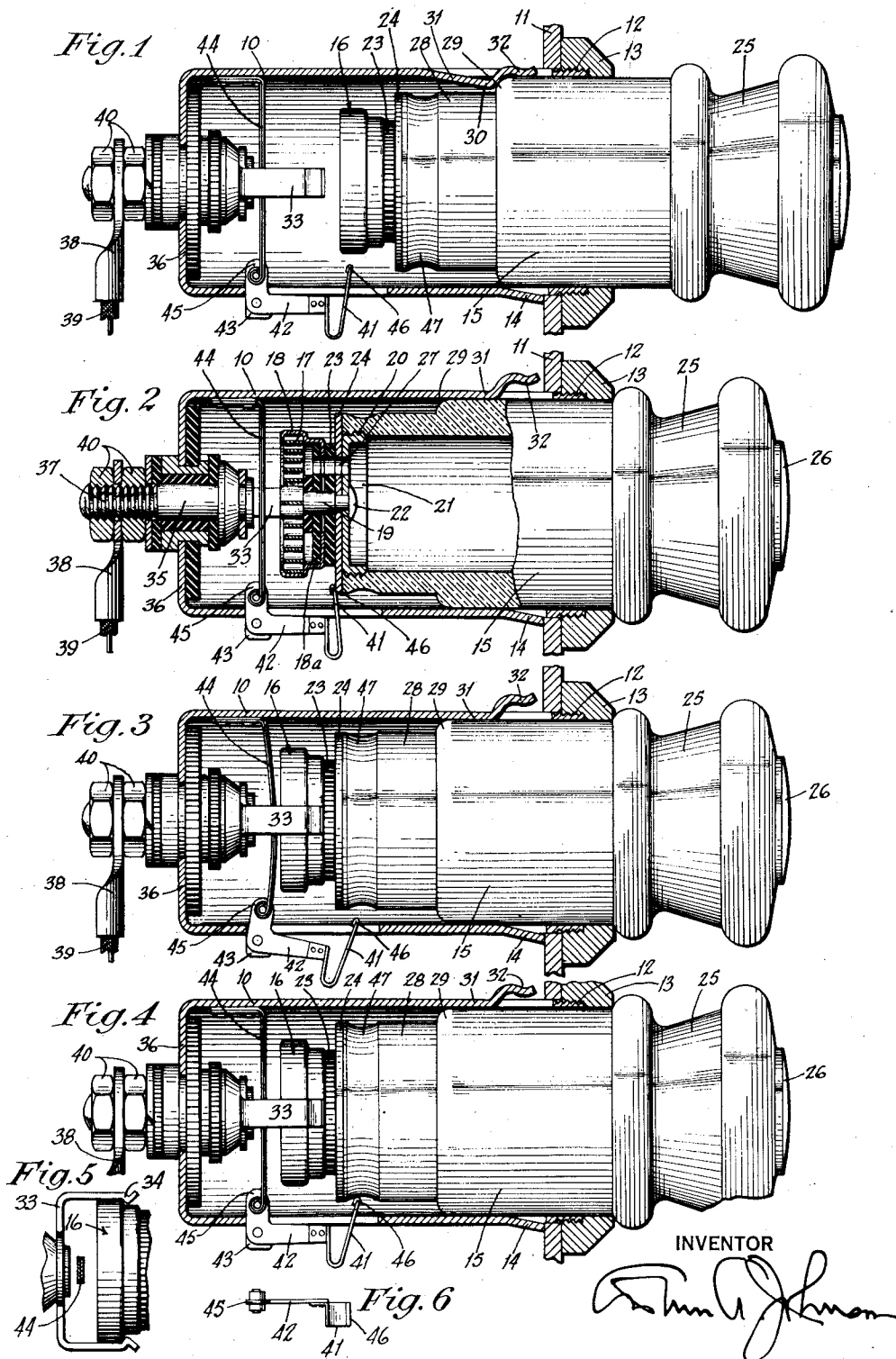
Feb. 24, 1942.

