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C. H. JORGENSEN

2,778,915

CIGAR LIGHTER

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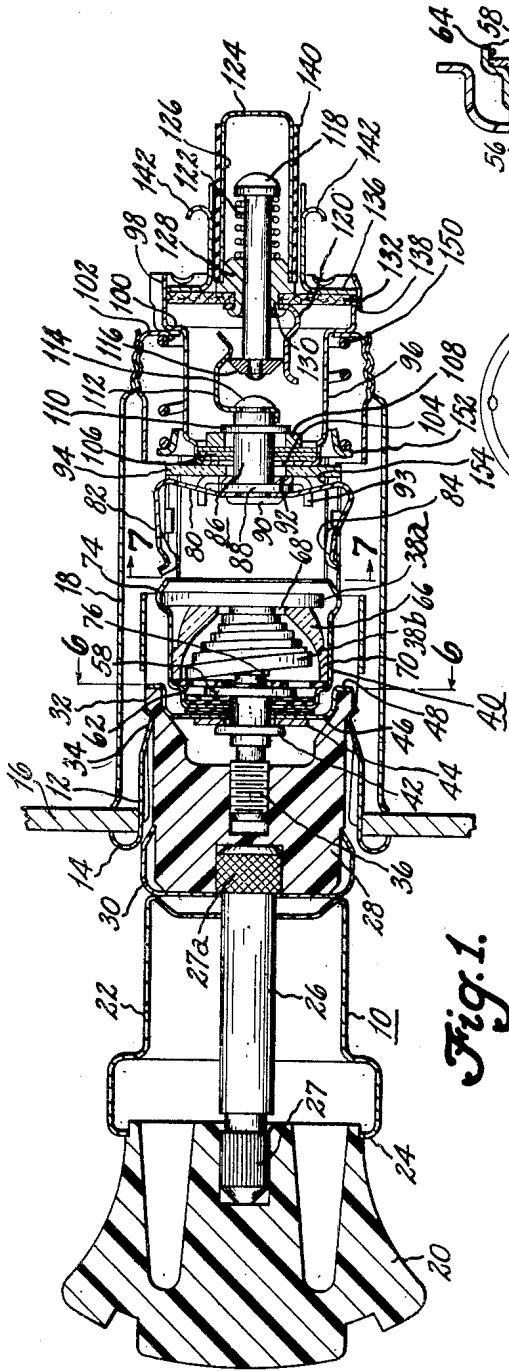


Fig. 1.

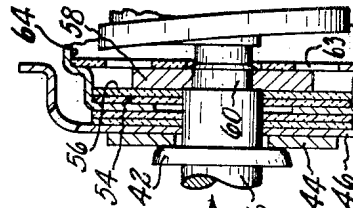


Fig. 4.

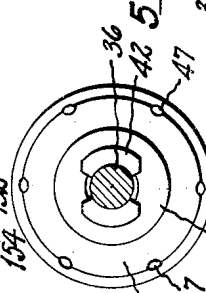


Fig. 5.

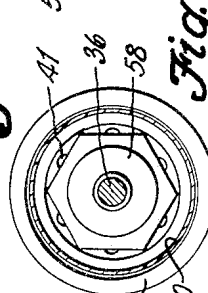


Fig. 6.

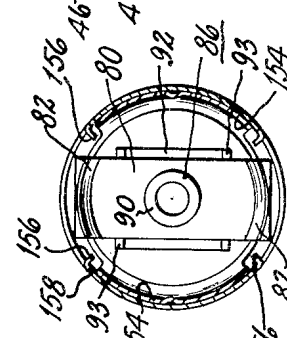


Fig. 7.

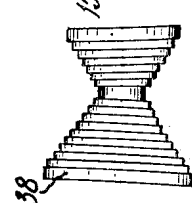


Fig. 2.

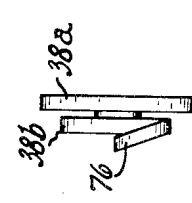


Fig. 3.

