

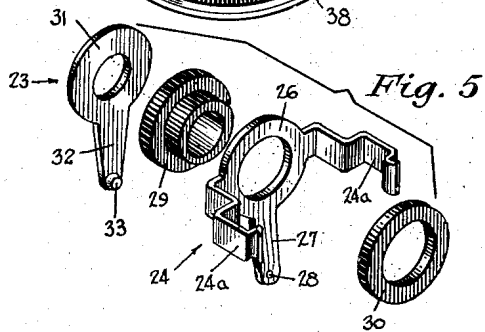
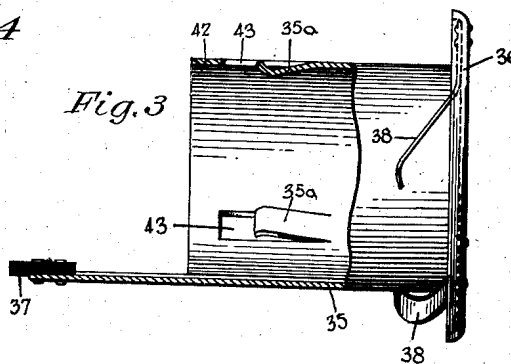
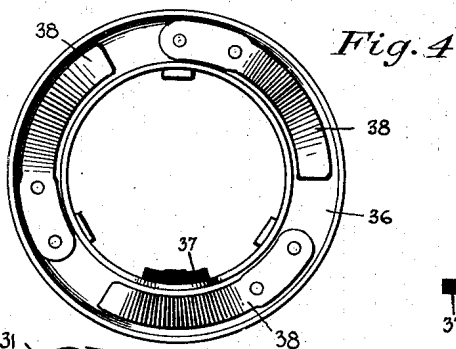
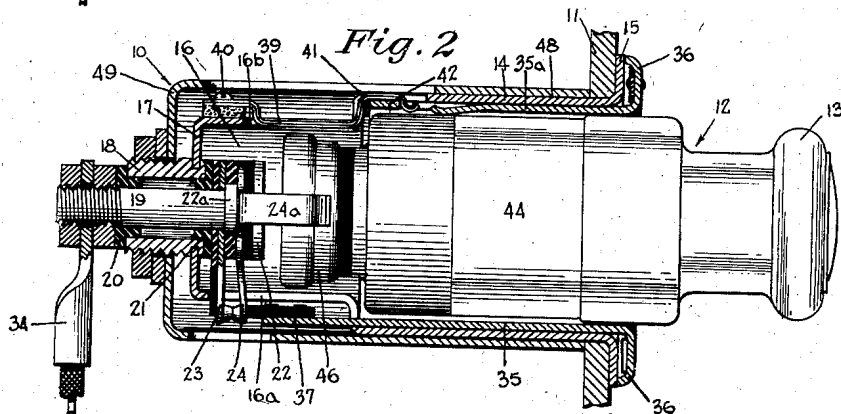
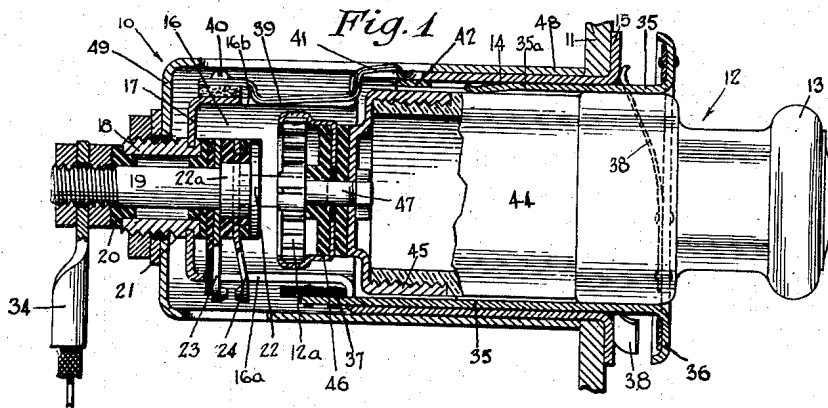
Dec. 30, 1941.

