Sept. 21, 1943. H. G. LEHMANN 2,329,844

CIGAR LIGHTER

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Fig. 1

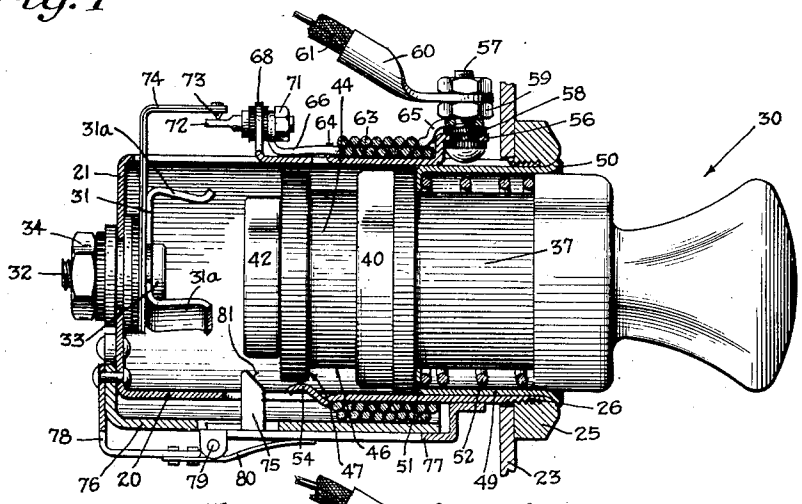
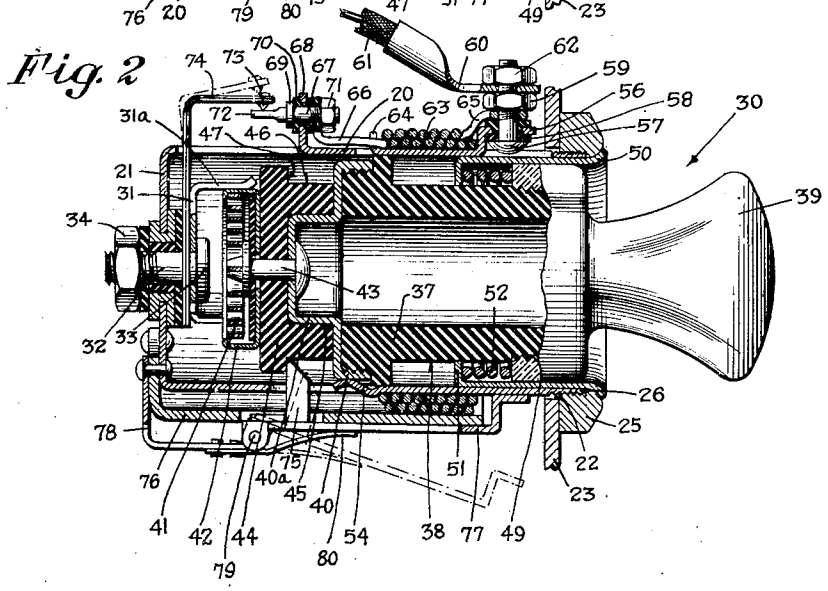