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2,274,068

ELECTRIC CIGAR LIGHTER

Filed Oct. 31, 1936



UNITED STATES PATENT OFFICE

2,274,068

ELECTRIC CIGAR LIGHTER

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Application October 31, 1936, Serial No. 108,556

17 Claims. (Cl. 219—32)

This invention relates to electric cigar lighters, and more particularly, to cigar lighters in which the energizing circuit is automatically broken when the heating element has been brought to desired temperature.

Heretofore it was proposed to provide a cigar lighter in which the igniting unit is moved from a normal position on a holding device where it is in open-circuit relation with an energized current to another or closed circuit position where the heating element of the igniting unit is connected to the energized current. It was also proposed to provide automatic means whereby the igniting unit would be returned to non-energizing position when the heating element was brought to incandescence for use. Such devices depend for their successful operation upon some movement of the igniting unit or the heating element thereof, and if, for any reason, such movement is impeded or prevented, such device, as previously proposed, would not operate successfully.

According to the present invention, relative movement between the igniting unit and the holding device is not depended upon for opening the current supply circuit when the heating element is ready for use. To the contrary, the igniting unit and the heating element may remain in energizing position and yet the circuit is opened at the proper time.

According to the invention in its preferred form, not only is the circuit opened without requiring movement of the heating element or the igniting unit, but the circuit is maintained open, once it is automatically opened, until the igniting unit is manually withdrawn from energizing position and returned thereto.

In the type of electric cigar lighter illustrated herein and to which the present invention is applied in one exemplary form thereof, the circuit through the heating element is closed by manual movement of the igniting unit. However, in the broader aspects of the invention, it is not essential that the circuit be closed by movement of the igniting unit, but the same advantages result whether the igniting unit is moved or not, so long as there is a manually movable member of some kind which is moved from a normal non-energizing position to an energizing position.

In the form of the invention herein illustrated, the objects above referred to are carried out in a simple and efficient manner, and without adding materially to the cost of producing the cigar lighter.

One of the important features of the device herein disclosed is the provision of a thermo-

static member which is so disposed in heat-conducting relation to the heating element that as it is heated by the heating element it moves closer to the heating element, thereby improving the heat-conducting relation between the thermostatic member and the heating element, and making available thereby greater power to operate a switch. The accelerated action of the thermostatic member above referred to makes the operation of the device less critical. The thermostatic member and the switch mechanism operated thereby are so arranged that the circuit is broken with a snap action, thereby avoiding arcing, and the switch is so arranged that when it cools and tends to return to its normal position, it is prevented from doing so by the presence of the igniting unit or other manually operable means in its energized position.

Other features and advantages will hereinafter appear.

In the accompanying drawing—

Figure 1 is a longitudinal section of the cigar lighter, showing the igniting element in normal or non-energizing position.

Fig. 2 is a similar view, but shows the igniting unit partly in section and shows the igniting unit in energizing position.

Fig. 3 is a similar view, but showing the position of the parts when the automatically operated switch has snapped to open circuit position.

Fig. 4 shows the automatic switch after the cooling of the thermostatic element, and particularly illustrates how the circuit is prevented from being reclosed until the igniting unit is removed from energizing position.

Fig. 5 is a detail showing how the contacts on the holding device engage the heating element of the igniting unit and hold the igniting unit in energizing position.

Fig. 6 is a plan view of the switch mechanism.

In the form of the invention herein disclosed, there is shown a holding device 10 in the form of a well or tube which may be secured in any suitable manner to a support such as an instrument board 11 of an automobile. As shown, the open end of the well 10 is provided with screw threads 12 to receive a nut 13 by means of which the well is clamped in a hole in the instrument board, the well being provided with struck out portions 14 engaging the rear surface of the instrument board.

The igniting unit 15 is in the form of a plug adapted to be slidably received by the well 10 so as to be movably mounted therein from a

normal inoperative position shown in Fig. 1 to an operative position shown in Fig. 2.