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2,268,120

CIGAR LIGHTER

Filed Aug. 1, 1936



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UNITED STATES PATENT OFFICE

2,268,120

CIGAR LIGHTER

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Application August 1, 1936, Serial No. 93,775

19 Claims. (Cl. 219—32)

This invention relates to electric cigar lighters such as are used in automobiles and the like, and more particularly to lighters of the above character which are automatic in their operation.

Lighters such as these are commonly provided with a holding device attachable to a support, and a removable igniting unit carrying the heating element, adapted to be held in the holding device, energized therein and removed therefrom for use.

There have been proposed a number of these lighters, automatically controlled, and which after being initially actuated to cause energization, operate to open the heating element circuit upon functioning of a thermally responsive member responding to heat from said heating element.

These lighters, whether of the intermittent energization type wherein positive opening of the circuit is effected only by a manual operation on the part of a user, or of the self-disconnecting type wherein permanent opening of the circuit is effected automatically, variously employ circuit making-and-breaking means so closely associated with the heat-responsive means as to have the characteristics of the latter largely determine those of the circuit making-and-breaking means.

I have found that under certain conditions it is desirable to have the heating-responsive means quite definitely disassociated from the circuit making-and-breaking means, so that the latter can be designed more nearly from the purely electrical standpoint. This has resulted, for certain operating conditions, in a more reliable and uniform operating characteristic of the lighter.

The present invention contemplates as an object, therefore, an automatic operating mechanism, in an electric cigar lighter, which is extremely reliable, and which will have uniform operating characteristics over an extended period of use, the mechanism being characterized by relatively disassociated elements as pointed out above.

The illustrated specific structure by which this object is attained includes a pair of electrical contact members adapted to act only as such, said members having contacting points of metal especially suitable for this purpose, and the members being operated by an actuating mechanism which is controlled by a heat-responsive element.

Distinguishing from prior lighter-operating mechanisms, the actuating mechanism of the present lighter has an actuating member separate from, and movable relative to, the knob or handle of the removable igniting unit of the

lighter. Therefore the igniting unit, which in previous lighters was moved to cause energization of the heating element, is now not so moved, but is held in the holding device in one position.

Further, the entire organization is such that the contact members are now substantially removed from the immediate vicinity of the heating element; and are also disposed in the path of a cool draft of air traveling past said members and toward the heating element, and therefore the members are not subjected to the undesirable effect which heat from said element would have.

Also the contacting points are now so disposed that they can be easily reached and readily cleaned, and are adapted to withstand removal of considerable material, as from repeated and thorough cleanings, without injurious effect.

In lighters as heretofore developed, the heat-responsive means, consisting almost universally of a bimetallic element, at times required replacement. This element, functioning in prior lighters as a contact or as a part closely associated with a contact, could not be easily replaced, and especially without requiring careful subsequent adjustment.

The automatic operating mechanism as provided by the present invention includes an extremely simple and rugged bimetallic heat-responsive element so disposed and adapted that it can be quickly and easily removed and replaced, and this replacement can be made without further necessary or delicate adjustment.

The cigar lighter illustrated herein, which embodies these objects and features, is shown specifically as a well-type lighter having a substantially tubular holding device presenting a socket into which a removable plug-like igniting unit is inserted, to be held thereby. The holding device includes a pair of electrical conducting means through which the igniting unit is energized prior to removal for use. The socket of the holding device carries a sleeve closely fitting therein and slidable relative thereto, said sleeve in turn receiving the igniting unit. This sleeve is the manually operable member which is depressed by a user when it is desired to energize a lighter. The depressible sleeve is yieldingly urged on the holding device to a normal, open-circuit position, and is held in a closed-circuit position against the urging of said yielding means by a bimetallic heat-responsive member, and said sleeve functions to actuate an electrical switch included in the ungrounded conducting means of the holding device. In addition, the operable sleeve, in encircling and carrying the igniting unit forms

part of the grounded current conducting structure of the holding device.