Fig. 2



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Fig. 3

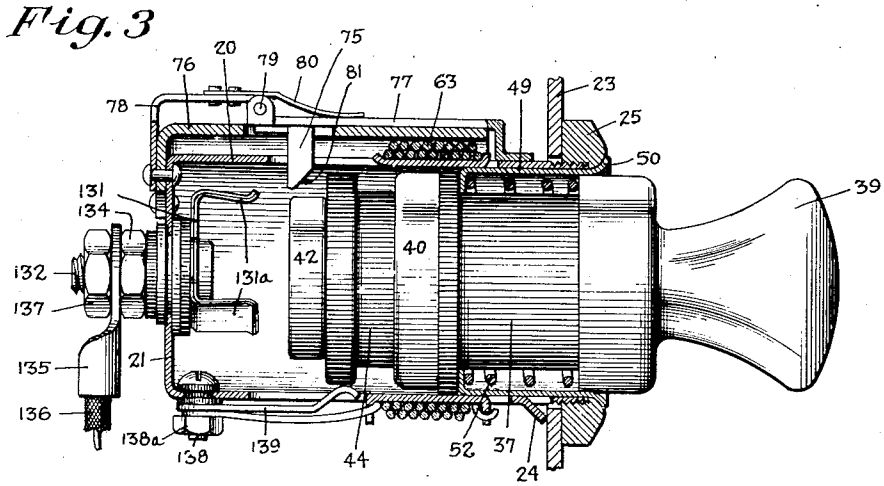


Fig. 4

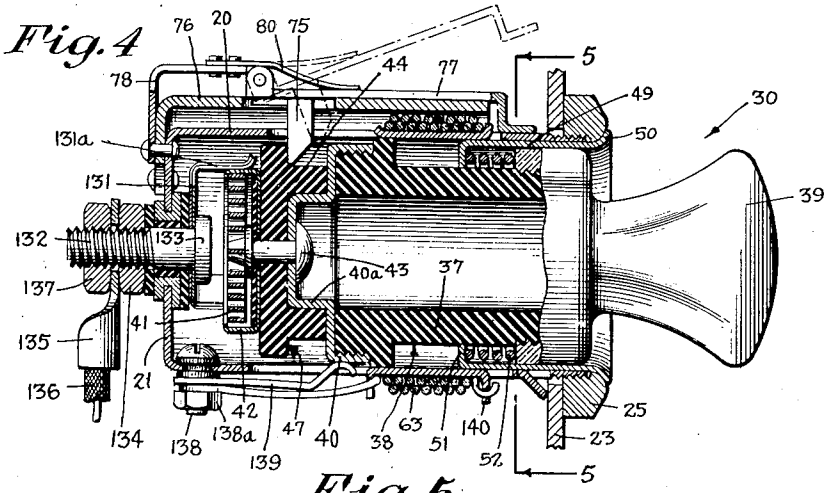
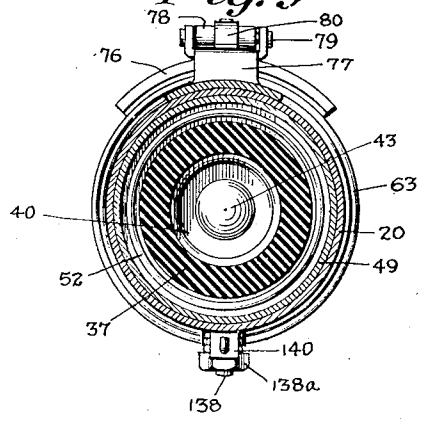