INVENTOR.
CLARENCE H. JORGENSEN
BY *Craig & Master*
ATTORNEY

2,778,915

CIGAR LIGHTER

Clarence H. Jorgensen, East Rochester, N. Y., assignor to General Motors Corporation, Detroit, Mich., a corporation of Delaware

Application August 21, 1953, Serial No. 375,599

15 Claims. (Cl. 219—32)

This invention relates to a cigar or cigarette lighter of the type generally used on automotive vehicles and, more particularly, to the construction of the igniting element of such lighter and parts immediately associated therewith.

One object of the present invention is to provide a cigar lighter having an igniting coil of improved design which will remain at a high enough temperature to ignite cigars and cigarettes for a longer period of time after the heating circuit has been opened than has been possible heretofore.

A further object of the invention is the provision of means which is effective to produce dissipation of heat from the igniting coil to as great an extent as possible after the circuit between such coil and the source of electrical energy is opened, and at the same time to prevent the coil from becoming hot enough either to be damaged itself or to damage the parts immediately associated therewith.

A still further object of the invention is to prevent short-circuiting of adjacent coils of the igniting element even though such adjacent coils are accidentally brought into contact with each other.

It is a still further object of the invention to provide a lighter of the character described having an igniter unit which can be safely used with a current source of higher voltage than the six-volt current source formerly used on most automotive vehicles, as, for example, the 12-volt current source, with which some automotive vehicles are currently equipped.

With these objects in view, one feature of the invention comprises an igniting coil of such length and cross-sectional area that the coil is of sufficient mass to remain at high enough temperature to be operative for a considerable time after the heating circuit is broken, but is insufficient to prolong materially the time required for heating the coil.

A further feature of the invention resides in the provision of a coil only part of which is actually used as an igniting element and a considerable part of which is in the form of a spiral cone which is positioned in a chamber formed inside a cup of ceramic material which almost completely surrounds this portion of the igniting element and reduces the dissipation of heat therefrom to a minimum. The form of the coil itself constitutes a still further feature of the invention as there must be a substantially definite relationship between the part of the coil which is within the ceramic cup and that part of the coil which is outside the cup and is the igniting element. If too great a proportion of the coil is within the cup, it is likely to become hot enough to be damaged itself and to do damage to elements associated immediately therewith when the other part of the coil without the protective cup is heated sufficiently to operate successfully. In other words, it is desirable to have as much of the coil within the cup as feasible in order to prolong the cooling off period but there are practical limits and no more than

a certain part of the coil can be positioned in the cup with safety.

Another feature of the invention is the oxidation of the surface of the igniting element so that if adjacent coils of the element ever come in direct contact with each other, there will be no short circuit.

The particular formation of the igniting coil itself and the method of forming a coil of this particular design constitute still additional features of the invention. The coil is so designed that the spiral cone portion, above referred to, one of which is connected to a pin to form a ground connection, exerts a force on the center of the other or operative portion of the coil to hold such other portion of the coil in such a position that the surface with which the cigar or cigarette to be lighted comes in contact is substantially flat or slightly concave.

According to the present invention, the igniting element which is a continuous strip, is first wound in much the same shape as an hour-glass with two reversely arranged spiral cones joined by a narrow neck, as in Fig. 2 of the drawings. The winding is then compressed to the form shown in Fig. 3, while current is passed through it. This effects a permanent distortion so that the coil remains set in this position after the pressing operation. When assembled in the lighter, the smaller coil is pulled out axially to hold the larger coil against the end of the ceramic cup to form the flat igniting surface above referred to.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings wherein a preferred form of the invention is clearly shown.

