Jan. 6, 1942. J. H. COHEN 2,269,008

CIGAR LIGHTER

Filed March 31, 1937

Fig. 1

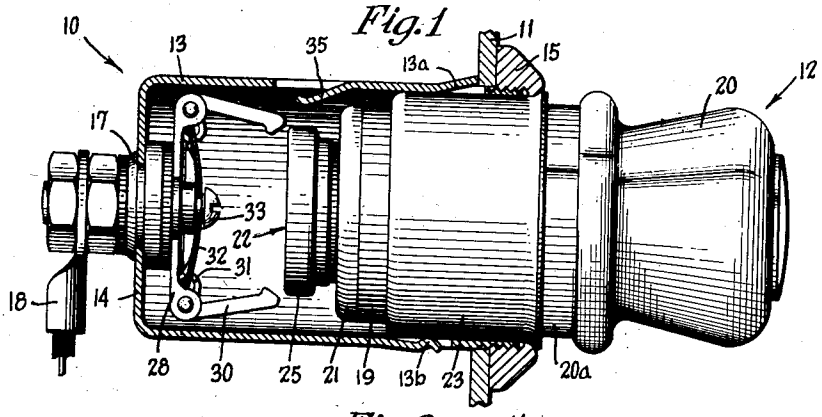


Fig. 2

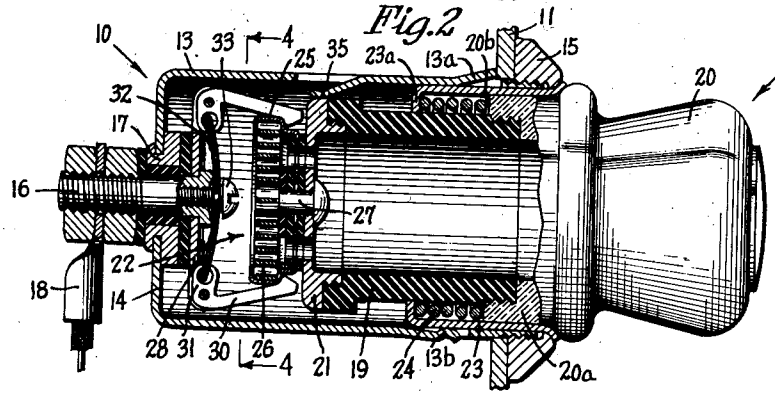


Fig. 3

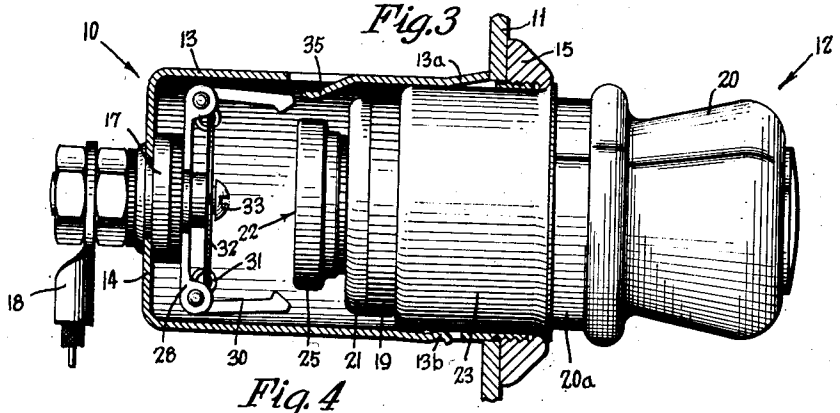
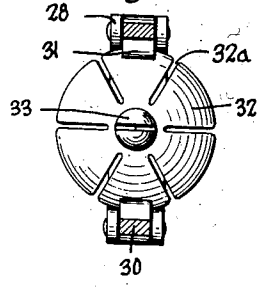


Fig. 4



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2,269,008

CIGAR LIGHTER

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11 Claims. (Cl. 219—32)

This invention relates to cigar lighters, and more particularly to devices of this character as used in automobiles and elsewhere.