The bimetallic element which detains the sleeve in the energizing position to which it must be moved by a user is disposed directly above the heating element carried by the igniting unit, and in the path of a flow of warm air from said element, and said bimetallic member, which is easily replaceable, releases the operable sleeve of the lighter in response to heat from the heating element.

The electric switch structure of the holding device carries a metal clip adapted to engage a heating element contact in the form of a metal cup surrounding said element, to provide for electrical connection thereto, and said clip also serves as a yieldable detent to hold the removable igniting unit in a given fixed position within the holding device.

The entire organization as just described is therefore characterized by an igniting unit which is held in a given fixed position on the holding device at all times that it is supported thereby, and further characterized by a manually operable member in the form of a sleeve surrounding the igniting unit, which sleeve is depressed by a user to cause energization of the heating element, and which sleeve is automatically released in response to heat from the element to open the circuit through the latter.

If for any reason whatever the heat-responsive element which detains the manually operable sleeve of the lighter should fail to hold the sleeve in depressed position, energization of the heating element can still be effected by manually depressing and holding said sleeve, in which case the lighter will function in the manner of a non-automatic device. In such event, during energization the igniting unit is removed upon evidence that it is ready for use.

It should be noted that the present improved lighter has much utility even without the bimetallic detent member for the operable sleeve; in this case the lighter is non-automatic in its operation, and energization of the heating element occurs during the period that the operable sleeve is manually depressed and held in this position. The electrical contact features are still present, since the contacts are disassociated from the bimetallic member, and the lighter is still characterized by improved operation.

Other features and advantages will hereinafter appear.

In the accompanying drawing:

Figure 1 is an axial sectional view of the lighter, with the igniting unit partially in elevation, the actuating sleeve being shown in open-circuit position.

Fig. 2 is an axial sectional view, but with the igniting unit shown in elevation, the actuating sleeve being in closed-circuit or energizing position.

Fig. 3 is a side elevation of the actuating sleeve of the lighter, a portion of said sleeve being in section.

Fig. 4 is an end view of the sleeve, looking in the direction of the arrow, in Fig. 3.

Fig. 5 is an exploded view of the contact assembly of the lighter.

The cigar lighter of the present invention, in the exemplary embodiment thereof shown in the drawing, illustrates the so-called well type of lighter, for use in automobiles, and comprises a tubular socket-carrying base member or holder 10 for attachment to a panel 11 of an automobile,

and a removable igniting unit 12 having a heating element 12a, which unit and element are normally supported by the carrier in one position thereon, but can be bodily moved therefrom for manual transportation within the car and for handling by various occupants therein for the purpose of lighting cigars, cigarettes and the like.

The holder 10 includes a sleeve 14 adapted to pass through an aperture in the panel 11, said sleeve having at its forward end adjacent the panel an outwardly extending flange 15, and said sleeve having a rear portion 16 of reduced diameter terminating in an integral transverse wall 17. The sleeve 14 is preferably formed of sheet metal to serve as a conductive element in the grounding portion of the energizing circuit of the lighter.

The holder 10 is also provided with an electrical contact connected with the live side of the automobile circuit, and for supporting this contact the wall 17, which is centrally apertured, carries an externally threaded metal sleeve 18 suitably attached thereto as shown. Passing through the sleeve 18 is a metal stud 19 insulated therefrom by shouldered washers 20 and 21, said stud having at its inner end a head 22 and an enlarged neck portion 22a as shown.

As provided according to the present invention, the stud 19 carries a pair of electrical contact members 23 and 24 adapted to engage each other, although normally separated, said members constituting the electrical switching means of the holding device 10. As shown, the reduced part 16 of the sleeve 14 of the holder has a slot 16a in its lower portion through which the contact members 23 and 24 extend, the engaging portions of said members being thus disposed outside of the sleeve 14.

The contact member 24, see Figs. 1 and 5, has a large circular apertured body portion 26 from which extends downwardly an integral resilient arm 27 carrying a contact point 28 of tungsten or other suitable material, said member 24 being firmly held under the head 22 of the stud 19, but insulated therefrom by washers 29 and 30 as shown. The corresponding contact member 23, see Fig. 5, has a body portion 31 and a resilient arm 32 integral therewith, said arm carrying a contact point 33 similar to the contact point 28. The member 23 is also carried by the stud 19, being electrically connected thereto by engagement with the enlarged portion 22a of the shank of said stud, said member 23 being suitably insulated, as shown, from the sleeve 18 of the holding device.