In the drawings:

Figure 1 is a section through the lighter, showing the igniter unit in its normal position in the supporting sleeve, with certain parts shown in elevation;

Figure 2 is a side elevation of the igniting coil as it is first formed;

Figure 3 is an elevation of the same coil after shaping for assembly in the lighter;

Figure 4 is an enlarged detail view of the stud 36 and the parts assembled thereon;

Figure 5 is an elevation of the stud 36 and parts secured thereto as seen from the left in Fig. 4;

Figure 6 is a section on line 6—6 of Figure 1; and

Figure 7 is a section on line 7—7 of Figure 1.

Most of the lighter as illustrated in the drawings is of substantially conventional construction and will be only briefly described. The lighter includes a removable igniter plug or unit designated generally by the reference number 10, which is supported, when not in use, in a sleeve 12 having an outwardly projecting flange 14 which engages one side of a supporting plate 16 which may be the instrument panel of an automotive vehicle. The particular construction of this sleeve forms no part of the present invention and is of substantially conventional form. At its right end, as shown in the drawings, the sleeve 12 has threaded engagement with an outer sleeve 18, the left end of which engages the opposite side of the supporting plate 16 so as to hold sleeve 12 in fixed position on plate 16.

The igniter plug or unit includes a knob or handle 20 of some suitable molded plastic which is positioned in the open end of the metal cup 22 and a shoulder on the knob engages an inwardly projecting flange 24 of the cup. A pin 26 which may have a knurled surface 27 and be molded in the knob, or provided with threads and screws thereon, if desired, extends through the cup 22 and may be provided with another knurled surface 27a and molded in a substantially cylindrical block 28 of suitable plastic material or have threaded engagement therewith. The left end of this block 28 is surrounded

by a cup-like washer 30 of suitable metal, for example copper or the like, which may be chrome-plated or otherwise finished, as desired. At the right end of the element 28 is a flange 32 which is normally engaged by latch fingers 34 projecting inwardly from sleeve 12 to hold the igniter unit in its normal inoperative position and prevent it being jarred or accidentally knocked out of its supporting sleeve.

A stud 36 is screwed into the block 28 and this stud supports the igniting coil 38, a cup-shaped element 40 which constitutes a movable contact and various associated parts. The igniter plug or unit includes the knob 20, cup 22, block 28, igniting coil 38, contact member 40 and associated parts which are secured together to form a unitary structure which can be bodily removed from the supporting sleeve 12 by the user.

The stud 36 has an outwardly projecting flange 42 and surrounding the stud immediately to the right of the flange is a metal washer 44, preferably steel, which engages the flange when the parts are assembled. Immediately to the right of washer 44 and having an opening therein of a size substantially the same as the diameter of the stud is a metal washer 46, having a flange 48 which engages the end of block 28 and is of such size that the periphery thereof engages sleeve 12 when the parts are assembled. This element has a series of holes 47 therein for a purpose later set forth. Immediately to the right of the lock washer are two insulating washers 50 and 52 of mica or other suitable material, which separate the washer 46 from the closed end of the cup-shaped element 40. On the opposite or right side of the element 40 are two insulating washers 54 and 56, which separate such element from a metal flange 58, which projects from stud 36 and the various elements supported on the stud are clamped between the two flanges 42 and 58. To the right of flange 58 the stud is of reduced size as at 60 and as pointed out later, one end of the heating element is attached to this part of the stud. The flange is integral with the stud but could be a separate washer mounted on the reduced end 60 and held in place by riveting. The element 40 has a central opening through which the stud passes, of such size that such element does not contact the stud. There are also a series of holes 41 in the closed end of element 40 (Fig. 6), and these with the holes 47 in the washer 46, as best shown in Figs. 4 and 5, respectively, permit the passage of air therethrough, for a purpose more fully explained later. While a series of relatively small openings 41 and 47 may be employed in the cup 40 and the washer 46, a single opening might be used if of the proper size, although such single opening would perhaps not be quite as efficient as a series of smaller openings.