Lighters for cigars, cigarettes, and the like, of the kind just indicated, commonly comprise a holding device having a well electrically served by connections from a source of current such that in the well there is a gap in an otherwise complete circuit, and an igniting unit in the form of a plug adapted to be held in and removed from the well for storage and use respectively.

The igniting unit has a heating element carrying contacts, and while the unit is in storage position in the well, the supply circuit is open, but when the unit is in operative position in the well the gap is closed through the contacts to place the heating element in the circuit for heating to incandescence.

The type of lighter to which the invention pertains is that wherein automatic operating means is incorporated, so functioning that when the removable igniting unit is in the socket and positioned therein for electrical energization of the heating element, the unit is held in such position until its element is heated to a predetermined extent, whereupon the circuit through the element is automatically broken by release of the unit to the storage or open-circuit position.

The present invention is applied to a lighter of the kind described, and an object is to provide a lighter which has uniform and consistently satisfactory operating characteristics, this being accomplished by an improved mechanism for completing the circuit through the heating element, and for automatically opening the circuit when the heating element reaches a predetermined useful temperature.

Whereas in prior thermostatic lighters the heat-responsive member has acted as a detent to hold the igniting unit in deep or operative position until heated to the desired degree of incandescence, and has acted also as a contact to connect the heating element of the unit, by the present invention said member functions only as an actuator, there being provided a separate detent and contact assembly operated by said member.

This assembly comprises, in the embodiment shown, a pair of pivotally mounted members operating as levers and having arms for engaging an igniting unit contact, the organization being such that only a small movement of the actuating or heat-responsive member is necessary to produce a large movement of the arms engaging the igniting unit contact.

Therefore, because of the relatively large movement of the contact detent arms, the likelihood of the igniting unit being retained for too long a period in operative position due to sluggish or faulty functioning of the heat-responsive member has been obviated.

A feature of this improved operating mechanism is that the heat-responsive member, being, in the embodiment shown, of bimetallic material, is of simple shape and construction, such that uniform and consistent operation thereof will result at all times.

Other features and advantages will hereinafter appear.

In the accompanying drawing, showing a preferred embodiment of the invention:

Figure 1 is an axial section, with the removable igniting unit shown in elevation, in shallow, inoperative position in the socket.

Fig. 2 is an axial sectional view, with the removable igniting unit in deep or operative position.

Fig. 3 is a view similar to Fig. 1, but showing the removable igniting unit released in response to heating of the element, and restored to shallow or storage position.

Fig. 4 is an elevation of the heat-responsive and contacting member on the holding device taken on line 4—4 of Fig. 2.

The cigar lighter of the present invention, in the exemplary embodiment thereof shown in the drawing, is of the so-called well type, for use in automobiles, and comprises a base member 10 for attachment to the panel 11 of an automobile, and a removable igniting unit 12 which is normally supported by the base member, but which may be mechanically and electrically disconnected for manual transportation within the car and for handling by various occupants therein for the purpose of lighting cigars, cigarettes and the like.

The removable igniting unit 12 ordinarily rests in the base member 10 so as to slightly protrude therefrom, as in Fig. 1, and the unit is moved to fully inserted position, as in Fig. 2, for energization of the heating element, by a person desiring to use the lighter.

As shown, the base member 10 comprises a shell 13 forming a deep socket, said shell being closed at its inner end by an integral transverse wall 14. The shell 13 is adapted to pass through a suitable aperture in the panel or instrument board 11, and is held in this position by a plurality of tabs 13a lanced outwardly therefrom and by a nut 15 screwed onto the externally threaded outer end of the shell.

The shell 13 is therefore electrically connected to the panel 11, which in turn is connected by the usual ground circuit to a source of energy; thus, the shell is adapted to serve as a conductive element of the grounded portion of the circuit for the energizing current when the removable igniting unit is in operative position in the socket.