Fig. 5



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Fig. 6

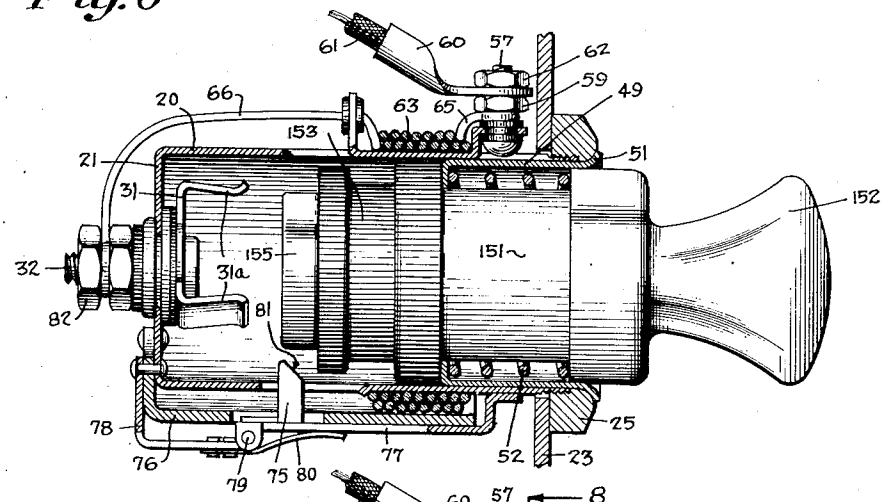


Fig. 7

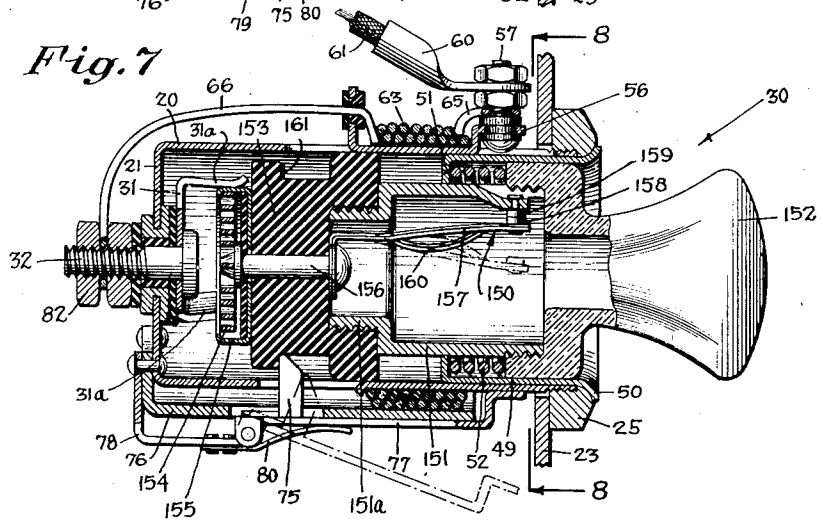
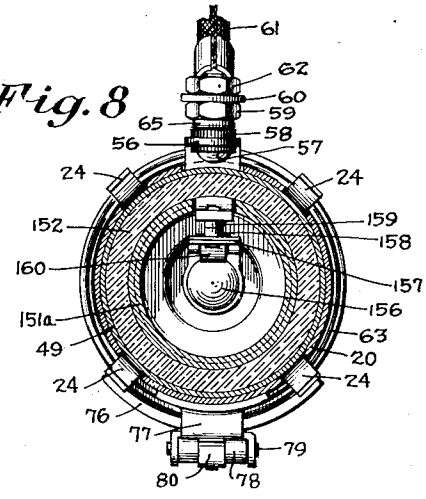


Fig. 8



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2,329,844

UNITED STATES PATENT OFFICE

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CIGAR LIGHTER

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Application August 8, 1938, Serial No. 223,626

4 Claims. (Cl. 219—32)

This invention relates to cigar lighters, and, more particularly, to the type in which the circuit to the heating element is opened upon the heating element reaching a predetermined desired usable heat.

In prior cigar lighters having a removable igniting unit, the unit was normally urged into open-circuit position, but was held in a closed-circuit position during the energizing period against said urge by means of a thermostatic latch which may or may not form a part of a switch in the circuit. In holding the circuit closed, a strain may be placed on the thermostatic element as it must overcome the pull of the means normally provided for urging the igniting unit into open-circuit position, which strain may alter its operation when it becomes heated so as to open the circuit through the heating element.

According to the present invention, the igniting unit is held in closed-circuit position by a detent or latch which is held in locking position by an electromagnet. The circuit to the electromagnet is controlled by a thermostatic switch in such a manner that when the heating element attains the desired usable heat, the switch will open, thus opening the circuit to the magnet whereby the detent will release its holding action on the igniting unit so that it can be moved into open-circuit position.

The igniting unit, according to the present invention, can be of the normal type which requires seven to ten seconds to heat up, or can be constructed as a quick-heating unit which is adapted to attain its desired heat in one or two seconds.

The electromagnetically-operated latch means of the present invention comprises a magnet coil surrounding the holder and a latch mounted on the holder so as to extend into the holder and provided with an armature extending into operative relation with the magnet. Preferably, the latch, which extends into the holder and into the path of movement of the igniting unit as the latter is moved into closed-circuit position, is yieldably and pivotally mounted on the holder, and is provided with a cam surface which cooperates with the igniting unit to move the latch outwardly on its yieldable mounting until the igniting unit is moved into closed-circuit position at which time an abutment on the igniting unit is moved past the latch and permits it to snap back into holding relation with the igniting unit.