The inner end of the igniting unit is provided with a heating element 16 comprising a spiral coil of resistance wire 17 mounted in a cup 18 to which the outer end of the wire is secured. The inner end of the wire is secured to a post 19. The heating element, in the form shown, is removably mounted on the igniting unit, the end of the latter being provided with screw threads 20 to receive a screw threaded cap 21 secured to the cup 18 by riveting over a head 22 of the post 19. Interposed between the cup 18 and the threaded cap 21 is an insulating washer 23 and a contact disk 24, the disk being in electrical contact with the post 19 and hence with the inner convolutions of the coil.

The body of the igniting unit may be made of any suitable material, but, preferably, has its handle portion 25, which extends beyond the well 10 and which is either wholly or partially made of translucent material so that light emanating from the heating element may impinge upon the same so that the translucent portion will glow and indicate to the user when the device has been brought to incandescence. In the form shown, the handle portion 25 has a lens 26 constituting a translucent portion for this purpose. The lens 26, or such other translucent portion as there may be, is in light-conducting relation with the interior of the igniting unit which is made hollow, and the cap 21, disk 24, cup 18, and an insulating washer 18a within the cup are provided with aligned apertures 27 so that light from the heating element may pass to the interior of the igniting unit and ultimately impinge upon the translucent portion thereof.

The igniting unit has a reduced portion 28 and a shoulder 29, the latter being in position to be engaged by a rather abrupt bend 30 of a resilient tongue 31 struck out from the material of the well 10 in the form of the invention shown. The abrupt bend 30, as shown in Fig. 1, defines the normal inoperative position of the igniting unit in the holding device, and it is only when the tongue 31 is deflected by intentional manual pressure on the igniting unit that the shoulder 29 may pass the abrupt portion 31. The end 32 of the tongue 31 normally engages the igniting unit beyond the shoulder 29 and frictionally holds the igniting unit in the socket. When it is desired to move the igniting unit to energizing position, pressure on the igniting unit flexes the tongue 31 upwardly to the position shown in Fig. 2, in which position the tongue tends to prevent casual movement of the igniting unit.

In the normal position of the igniting unit on the holding device shown in Fig. 1, current does not flow through the heating element. When the igniting unit is moved to the Fig. 2 position, however, the disk 24, connected to the inner end of the coil 17 and the cup 18 connected to the outer end of the coil 17, are brought into engagement with current supply terminals of opposite polarity. In the form of the invention herein disclosed, one of these current supply terminals is constituted by a contact member 33, U-shaped in form (see Fig. 5), and having sharply depressed portions 34 to ride over the periphery of the cup 18 and electrically engage the same when the igniting unit is moved to energizing position shown in Fig. 2. The contacts 33 are mounted on a post 35 extending through an aperture in the bottom wall 35 of the well 10 and at its outer end is provided with a screw threaded

portion 37 to receive a lug 38 connected to a current supply wire 39, which lug is held in electrical contact with the threaded end 37 by nuts 40.

Besides contacting with the cup portion 18 of the heating element to conduct current thereto, because of the depressed ends 34 the contact member 33 holds the igniting unit in energizing position against casual movement therefrom.

In the energizing position of the igniting unit, current is conducted to the contact disk 24 by a contact 41 carried by a switch arm 42 pivotally mounted on ears 43 struck out from the wall of the well 10. The well may be in any suitable manner connected to the source of current supply. Usually, it is connected thereto through the instrument board 11, which in turn is connected to the battery or other source of current.

As soon as the igniting unit is moved to the position shown in Fig. 2, current flows through the heating element to heat the same for use.

To automatically open the circuit when the heating element has been brought to the desired degree of incandescence, there is provided a thermostatic member 44 in the form of a strip of bimetallic metal. One end of the strip 44 is riveted or otherwise secured to the well 10 so that the strip extends diametrically across the well. The other end of the strip is connected to an arm 45 of the switch arm 42. When the bimetallic strip 44, which is located directly in front of the heating coil 17, becomes heated thereby, it attempts to move to the right, as viewed in Figs. 1 to 4. This rocks the switch lever 42 so as to withdraw the end 46 of the contact 41 from the disk 24, and when the heating coil approaches the desired degree of incandescence, the end 46 of the contact 44 snaps by the edge of the disk 24, the contact 41 being resilient and being mounted so as to yield until the switch arm 42 and contact 40 arrive at the position substantially as shown in Fig. 3.