The base member 10 carries a second electrical

connection in the form of a stud 16 passing through a shouldered metal bushing 17 located in the rear wall 14 of the shell, but insulated therefrom and from the base member by an insulating sleeve and a pair of insulating washers, as shown. The stud 16 is rigidly secured in place by a primary hexagonal nut, and has secured thereto an electrical connection lug 18 by a second nut. The lug 18 is connected to the other terminal of the source of energy for the lighter.

The igniting unit 12 comprises a tubular body 19 of insulating material, externally threaded at its front end to carry a knob 20 and internally threaded at its rear end to carry a metal cap 21 on which is mounted a heating element 22.

The igniting unit 12 is adapted to be yieldingly held in shallow open-circuit position in the holder, and for this purpose the knob 20 is provided with a cylindrical portion 20*a* adapted to slidably fit within a metal sleeve 23 which latter is slidably received and held in the shell 13 of the holding device. The front or outer rim of the sleeve 23 is flared outwardly to engage the nut 15 so that said sleeve is positioned thereby in the holder, and the inner or rearward end of the sleeve is turned inwardly to provide a flange 23*a* adapted to slide on the outer reduced surface of the tubular body 19. Disposed about the reduced surface of the tubular body 19 is a helical compression spring 24, which bears on the inner face of the flange 23*a* and on a shoulder 20*b* of the cylindrical portion 20*a*, to yieldingly urge the knob 20 outwardly and into its normal position, as of Fig. 1. The igniting unit 12, including the sleeve 23, is held in the base member 10 against casual displacement or dropping out therefrom by a resilient tongue 13*b* lanced from the shell 13 and biased inwardly to frictionally engage under slight pressure the sleeve 23.

The heating element 22 of the igniting unit comprises an outer metal contact cup 25 enclosing a spiral heating coil 26, the outer end of which is attached to the cup 25, and the inner end of which is held in the slitted head of a pin 27 passing through a central aperture of the cup 25 and the metal cap 21, and being headed-over against the cap for holding the heating element thereon. The pin 27 is insulated from the cup 25, which latter is insulated from the cap 21 by suitable washers as shown in Fig. 2, the pin 27 effecting electrical connection between the inner end of the heating coil 26 and the cap 21 so that the latter can serve as one contact for the heating coil, and the cup 25 serve as the other contact.

The lighter shown is of the type wherein energization of the heating element is effected by moving the igniting unit from its normal open-circuit position of Fig. 1 to a deep position in the holder, as in Fig. 2.

According to the present invention, there is provided within the shell 13 and insulatedly supported on the rear transverse wall 14 of said shell an improved means for closing the circuit through the heating element when the igniting unit is in the closed-circuit position, as in Fig. 2, and for holding the igniting unit in said position and releasing the unit for return to open-circuit position in response to heating of the coil 26. This means comprises a contact and detent assembly carried by the stud 16 and adapted to engage and hold the cup 25 of the heating element, and to release said cup when the element reaches a predetermined useful temperature.

For the purpose of making electrical connection to the cup 25 and for holding same and the igniting unit in operative or energizing position, there is provided a strap or carrier 28 carried by the stud 16, and a pair of contact arms 30 pivotally carried one at each end of said strap, the arms 30 at their pivot points each having an integral laterally extending actuating arm 31 to form substantially a bell-crank member.

The arms 30 are operated through the actuators 31 by a heat-responsive bimetallic disk 32 secured at its center by an adjustable screw 33 to the stud 16, and preferably the disk 32 is provided with a plurality of radial slots 32*a*, as in Fig. 4, to effect a greater movement of the disk edge in response to heat from the element.

Normally the bimetallic disk 32 is curved to present a convex face to the igniting unit so that the contact arms 30 extend substantially inwardly toward each other, as in Fig. 1.