Thus the member 23 is connected, through the stud 19 and an electrical connection lug 34 to the live side of the automobile circuit, and the member 24, normally separated from the member 23, is electrically neutral or dead until it is caused to engage the latter member, as shown in Fig. 2.

According to the invention, and for the purpose of actuating the resilient arm 27 of the member 24 to close the switch, the holding device 10 is provided with a manually operable sleeve 35, adapted to slidably fit within the shell 14. The sleeve 35 at its forward end has an outwardly extending flange 36 so that said sleeve may be readily actuated by a user, and also has a rearward extension passing through the slot 16 of the holder and carrying an insulating shoe 37 for engagement with the contact member 24. The sleeve 35 has two positions on the holding device, an inoperative or open-circuit position, as

shown in Fig. 1, and an energizing or closed-circuit position as shown in Fig. 2. The flange 35 of the sleeve engages the flange 15 of the holding device when the sleeve is in the latter position; when in open-circuit position the sleeve is positioned and held against removal from the holder by engagement of the insulating shoe 37 with the sleeve 14.

When the sleeve 35 is in the open-circuit position shown in Fig. 1, the insulating shoe 37 is away from the contact member 24 so that the latter, being biased forwardly, is normally out of engagement with the contact member 23. When the sleeve 35 is depressed and moved to closed-circuit position, as in Fig. 2, the shoe 37 will abut the contact member 24 and will cause said member to engage the member 23, thus making both members a part of the live side of the automobile circuit.

The manually operable sleeve 35 is held in the normal open-circuit position of Fig. 1 by means of a plurality of resilient arms 38 carried by the flange 36 of said sleeve and engaging the flange 15 of the holder 10.

For the purpose of detaining the operable sleeve 35 in closed-circuit position there is provided a bimetallic detent arm 39 attached to the reduced portion 16 of the holding device by a screw 40, said bimetallic arm being disposed in a longitudinal slot 16b in the upper part of said reduced portion. The detent arm 39 is formed in the shape of a clip 41 at its forward end, said clip being adapted to engage a transversely extending strip portion 42 of the sleeve 35 formed by punching out a part of the sleeve as at 43 in Fig. 3.

It will be seen that when the sleeve 35 is in open-circuit position, as in Fig. 1, the clip 41 of the bimetallic detent 39 will be held in an upward and outward position, and that when the sleeve 35 is moved to the energizing position shown in Fig. 2 the clip 41 will snap downward so as to engage the portion 42 and prevent return of the sleeve 35. The bimetallic detent 39 is adapted to respond to heat from the heating element of the igniting unit in such a manner that it will bend or curve to move the clip 41 upward and to thereby release the sleeve 35 so that the latter will return, under the urging of the resilient arms 38 to open-circuit position.

The removable igniting unit 12 has a main or body portion 44 the forward end of which carries the knob 13, said body being substantially cylindrical in shape and being adapted to slidably fit within the sleeve 35. The rearward portion of the body 44 is cylindrically reduced and externally threaded and carries a metal cap 45 having an external diameter equal to that of the body 44.

The heating element 12a is positioned within a metal cup 46, said cup being insulatedly mounted on the metal cap 45 by means of a threaded stud 47 and suitable insulating washers as shown. The heating element 12a is in the form of a spiral coil, the inner end of the coil being held in a slotted head of the stud 47. Thus the heating element has its inner end connected to the metal cap 45 and its outer end connected to the cup 46.

For the purpose of yieldingly holding the igniting unit 12 in a given fixed position on the holding device, and for the purpose of making electrical connection to the outer end of the heating element by way of the cup 46, the electrical contact member 24 is provided with a pair of

resilient clip arms 24a, see Fig. 5, between which the cup 46 is grasped. The clip arms 24a thus serve to electrically connect the contact member 24 to the heating element, and also serve to yieldingly hold the igniting unit in proper position on the holding device until manually removed therefrom.