In becoming heated and in flexing as a result of the heating, the bimetallic strip 44 moves toward the heating element, thereby increasing the effective heating of the bimetallic member and making it move rapidly to open the circuit between the end 46 of the contact 41 and the disk 24. It will be noticed, however, that in so moving, the bimetallic member 44 does not alter the position of the igniting unit 15 or the heating element 16 thereby, but these parts are allowed to remain in their energizing position. If the igniting unit is not removed for use by the user but is allowed to remain in energizing position, cooling off of the heating element and the bimetallic strip 44 will tend to return the switch arm 42 to its normal position shown in Fig. 1. To avoid the circuit being reclosed under these conditions, the contact 41 is so arranged that it cannot return to contacting engagement with the disk 24, but, instead, flexes outwardly as the switch arm 42 is returned to its normal position.

To insure the proper flexing movement of the contact 41, the end of the igniting unit adjacent the disk 24 is made of insulating material and is preferably provided with an annular semicircular groove 47 which, upon being engaged by the end 46 of the contact 40, causes the end to be cammed to the right and away from the contact disk 24. In order to reclose the circuit under these conditions, it is merely necessary for the operator to withdraw the igniting unit from energizing but electrically disconnected position shown in Fig. 4 to the non-energizing position shown in Fig. 1, during which movement the

contact 41 is allowed to escape from the groove 47 and return to the upright condition shown in Fig. 1, where it is in position to be engaged by the disk 24 when the igniting unit is again moved to energizing position.

If, as is intended, the igniting unit is removed for use when the transparent portion 26 of the igniting unit glows, the bimetallic strip 44 will cool off while the igniting unit is being used so as to return the switch arm 42 and contact 41 to the normal position shown in Fig. 1 before the igniting unit is returned to normal position.

With the device of the present invention, the disadvantage of holding the igniting unit in place manually while the heating element is being energized is avoided, but no part of the igniting unit or the heating element must needs move in order to open the circuit when the heating element has been brought to incandescence. Yet, if the igniting unit is not moved or removed after it has been brought to incandescence, the circuit cannot be automatically reclosed, except after the performance of the special manual operation of moving the igniting unit to non-energized position and then returning it to energizing position.

As stated above, in the broader aspects of the invention, it is immaterial whether the heating element or igniting unit themselves be the parts which are manually moved to close the circuit, and it is within the scope of this invention to automatically open the circuit and prevent its being reclosed whether the circuit was originally closed by actual movement of the igniting unit, or heating element, or some other manually movable part.

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

I claim:

1. In an electric cigar lighter of the class described, a holding device; an igniting unit mounted on the holding device for complete removal and replacement in use; a heating element carried by the igniting unit; cooperating contacts on the holding device and igniting unit; manually operated means for moving the igniting unit from an idle open-circuit position to an operating position wherein the contacts carried by the igniting unit are in engagement with the contacts carried by the holding device to establish an energizing circuit to said heating element; means automatically operated when the heating element has been heated for use for moving at least one of said cooperating contacts to open the circuit, said igniting unit remaining in operating position during said opening of the circuit; and means for retaining said contact in open-circuit position and preventing reclosing of the circuit by said contact until said igniting unit has been moved from operating position to idle position and then back to operating position.

2. In an electric cigar lighter of the class described, a holding device; an igniting unit mounted on the holding device for complete removal and replacement in use; a heating element on said igniting unit; cooperating contacts carried by said holding device and igniting unit; manually operated means for moving the igniting unit from an idle open-circuit position to an operating position wherein the cooperating contacts are moved into engagement to close a circuit to the heating element, one of said contacts being resilient and yieldable; heat-responsive means connected to said yieldable contact for

moving the contact out of engagement with a coacting contact upon the heating element attaining a desired heat, the resilient contact yielding during movement thereof whereby the igniting unit remains in said operating position as the circuit is opened; and means carried by the igniting unit for engaging said movable contact and holding the same against returning to closed-circuit position upon cooling of the heat-responsive means.