The circuit for the device is so arranged that when it is closed to energize the heating element, it also will close an energizing circuit to the magnet coil and render the magnetic detent operable to hold the igniting unit in closed-circuit position. This circuit is provided with a heat-responsive switch which, upon the heating element reaching its predetermined desired usable heat, will open the circuit and deenergize the magnet coil. The detent will be released and the igniting unit, which is normally urged into open-circuit position, will cause the detent to move about the pivotal mounting.

If the device be of the quick-heating type, it is desirable to have a quick-acting switch in the circuit so that it will open the circuit to the magnet immediately upon the heating coil attaining its desired usable heat to prevent the coil from burning out. As soon as the quick-acting switch opens the circuit, the magnetic detent will be released and the heating element moved into open-circuit position.

With the magnetic detent holding the igniting unit in closed-circuit position against the pressure of the means urging the igniting unit into open-circuit position, no strain is applied to the heat-responsive means, and it can more accurately control the circuit to the heating element and the magnet than when it served to hold the igniting unit in closed-circuit position.

Other features and advantages will be apparent from the specification and claims when taken in connection with the drawings, in which:

Figure 1 shows a longitudinal sectional view of a holder with the igniting unit in open-circuit position.

Fig. 2 is a longitudinal sectional view of the holder and a portion of the igniting unit, with the igniting unit in closed-circuit position.

Fig. 3 is a longitudinal sectional view of the holder showing another form of the invention, with the igniting unit in open-circuit position.

Fig. 4 is a longitudinal sectional view of the holder and a portion of the igniting unit showing the form of the invention shown in Fig. 3, with the igniting unit in closed-circuit position.

Fig. 5 is a sectional view taken along line 5—5 of Fig. 4.

Fig. 6 is a longitudinal sectional view of the holder showing another form of the invention, with the igniting unit in open-circuit position.

Fig. 7 is a longitudinal sectional view of the holder and portion of the igniting unit of the form of the invention shown in Fig. 6, with the igniting unit in closed-circuit position.

Fig. 8 is a sectional view taken along line 8—8 of Fig. 7.

In the form of the invention shown in Figs. 1

and 2, a sheet metal holder 20 is provided and has a transverse wall 21 at one end. The sheet metal holder is adapted to be mounted in an aperture 22 in a dashboard 23 or other support and locked in place in any suitable manner. Preferably, the holder is provided with a plurality of tangs 24, as shown in Fig. 8, which engage the back of the dashboard, and a collar 25 is threaded on the open end 26 of the holder and into engagement with the outer face of the dashboard to clamp the holder in place in the aperture therein and ground it to the dashboard.

The holder is adapted to slidably receive a removable igniting unit 30 and is provided with a fixed base contact 31 having a plurality of resilient contact fingers 31*a* projecting into the holder to cooperate with the igniting unit to form an energizing circuit as will be explained. The contact is mounted on the wall 21 by a bolt 32 insulatedly mounted in an aperture in the wall with the contact disposed under the head 33 of the bolt and held in place by a nut 34 threaded on the free end of the bolt.

The igniting unit, which is adapted to be removably mounted in the holder, comprises a tubular member 37 of insulating material, having a portion of reduced diameter 38 to which is threaded a handle 39. The other end of the tubular body carries the conducting cap 40 on which is mounted a heating element 41.

The heating element, in the preferred form of the invention, comprises a spiral coil of resistance wire which is disposed in a contact cup 42 and has one end connected thereto and the other end connected to a central stud 43. The contact cup is clamped against an insulating cap 44 which is provided with an internal recess 45 adapted to receive a projecting portion 40*a* of the conducting cap 40. The contact cup and insulating cap are held to the projecting portion 40*a* by heading over the central stud which also electrically connects the end of the coil to the conducting cap. The outer surface of the insulating cap 44 is provided with a circular recess 46 forming an abutment 47, the purpose of which will be later described.

The igniting unit 30 is normally held in shallow open-circuit position by means of a friction sleeve 49 slidably and frictionally held in the holder and having an outwardly flared end 50 adapted to engage the collar 25, as shown in Fig. 1, which limits the inward movement of the sleeve 49 in the holder. The inner end of the sleeve is turned inwardly to form a flange 51 which slidably engages the portion of the reduced diameter 38 of the tubular member 37, and forms an abutment for one end of a spring 52 which surrounds the reduced portion 38 of the insulating member, the other end of the spring abutting the handle threaded on the end of the tubular body 37.