For insuring positive electrical contact from the metal cap 25 to the sleeve 14 of the holding device, the manually operable sleeve 35 is provided with a plurality of resilient tongues 35a lanced therefrom, said tongues being biased inwardly as shown and being disposed so that when the sleeve 35 is in energizing position the tongues press firmly against the outer cylindrical surface of said metal cap.

The holding device 10 is secured to the panel by means of an outer shell 48 fitting over the sleeve 14, said shell having at its rear an apertured end 49 through which the externally threaded sleeve 18 passes, and said sleeve carrying a nut and washer for securing the shell 48 tightly against the panel 11.

Operation of the lighter is as follows:

With the parts in the positions shown in Fig. 1, the lighter is in normal de-energized position. When it is desired to energize the lighter for use, the manually operable sleeve 35 is depressed by pressure on the flange 36 thereof until the bimetallic detent arm 39 locks the sleeve in depressed position, as shown in Fig. 2. It will be noted that this movement of the sleeve 35 has caused the insulating shoe 37 to move the electrical contact member 24 into engagement with the live member 23. Thus the electrical circuit through the heating element is completed, current flowing through the connection lug 34, stud 19, contact members 23 and 24, clip arms 24a, heating element cup 46, through the heating element 12a, stud 47, cap 45, resilient tongues 35a, sleeve 35, sleeve 14 of the holder, and thence through the panel 11 to the grounded side of the automobile circuit. After the heating element 12a has attained a predetermined temperature, the bimetallic detent arm 39, responding to this heat, will bend so that the clip 41 of said arm will move upwardly, thus releasing the sleeve 35 to open-circuit position.

It should be noted that the electrical contact points 28 and 33 are disposed outside of the sleeve 13 of the holding device, and disposed somewhat away from the heating element 12a. Therefore said contacts are not subjected to the intense heat from the element, and are better able to withstand continual usage. Also, the points are easily accessible from below the outer shell 48, which shell is slotted adjacent the contacts as shown, and therefore a file may be inserted to clean the contacting points, should this become necessary. Also, the outer shell 48 is apertured above the bimetallic arm 39, and said arm, being secured by the screw 40, is easily removable and replaceable. During heating of the element 12a a draft of air will be caused to flow past said element in an upward direction, therefore keeping the contacts 28 and 33 relatively cool while at the same time transferring heat to the bimetallic detent arm 39.

It is not necessary that the bimetallic arm 39 be used with the lighter of this invention if it is not desired to have the operation of the lighter automatic. If the bimetallic arm 39 be omitted, energization of the lighter is effected by depressing the sleeve 35 and holding said sleeve in depressed position. This will cause energization of

the heating element, and after a reasonable length of time the sleeve may be released and the igniting unit removed for use. The advantages of using the contact and switch structure, as disclosed herein, will still be present whether the lighter is automatically or manually operated.

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 a cigar lighter, a holding device; an igniting unit supported in a predetermined position against movement on and completely removable from the holding device for use; a heating element carried by the igniting unit; means for yieldably holding the igniting unit in said predetermined position, a manually operable member carried by the holding device and movable relatively to the holding device and the igniting unit; means, including electric circuit means, for closing a circuit through the heating element in response to movement of the operable member; and means responsive to heat from the heating element for effecting movement of the operable member to open the circuit through said element.

2. The invention as defined in claim 1, in which the holding device has a tubular recess for receiving the igniting unit, and in which the operable member is a sleeve adapted to slidably move in the recess of the holding device, said sleeve having a flange for hand engagement.

3. In a cigar lighter, a holding device; an igniting unit supported by and completely removable from the holding device for use; means for yieldingly holding the igniting unit in predetermined position on the holding device; a heating element carried by the igniting unit; a manually engageable and operable member interposed between the holding device and igniting unit and movable relatively to the holding device and the igniting unit; means, including electric circuit means, for closing a circuit through the heating element in response solely to movement of the operable member to a closed-circuit position; and means responsive to heat from the heating element for effecting movement of the operable member to an open-circuit position to open the circuit through said element while the igniting unit is held in said predetermined position.