3. In an electric cigar lighter of the class described, a holding device; an igniting unit mounted on the holding device for complete removal and replacement in use; a heating element carried by the igniting unit; an energizing circuit for said heating element; a self-returning thermally-operated switch in heat-receiving relation with the heating element for opening said energizing circuit when the heating element has been brought to a predetermined temperature; manually operated means movable from an idle open-circuit position to an operating position for engaging and closing said switch to establish an energizing circuit to said heating element, the manually operated means remaining in operating position during said opening of the switch; and means controlled by the said manually operated means for engaging a portion of said switch while in open-circuit position and preventing the return of said switch to circuit-closing position upon cooling thereof until the manually operated means has been manually removed from operating position.

4. In an electric cigar lighter of the class described, a holding device; an igniting unit mounted on the holding device for complete removal and replacement in use; a heating element carried by the igniting unit; cooperating contacts on the holding device and the igniting unit; manually operated means for moving the igniting unit from an idle open-circuit position to an operating position for establishing an energizing circuit to said heating element; a self-returning thermally operated means in heat-receiving relation with the heating element moving one of said contacts relative to another of said contacts for opening said energizing circuit when the heating element has been brought to a predetermined temperature, the manually operated means remaining in operating position during said opening of the circuit; and means on the igniting unit for engaging and preventing the return of said moved contact to normal position until the manually operated means has been manually removed from operating position.

5. In an electric cigar lighter of the class described, a socket-like holding device; a plug-like igniting unit mounted on the holding device for complete removal and replacement in use; a heating element carried by the igniting unit; manually operated means for moving the igniting unit inwardly of the socket from an idle open-circuit position to a deeper operating position; cooperating contacts carried by the igniting unit and holding device for establishing an energizing circuit to said heating element in said deeper position; means automatically operated when the heating element has been heated for use for moving one of the contacts with relation to a cooperating contact and opening the circuit to the igniting unit, said igniting unit remaining in deeper operating position during said opening of the circuit; and means carried by the igniting unit for engaging the contact when moved to open-circuit position for prevent-

ing reclosing of the circuit by said contact until said igniting unit has been moved outwardly from operating position to idle position and then back inwardly to operating position.

6. In an electric cigar lighter of the class described, a holding device; an igniting unit mounted on the holding device for complete removal and replacement in use; a heating element carried by the igniting unit; cooperating contacts carried by the holding device and igniting unit; manually operated means for moving the igniting unit from an idle open-circuit position to an operating position for closing said cooperating contacts and establishing an energizing circuit to said heating element; means automatically operated when the heating element has been heated for use for moving at least one of said cooperating contacts and opening the circuit; means for releasably holding the igniting unit in operating position during the movement of said contact; and means for engaging said contact and preventing reclosing of the circuit until said igniting unit has been moved from operating position against the resistance of said holding means to idle position and then back to operating position.

7. An electric cigar lighter comprising a holding device, an igniting unit mounted on the holding device for complete removal and replacement; a heating element on the igniting unit; manually operated means for closing a current supply circuit through said heating element to energize the same; and a thermally-operated switch for opening said circuit when the heating element has been brought to a predetermined temperature, said switch comprising a contact member and a bimetallic strip for operating the contact member, said bimetallic strip being mounted on the holding device for movement toward said heating element as the bimetallic strip is heated by said heating element, whereby the heat-conducting relation between the heating element and the bimetallic strip is improved as the temperature of the heating element increases.