When it is desired to energize the heating element, the handle is manually pressed so that the igniting unit is moved against the action of the spring to a deep position on the holder in which the circuit for the heating element is closed by the fingers 31*a* of the base contact 30 engaging the contact cup, and the conducting cap 40 engaging a contact finger 54 lanced from the body of the material.

In order to maintain the igniting unit in closed-circuit position, a novel magnetic latch or detent mechanism is used. In the form of the invention as shown in Figs. 1 and 2, the tubular holder is provided with an upstanding lug 56 lanced from the body. A bolt 57 is disposed in an aperture and insulated therefrom by insulation 58, and is locked in place by a nut 59. The bolt is connected to a suitable source of energy by a connector lug 60 which is connected to a conductor 61 leading from the source of energy, which lug is locked in place on the bolt by a nut 62.

The actuating means for the latch or detent comprises a magnet coil 63 which is wound about the exterior of the body of the holding device and is effectively prevented from shifting on the holder by having one side abut the lug 56 and the other side engage an upstanding finger 64 lanced from the body of the holder.

The coil is connected in series between the bolt 57 connected to the source of energy and the base contact. This is accomplished by having one terminal 65 of the coil connected to the bolt 57 by being clamped between the nut 59 and the insulation 58. The other terminal 66 of the coil is connected to a bolt 67 carried by a finger 68 lanced up from the body of the holder adjacent the base thereof. The bolt, which has a shoulder 69, is disposed in an aperture in the finger, and insulated therefrom by insulation 70, and locked in place by a nut 71 which also locks the terminal thereto.

The other end of the bolt is provided with a contact 72 adapted to cooperate with a movable contact 73 carried by a bimetallic arm 74 which projects from the interior of the holder and is normally disposed with the contacts in closed-circuit relation. The bimetallic member is electrically connected to the base contact 31 by being disposed between the contact and the insulation as shown in Figs. 1 and 2, and held in place by the clamping action of the bolt 32. While the circuit is completed through the heating element by the igniting unit closing the circuit between the contacts 30 and 54 on the holder, the coil will be energized and act to hold a latch 75 in operative holding position.

To operate the latch, the holding device is provided with a pole piece 76, preferably semicircular, which is secured to the end wall 21 and extends over the magnet coil as shown in Figs. 1 and 2. The latch or detent 75 is mounted on the holder so as to extend through suitable openings in the holder and pole piece and into engagement with the abutment 47 on the igniting unit, when the latter is in closed-circuit position, to maintain the circuit closed and is provided with an armature 77 extending into operative relation with the pole piece so as to be held thereby when the magnet coil is energized.

As shown in Figs. 1 and 2, the latch is mounted on the holder by a resilient element 78 to which the armature 77 carrying the latch or detent 75 is pivoted at 79. A leaf spring 80, secured to the resilient element 78 as by rivets, extends into engagement with and bears against the armature and normally urges the latch or detent 75 to an operative position, in which position the detent extends through openings in the pole piece and holding device and into the path of movement of the igniting unit when the latter is moved into closed-circuit position.

The face of the detent first encountered by the igniting unit, in so moving, is provided with a taper or cam surface 81 which will engage the face of the insulating cap 44 so that continued movement of the igniting unit will cam or move

the detent outwardly, the resilient member yielding to permit the detent to so move, and permit the igniting unit to move into closed-circuit position at which time the abutment on the insulating member will have passed the detent and it will snap into the recess **46** on the insulating cap.

The circuit being completed through the magnet coil and heating element when the igniting unit is in this position, the magnet coil will be energized and will hold the armature **77** in engagement with the pole piece so that the latch will be held in operative position to resist the outward movement of the igniting unit under the urge of the spring, tending to move it to normal open-circuit position.