4. In a cigar lighter, a holding device; an igniting unit supported by and completely removable from the holding device for use; means, including an electrical connection to the igniting unit, for yieldingly holding said unit in predetermined position on the holding device; a heating element carried by the igniting unit; a manually operable member movable relatively to the holding device and the igniting unit; means, including electric circuit means, for closing a circuit through said yielding holding means and the heating element in response to movement of the operable member; and means responsive to heat from the heating element for effecting movement of the operable member to open the circuit through said holding means and heating element.

5. In a cigar lighter, a holding device; an igniting unit supported by and completely removable from the holding device for use; a heating element carried by the igniting unit; a manually operable member carried within the holding device and movable relatively to the holding device and the igniting unit; means for yieldingly urging the operable member to a given position relatively to the holding device and igniting unit;

means, including electric circuit means, for closing a circuit through the heating element in response to movement of the operable member against said yielding means to a second position from said given position; and a heat-controlled detent for engaging and holding the operable member in said second position, and for releasing said member in response to heat from the heating element for return to initial position by said yielding means so as to open the circuit through said element.

6. The invention as defined in claim 5, in which the holding device has a tubular recess for receiving the igniting unit, said recess having at its mouth an outwardly extending flange, in which the operable member is a sleeve adapted to slidably move in the recess of the holding device, said sleeve having a flange adjacent the flange of the holding device, and in which the means for yieldingly urging the operable member to a given position includes a resilient member engaging both said flanges.

7. In a cigar lighter, a holding device; an igniting unit supported by and completely removable from the holding device for use; a heating element carried by the igniting unit; a pair of current conducting members carried by the holding device; means for connecting one end of the heating element with one of the current conducting members when the igniting unit is being supported on the holding device, including a manually operable member movable relative to the igniting unit and the holding device and surrounding the igniting unit; means for connecting the other end of the heating element to the other conducting member of the holding device in response to movement of the operable member; and means responsive to heat from the heating element for effecting movement of the operable member to disconnect the end of the heating element which was connected by the initial movement of said operable member.

8. In a cigar lighter, a holding device having a cylindrical recess therein; an igniting unit supported within said recess and completely removable therefrom for use; a heating element carried by the igniting unit; a manually operable sleeve adapted to be slidably held in the recess of the holding device, and adapted to receive the igniting unit; means for yieldingly urging the sleeve to a given position in the holding device; means for yieldingly holding the igniting unit in a given position in the holding device while said sleeve is moving; electrical circuit means constituting a circuit, normally open, through the heating element and holding device; means for closing the circuit through the heating element by movement of the operable sleeve to a second position against the means for yieldingly urging it in initial position, and for opening the circuit by return of the sleeve to initial position; and heat-responsive means for holding the sleeve in said second position, and for releasing the sleeve in response to heat from the heating element for return to initial position so as to open the circuit through said element.

9. In a cigar lighter, a holding device having a tubular recess therein; an igniting unit supported in said recess and completely removable therefrom for use; a heating element carried by the igniting unit; a manually operable sleeve adapted to be slidably held in the recess of the holding device, and adapted to receive the igniting unit; means for yieldingly urging the sleeve to a given position in the holding device; means for yield-

ingly holding the igniting unit in a given position in the holding device; electrical circuit means constituting a circuit, normally open, through the heating element and holding device; and means for closing the circuit through the heating element by movement of the operable sleeve to a second position against the means for yieldingly urging it in initial position.

10. In a cigar lighter, a holding device having a recess; an igniting unit supported by the holding device in the recess thereof and completely removable from the holding device for use; a heating element carried by the igniting unit; a manually operable member comprising a sleeve slidably mounted in the recess of the holding device and surrounding the igniting unit; means for closing a circuit from the heating element in response to movement of said sleeve relative to the holding device by manual pressure applied thereto; and means for automatically opening the circuit through said element when the heating element is ready for use.