8. A cigar lighter comprising a holding device; an igniting unit mounted on the holding device for complete removal for use; a heating element carried by said igniting unit; an energizing circuit for the heating element, said circuit having a movable contact in normal circuit-closing position; manually operable means for closing said circuit upon movement from an idle open-circuit position to an operating position; heat-responsive means for moving the movable contact from a normal circuit-closing position to an open-circuit position without moving said manually operable means from said operating position; and means for preventing the return of said contact to normal circuit-closing position upon cooling of the heat-responsive means until the manually operable means has been withdrawn from said operating position.

9. A cigar lighter comprising an igniting unit having an electrical heating element thereon; holding means for supporting said igniting unit for movement thereon and complete removal for use; means for closing an energizing circuit for said heating element by movement of the igniting unit on said holding means from an idle open-circuit position to an operating position; heat-responsive means in heat-receiving relation with said heating element for opening said circuit upon the heating element attaining a desired heat without withdrawing the igniting unit from

said operating position; and means for maintaining said circuit open after operation of said heat-responsive means so long as the igniting unit remains in said operating position.

10. In an electric cigar lighter of the class described, a plug-like igniting unit having an electrical heating element on its inner end; a socket in which said igniting unit is mounted; cooperating current supply contacts on the igniting unit and the socket; means for moving said igniting unit to a position in which said contacts engage for establishing an energizing circuit to said heating element; a heat-responsive member operative upon predetermined heating of said heating element for moving one of said contacts out of cooperative relation with a coacting contact to open said energizing circuit while said igniting unit remains in energizing position; and means for intercepting the contact so moved to prevent the heat-responsive means from returning said contact to circuit-closing position until the igniting unit is removed from energizing position after the circuit has been thus automatically opened.

11. In an electric cigar lighter of the class described, an igniting unit having an electrical heating element on its inner end; a holding device for movably supporting the igniting unit; cooperating current supply contacts on the igniting unit and the holding device; means for moving said igniting unit to an operating position in which said contacts engage for closing an energizing circuit to said heating element; a heat-responsive member operative upon predetermined heating of said heating element for moving a contact on the socket out of cooperative relation with its related contact on the igniting unit without moving the igniting unit from operating position; and means controlled by the igniting unit for holding said contact in said open-circuit position and against circuit-closing movement by said heat-responsive means during cooling thereof so long as the igniting unit remains in said operating position.

12. In an electric cigar lighter of the class described, a plug-like igniting unit having an electrical heating element on its inner end; a socket in which said igniting unit is mounted; cooperating current supply contacts on the igniting unit and the socket; means for moving said igniting unit to a position in which said contacts engage for establishing an energizing circuit to said heating element; a heat-responsive member operative upon predetermined heating of said heating element for moving a contact on the socket out of cooperative relation to its related contact on the igniting unit so long as the igniting unit remains in energizing position; and an insulating means on the igniting unit adapted to be engaged by said movable contact on the socket upon cooling off of the heat-responsive member for preventing the reclosing of said circuit until the igniting unit has been moved from and returned to energizing position.

13. The invention as defined in claim 12 in which said movable contact on the socket is yielding to permit the heat-responsive member to return to normal position upon cooling while said contact is engaged with said insulating means.

14. The invention as defined in claim 11 in which the heat-responsive means extends diametrically across the socket in front of the heating element and moves closer to the heating element as it becomes heated by the latter.

15. The invention as defined in claim 11 in which the heat-responsive means is connected to the contact by a bell crank pivotally mounted on the socket in such position that said movable contact is moved radially away from the contact on the igniting unit when the heat-responsive means operates upon heating of the heating element.

16. The invention as defined in claim 11 in which the other two contacts are disposed on the socket and igniting unit respectively and so engaged in the energizing position of the igniting unit as to hold the igniting unit in energizing position against casual removal therefrom.

17. In an electric cigar lighter of the class described, a plug-like igniting unit having an electric heating element at its inner end and having a shoulder; a socket in which the igniting unit is mounted to move from a non-energizing position to an energizing position; and means on the socket adapted to engage said shoulder and yieldingly resist movement of the plug to energizing position in the socket, said means frictionally holding the plug member in the socket in energizing position when the igniting unit is moved to energizing position.

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