The latch will hold the igniting unit in closed-circuit position until the heating element has been brought up to the desired heat, at which time the bimetallic switch will move to open-circuit position shown in dot-and-dash lines in Fig. 2 and open the energizing circuit to the magnet coil and heating element. Upon the circuit being broken to the magnet coil, the armature A will be released, and the spring, urging the igniting unit into open-circuit position, will cause the detent to move about its pivot to the dot-and-dash position shown in Fig. 2 and out of engagement with the igniting unit.

The switch, as shown in Figs. 1 and 2, extends beyond the holder and will readily cool so that by the time another light is desired the switch will have cooled off and have returned to its normally closed-circuit position so that the circuit can be completed through the heating element when the igniting unit is moved into closed-circuit position.

In the form of the invention shown in Figs. 3 to 5, the holder, igniting unit and latch mechanism are the same as in the form of the invention previously described. However, the circuit for controlling the operation of the device is altered.

In this form of the invention, a base contact **131** of bimetallic material, having a plurality of resilient contact fingers **131***a*, is mounted on the end wall **21** of the holder and insulated therefrom by suitable insulation. The contact is clamped in place by a bolt **132** which extends through the wall and insulated therefrom and has a nut **134** threaded thereon for drawing the head **133** of the bolt against the face of the contact, as shown in Fig. 4. The contact **131** is connected to a source of energy through a connector lug **135** mounted on the bolt and connected to a conductor **136** which leads to one terminal of a source of energy. The connector lug is locked to the bolt by a nut **137**.

The magnet coil for operating the latch in this form of the invention surrounds the holder and has one terminal connected to a bolt **138** insulatedly mounted to project from the holder adjacent the base thereof and locked in place by a nut **138***a*. The bolt carries a contact finger **139** which is electrically connected to the terminal and extends into the holder to a position to engage the conducting cap **40** of the igniting unit when the igniting unit is moved to deep circuit-closing position. The other terminal of the magnet coil is electrically connected to a tongue **140** lanced from the holder, and is thus grounded.

The circuit between the base contact and the magnet coil is normally open. Upon the igniting unit being moved to closed-circuit position, the contact cup **42** on the igniting unit will engage the fingers **131***a* of the bimetallic base contact **131** and the conducting cap will engage the contact finger **139** and complete the circuit from the source of energy through the base contact, heating element, to the conducting cap, through the contact, to the bolt, through the coil to ground.

The latch will cooperate with the igniting unit as previously described. As soon as the igniting unit is in position to complete the circuit, the magnet coil will be energized and will act on the armature **77** to hold the latch in operative position to prevent the igniting unit from moving into open-circuit position.

When the heating coil has been brought to the desired heat, the bimetallic contact fingers will have become heated and flex so as to move away from the contact cup and will open the energizing circuit. The magnet coil, being deenergized, will release the magnetic-operated detent which will move about its pivot, as shown in dot-and-dash lines in Fig. 4, as the igniting unit is moved to the shallow normal open-circuit position under the urge of the spring.

In the form of the invention shown in Figs. 6 through 8, the holding device and detent mechanism is the same, as previously described in the form of the invention shown in Figs. 1 and 2, with the exception that the terminal **66** of the magnet coil is connected directly to the bolt **32** carrying the base contact **31** and is locked thereto by a nut **82**.

In this form of the invention, the circuit is designed to abnormally energize the heating element upon the circuit being closed so that a heavy current will flow and it will be quickly brought to the desired heat.

When the heating element is quickly brought to heat, it is desirable that the circuit be broken as quickly as possible. This is accomplished by providing the igniting unit with a quick-acting switch **150** for controlling the circuit to the magnet coil and a heating element. The igniting unit, in this form of the invention, comprises a metallic sleeve **151** having a handle **152** threaded thereon at one end and the other end provided with a reduced neck portion **151***a* to which is secured an insulating cap **153**. A heating element **154** is disposed within a contact cup **155** and is mounted on the insulating cap and secured thereto by a central stud **156** which is insulated from the contact cup but electrically connected to one end of the heating element. The heat-responsive switch includes a movable element **157** which is connected to the central stud and carries a contact **158** which engages a contact **159** connected to the sleeve **151**. The igniting unit is held in normal open-circuit position by a friction sleeve and spring as previously described, the metallic sleeve being connected to the holder through the friction sleeve **49** by the inturned flange **51** which slidably engages the outer surface thereof.