When the igniting unit 12 is moved to the deep position in the holder, the metal cup 25 will cause the contact arms 30 to spread and finally to close over said cup as in Fig. 2, thereby to grip the cup and make contact thereto, and hold the entire igniting unit in energized position and against the action of the spring 24.

For this closed-circuit position, a second contact to the heating element is effected by a resilient finger 35 lanced inwardly from the shell 13 to engage the rim of the cap 21, and current will flow through the lug 18, stud 16, strap 28, contact arms 30, cup 25, heating coil 26, pin 27, cap 21, contact finger 35, shell 13 and through the panel 11 to the ground return of the circuit.

Movement of the igniting unit 12 to this deep operative position as in Fig. 2, results in energization of the heating element 22. Heat thus will be radiated by said element and will act on the bimetallic disk 32, so that after a certain predetermined lapse of time, as for instance to bring the heating element 22 to incandescence, the bimetallic disk will flatten out sufficiently to move the actuating arms 31, thus causing the contacts 30 to move outwardly and away from the cup to release the igniting unit, as in Fig. 3. Thereupon said unit will move forwardly under the action of the spring 24 to its initial open-circuit position, the circuit through the heating element being thus broken. The igniting unit is then removed for transportation and use, and again replaced in the holder to the position of Fig. 1.

An important feature of the present improved contact and detent assembly as just described is the relatively great radial movement of the detent-contact arms 30 as compared with the small lateral movement of the bimetallic disk 32, this providing a more positive release of the igniting unit. It is also possible by this organization to adjust the pressure on the contact-detent arms 30 by turning the adjusting screw 33 at the center of the bimetallic disk 32, so that the subsequent increase or decrease in pressure of the screw on the bimetallic disk will produce a corresponding adjustment of the contact-detent arms as desired.

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 comprising a holding device and an igniting unit having a heating element and contact therefor movably supported by the holding device and completely removable therefrom for use; the combination of means for closing the circuit through the heat-

ing element including a pivotally mounted conducting member having a pair of angularly disposed rigid arms, one engaging the contact on the igniting unit when the latter is moved to circuit-closing position and serving as a contact to complete a circuit through the heating element and the other arm serving as an actuator for the contact and a bimetallic member in heat-receiving relation with the heating element and operatively connected with said actuating arm, said bimetallic member upon being heated flexing and moving said actuating arm about its pivot to pivotally move said contact arm out of engagement with the contact on the igniting unit.

2. In an electric cigar lighter comprising a holding device and an igniting unit having a heating element and contact therefor movably supported by the holding device and completely removable therefrom for use; the combination of means for closing a circuit through the heating element including a contact comprising a bell crank lever pivoted in the holder so as to have a relatively long contacting arm for engaging the contact on the igniting unit when the igniting unit is moved into closed-circuit position, and a relatively short actuating arm, and means connected to the actuating arm for moving the contact arm away from the contact on the igniting unit in response to the heat of the heating element, said last-named means including a heat-responsive member operable upon being heated to deform and move the actuating arm of the lever in a direction about the pivotal mounting thereof to pivotally move the contact arm out of engagement with the contact on the igniting unit.

3. In an electric cigar lighter comprising a holding device and an igniting unit having a heating element and contact therefor movably supported by the holding device and completely removable therefrom for use; the combination of means for closing a circuit through the heating element including a terminal plate mounted on the holding device, and a contact comprising a bell crank lever pivotally mounted on the terminal plate and having one arm of the lever relatively long and positioned to engage the contact on the igniting unit when the latter is moved into closed-circuit position, and a relatively short actuating arm, and means engaging the actuating arm and normally urging the long arm of the lever into said position, said means being heat responsive and deformable upon the heating element reaching a predetermined temperature to move the actuating arm in a direction to move the relatively long contact arm quickly away from and out of engagement with the contact on the igniting unit.