11. In a cigar lighter, a holding device having a recess; an igniting unit supported in the recess in the holding device and completely removable therefrom for use; a heating element carried by the igniting unit; a manually operable sleeve slidably mounted in the recess of the holding device; means including electric circuit means for closing a circuit through the heating element in response to manual movement of said sleeve, said holding device being provided at the mouth of the recess with an outwardly extending flange, and the movable sleeve having a flange adjacent the outwardly extending flange of the holding device; and means engaging both of said flanges for yieldingly urging the sleeve to a given normal position on the holding device.

12. In a cigar lighter, a holding device having a recess; an igniting unit supported in the recess of the holding device and completely removable therefrom for use; a heating element carried by the igniting unit; a manually engageable and operable sleeve slidably mounted in the recess of the holding device and surrounding the igniting unit and having a portion for receiving manual pressure for sliding said sleeve; and means, including electric circuit means for closing a circuit through the heating element in response to movement of said sleeve.

13. In a cigar lighter, a holding device having a recess; an igniting unit supported in the recess of the holding device and completely removable therefrom for use; a heating element carried by the igniting unit; a manually operable sleeve slidably mounted in the recess of the holding device, said sleeve having a flange for hand engagement; means, including electric circuit means for closing a circuit through the heating element in response to movement of said sleeve; the holding device having an outwardly extending flange at the mouth of the recess, adjacent the flange of the sleeve; and means engaging both said flanges for yieldingly urging the sleeve to a given normal position on the holding device.

14. The invention as defined in claim 9, in which there is means for automatically opening the circuit by releasing the sleeve for return to its initial position.

15. In a cigar lighter, a holding device having a recess therein; an igniting unit supported in said recess and completely removable therefrom for use; a heating element carried by the igniting unit; means for conducting current from one terminal of the heating element to the holding

device; a connection clip carried by the holding device for engaging the other terminal of the heating element when the igniting unit is on the holder, said clip having a resilient contact arm extending substantially laterally therefrom; a manually operable member; a second electrical contact on the holding device for engaging said contact arm; and means for causing said arm to engage said second contact as a result of movement of the operable member.

16. In a cigar lighter, a holding device having a recess therein; an igniting unit supported in said recess and completely removable therefrom for use; a heating element carried by the igniting unit; means for conducting current from one terminal of the heating element to the holding device; a connection clip carried by the holding device for engaging the other terminal of the heating element when the igniting unit is on the holder, said clip having a resilient contact arm extending substantially laterally therefrom; a manually operable member; a second electrical contact on the holding device for engaging said contact arm; means for causing said arm to engage said second contact as a result of movement of the operable member; and means for causing said contact arm to disengage the second contact automatically when the heating element is ready for use.

17. In a cigar lighter, a holding device having a recess therein; an igniting unit supported in the recess of the holding device and completely removable therefrom for use; a heating element carried by the igniting unit; a manually operable sleeve slidably mounted in the recess of the holding device, said sleeve having an aperture therein providing a retaining edge; means for yieldingly urging the sleeve to a given position relatively to the holding device and igniting unit; means, including electric circuit means, for closing a circuit through the heating element in response to movement of the operable member against said yielding means to a second position from said given position; and a latch carried by the holding device for engaging said retaining edge of the sleeve to hold the latter in said second position.

18. The invention as defined in claim 17, in which the latch is of bimetallic material and is in heat-receiving relation with the heating element so that it will respond to heat therefrom by releasing the operable sleeve to open the heating element circuit.

19. In a cigar lighter, a holding device; an igniting unit supported by and completely removable from the holding device for use; a heating element carried by the igniting unit; electric circuit means from the holding device through the heating element, said circuit having a pair of separate gaps therein, one on each side of the heating element; a manually operable member movable relative to the holding device and igniting unit and operable upon movement thereof for closing the gaps, one of said gaps comprising a heat-controlled latch contact adapted to engage the movable member to complete the circuit and to hold the member in circuit-closing position, said heat-controlled contact releasing the movable member upon the heating element attaining a desired usable heat for opening the circuit thereto; and means for moving the movable member relative to the holder to open the circuit at the other gap.

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