Preferably, the movable element of the switch **150**, carried by the igniting unit, is made of bimetallic material and is provided with a section **160** which is buckled out of the plane of the member as shown in Fig. 7 so that it is normally held in closed-circuit position. The switch is so designed that it will be heated at the same rate as the heating element so that when the heating element reaches its predetermined heat, the switch will have become heated to the point wherein the buckled portion shifts to the other side of the element **157**, and snaps it into an open-circuit position, as shown in dotted lines in Fig. 7.

When the igniting unit is moved to closed-

circuit position, the circuit will be completed from the conductor through the magnet coil to the base contact and from the base contact to the contact cup, through the heating element, to the central stud, through the switch arm, through the contacts to the metallic sleeve, and to ground through the friction sleeve.

The magnet coil, being energized, will cause the latch, which engages an abutment 161 on the igniting unit, to hold the igniting unit in closed-circuit position. Upon the heating element attaining its desired heat, the quick-acting switch will move to open-circuit position and will open the circuit to the magnet coil which will release the detent and permit the igniting unit to move into an open-circuit position.

From the foregoing, it will be seen that in each instance the igniting unit is held in closed-circuit position by a latch, which is rendered operative upon the closing of a circuit through the heating element, until the heating element has attained its desired heat, at which time a heat-responsive switch opens a circuit to a magnet coil which controls the operation of the detent and permits the igniting unit to move from closed-circuit position to its normal shallow open-circuit position.

In this position, the circuit cannot be made to reenergize the heating element until the igniting unit had been again manually operated into closed-circuit position.

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 having a magnet coil surrounding the body thereof; a detent carried by the holding device and having an armature cooperating with the magnet; an igniting unit having a heating element thereon movably mounted on the holding device and completely removable therefrom for use; means for closing an energizing circuit to the heating element upon movement of the igniting unit into closed-circuit position, said detent engaging the igniting unit and holding the same in said closed-circuit position; and a heat-responsive switch for opening the circuit to the magnet upon the heating element attaining a desired usable heat whereby the detent releases the igniting unit from closed-circuit position.

2. In a cigar lighter, a holding device having a magnet coil surrounding the body thereof; a detent yieldably and pivotally mounted on the holding device and having an armature cooperating with the magnet; an igniting unit having a heating element thereon movably mounted on the holding device and completely removable therefrom for use; means for closing an energizing circuit to the heating element and magnet coil upon movement of the igniting unit into closed-circuit position, said detent engaging the igniting unit and holding the same in said closed-circuit position; and a heat-responsive switch for opening the circuit to the magnet coil upon the heating element attaining its desired usable heat whereby the detent releases the igniting unit.

3. In a cigar lighter, a holding device having a magnet coil surrounding the body thereof; a detent yieldably and pivotally mounted on the holding device and having an armature cooperating with the magnet; an igniting unit having a heating element and an abutment thereon movably mounted on the holding device and completely removable therefrom for use; means for closing an energizing circuit to the heating element and magnet coil upon movement of the igniting unit into closed-circuit position, said detent engaging the igniting unit and holding the same in said closed-circuit position; and a heat-responsive switch for opening the circuit to the magnet coil upon the heating element attaining a desired usable heat whereby the detent releases the igniting unit from closed-circuit position, said detent being provided with a cam face whereby it is moved outwardly against the yieldable mounting means when the igniting unit is moved to closed-circuit position until it can move into engagement with the abutment thereon.

4. In a cigar lighter, a holding device having a magnet coil surrounding the body thereof; a contact in the base of the holding device, the coil and contact being electrically connected; an igniting unit having a heating element thereon movably mounted in the holding device and completely removable therefrom for use; means for closing an energizing circuit to the heating element and magnet coil through the contact on the base upon movement of the igniting unit into closed-circuit position; a detent operable by the magnet coil for holding the igniting unit in closed-circuit position; and heat-responsive switch means disposed outside of the holder and in heat-receiving relation with the heating element for opening the circuit to the magnet coil to thereby release the detent upon the heating element attaining its desired usable heat.

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