4. In an electric cigar lighter comprising a holding device and an igniting unit having a heating element and contact therefor movably supported by the holding device and completely removable therefrom for use; the combination of means for closing the circuit through the heating element when the igniting unit is moved to circuit-closing position on the holder including a contact comprising a lever pivotally mounted on the holding device and having a relatively long arm provided with a hook at the end thereof for engaging a shoulder on the contact of the igniting unit for closing a circuit to the heating element and holding the igniting unit against movement from the closed-circuit position, said lever having a relatively short angularly disposed actuating arm, and means for moving the contact arm into open-circuit position and releasing the hook from the contact of the igniting unit when the heating element reaches the desired temperature including a deformable heat-responsive elongate strip in heat-receiving relation with the heating element and connected to the actuating arm to pivotally move the same so that the hook of the long contacting arm is quickly moved away from and out of engagement with the contact on the igniting unit.

5. In an electric cigar lighter, a holding device; an igniting unit supported by the holding device and completely removable therefrom for use; a heating element carried by the igniting unit; means for closing a circuit through the heating element, said means including a pair of contacts adapted to engage each other, one of said contacts comprising a lever pivoted in the holder so as to have a relatively long contacting arm for engaging the other contact and a relatively short actuating arm; means for opening the circuit in response to heat from the heating element, said circuit-opening means including a heat-responsive bimetallic disk having a central opening formed therein in heat-receiving relation with said element and operatively connected with the actuating arm of said lever; and means for adjustably mounting said disk on the holding device comprising a support on the holding device having a recessed end, and an adjusting screw extending through the opening in the disk and threaded into the recessed end of the support for adjusting the position of the disk around the edge of the recess as a pivot.

6. In an electric cigar lighter, a holding device; an igniting unit having a heating element supported on the holding device and completely removable therefrom for use, said unit being movable on the holding device; a contact carried by the igniting unit; means for normally holding the igniting unit in an open-circuit position on the holding device; means for moving said igniting unit to a closed-circuit position; means for holding the igniting unit in said closed-circuit position including a pivotally mounted conducting member serving as a detent and contact to engage said igniting unit contact when the unit is moved to closed-circuit position for closing the circuit through the heating element and for holding the unit in said position; and means releasing said holding means when the heating element reaches a useful temperature, said means including a bimetallic member in heat-receiving relation with the heating element and operatively connected with said member to pivotally move the same out of engagement with the igniting unit contact when the heating element reaches a predetermined temperature so that the igniting unit will return to the open-circuit position on the holding device.

7. In an electric cigar lighter, a holding device; an igniting unit having a contact supported by the holding device and completely removable therefrom for use, said unit being movable on the holding device; a contact carried by the igniting unit; means for yieldingly urging the igniting unit to one position on the holding device; means for closing a circuit through the heating element when the igniting unit is moved from said position to a second position on the holder, said means including a conducting member having a pair of angularly disposed arms, one of said arms adapted to contact and engage the igniting unit contact when the unit is in said second position and hold the unit in position, said member being pivotally mounted on

said holding device at the union of said arms; and means for releasing the unit from said second position to open the circuit in response to heat from the heating element, said means including a bimetallic member in heat-receiving relation with the heating element and operatively connected with the second arm of the conducting member for pivotally moving the contact arm thereof away from the igniting unit contact upon the heating element reaching a predetermined useful temperature, the movement of the contact arm away from the igniting unit contact releasing the same from its holding engagement with the contact of the igniting unit whereby the unit is returned by said yielding means to said first position.

8. In an electric cigar lighter, a holding device; an igniting unit having a heating element supported by the holding device and completely removable therefrom for use; a contact carried by the igniting unit; means for closing a circuit through the heating element, said means including a bell crank lever pivotally mounted on the holding device and having a relatively long contacting arm for engaging the contact carried by the igniting unit and a relatively short actuating arm; means for opening the circuit in response to heat from the heating element, said circuit-opening means including a heat-responsive deformable bimetallic strip in heat-receiving relation with said element, said strip having a normal buckled position and straightening out as the heating element attains a predetermined temperature, said strip being operatively connected with the actuating arm of said lever and throwing said arm in a direction to cause the contact arm to release its engagement with the contact carried by the igniting unit upon the heating element reaching a predetermined temperature; and means for adjustably mounting said strip on the holding device so that its action can be controlled and made operative to cause said contact arm to release its engagement with the igniting unit contact at various adjusted predetermined temperatures of the heating element.

9. In an electric cigar lighter, a holding device presenting a well or recess; an igniting unit supported in the well of the holding device and completely removable therefrom for use, said unit being manually movable in said well from an open-circuit position to a closed-circuit position, and vice versa; a heating element carried by the igniting unit; means for yieldingly urging the igniting unit to open-circuit position; means for holding the igniting unit in closed-circuit position and for closing a circuit through the heating element when in said position, said means including an annular contact on the igniting unit and a pair of contacts on the holding device, each of said pair comprising a pivotally mounted bell crank lever having a long contact-and-detent arm adapted to engage and hold said annular contact when the igniting unit is moved to closed-circuit position and having a relatively short actuating arm; and means for opening the circuit in response to heat from the heating element, including a heat-responsive member in heat-receiving relation with the element and operatively connected with the actuating arm of each lever and adapted upon the heating element reaching a predetermined temperature to exert a force against the actuating arms of both levers, the force applied against the actuating arms causing the contact-and-detent arm of each lever to pivotally move away from the annular contact on the igniting unit thereby breaking the circuit and releasing said unit to allow the yielding means to return the same to the open-circuit position on the holding device.

10. In an electric cigar lighter, a holding device presenting a well or recess; an igniting unit supported in the well of the holding device and completely removable therefrom for use, said unit being manually movable in said well from an open-circuit position to a closed-circuit position, and vice versa; a heating element carried by the igniting unit; means for yieldingly urging the igniting unit to open-circuit position; means for holding the igniting unit in closed-circuit position and for closing a circuit through the heating element when in said position, said means including an annular contact on the igniting unit and a pair of contacts on the holding device, each of said pair comprising a pivotally mounted lever having a long contact-and-detent arm adapted to engage and hold said annular contact and having a relatively short actuating arm; means for opening the circuit in response to heat from the heating element, including a heat-responsive disk, said disk being supported at its center in heat-receiving relation with the heating element and being operatively connected at oppositely spaced points on the periphery thereof to the actuating arms of said levers for pivotally moving each lever upon the heating element reaching a predetermined temperature so that the contact-and-detent arms thereof are pivotally moved out of engagement with the annular contact on the igniting unit and release the same.

11. In an electric cigar lighter, a holidng device presenting a well or recess; an igniting unit supported in the well of the holding device and completely removable therefrom for use, said unit being manually movable in said well from an open-circuit position to a closed-circuit position, and vice versa; a heating element carried by the igniting unit; means for yieldingly urging the igniting unit to open-circuit position; means for holding the igniting unit in closed-circuit position and for closing a circuit through the heating element when in said position, said means including an annular contact on the igniting unit and a pair of contacts on the holding device, each of said pair comprising a pivotally mounted lever having a long contact-and-detent arm adapted to engage and hold said annular contact and having a relatively short actuating arm; means for opening the circuit in response to heat from the heating element, including a heat-responsive disk provided with a plurality of radial slots forming a plurality of fingers extending radially from the center of said disk, said disk being supported at its center in heat-receiving relation with the heating element and having the extremities of a pair of oppositely extending fingers thereof operatively connected with the actuating arms of said levers for pivotally moving each lever upon the heating element reaching a predetermined temperature so that the contact-and-detent arms thereof are pivotally moved out of engagement with the annular contact on the igniting unit and release the unit whereby it is returned to open-circuit position by said yielding means.

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