Surrounding the reduced end 60 at the right of flange 58 is an insulating plate 62 of substantially the same diameter as the inside of element 40 so that it engages a shoulder 64 formed thereon. This plate also has a series of holes 63 for passage of air and the surface thereof adjacent its periphery is engaged by the left end of a ceramic cup 66, inside of which is a chamber in which is positioned a part of the igniting element 38 and the ceramic cup has a reduced opening 68 at its right end through which the igniting element extends. A part of the cup is cylindrical in form as indicated at 70 and fits within the element 40. The latter element is enlarged adjacent its right end as indicated at 74 and in this enlargement is positioned in that part of the igniting element 38 with which the end of a cigar or cigarette to be lighted is adapted to contact when the lighter is in use.

That part of the igniting coil 38 which is positioned outside of cup 66 is designated 38a and when the device is assembled, is in the form of a spiral coil in which the several coils lie in substantially the same plane and the surface at the right end thereof is substantially flat or slightly concave. The coil is formed of a flat ribbon of suitable conducting material and one end is secured to the inner surface of element 40 by brazing or soldering,

or in any other suitable way. That part of element 38 which is positioned within the cup 66 is a continuation of the same ribbon and is designated 38b. The part 38b is also a spiral coil but is generally conical in shape, and is spaced from the inner wall of the ceramic cup 66 throughout its length while at the left end thereof it is connected in any suitable manner, as by molding, to the right end of the extension 69 of stud 36. This end of the coil is indicated by the number 76.

The opening 68 is very little larger than the middle and smallest part of the coil which is received therein so that the chamber around the part 38a of the coil has a very restricted outlet and is almost a closed chamber. The provision of this form of chamber around a large part of the igniting coil retards cooling off of that part of the coil which lies within such chamber to a very great extent and causes the operative part 38a of the igniting coil to remain hot enough to light a cigar or cigarette much longer than is possible in a lighter of conventional construction. Not only does the chamber act as a heat insulator, but the igniting coil is of much greater length and mass than that normally used in conventional lighters. Both the positioning of a part of the coil in a heat insulated chamber and the increase in length and mass of the coil aid in retarding the cooling of the coil after the heating circuit is opened.

When the voltage of the heating circuit is increased, as for example to 12 volts, the desired heating of the coil can be accomplished when the length of the coil is increased to a required extent, or if the cross-sectional area of the ribbon from which the coil is formed could be reduced sufficiently, heating of the coil to the desired temperature could be effected without increasing the length. However, there are certain practical limits which must be taken into consideration. For example, it is not possible to reduce the cross-sectional area of the ribbon beyond a certain point because, if too small, it would burn out. Therefore, what is disclosed is a compromise in which, although the area of the ribbon used on the igniting coil is somewhat reduced in size, by comparison to that used in conventional lighters for use with the usual 6-volt ignition system, the coil employed could not be reduced sufficiently to permit the desired heating effect to be obtained with a coil of the same length as the usual 6-volt coil. Accordingly, although the cross-sectional area is somewhat smaller, the coil employed has to be of considerably greater length than the conventional coil used with a 6-volt current source. Also, although the cross-sectional area of the ribbon used in the igniting coil has been somewhat reduced and the mass per unit of length is reduced, the length of the coil is so much greater than the conventional 6-volt coil that the total mass of the coil is considerably greater. As already indicated, this increase in mass would retard the cooling of the coil, even if part of the coil was not positioned in a partially closed and insulated chamber.

The coil is formed in the specific manner disclosed partly for the purpose of positioning a portion of the coil in the manner disclosed and partly for the reason that, due to the length of the coil, it would have been impractical to wind the coil in the form of a flat spiral as the diameter of the spiral would be so great that the size of the lighter using such a coil would be impractical. By use of a coil of the form shown, the cooling of the coil after the heating circuit is opened can be retarded to the desired extent and a coil of the required length can be employed without increasing the size of the lighter.

As already stated, the element 40 constitutes a movable contact. A fixed contact is provided with which the movable contact engages when the heater circuit is closed. This fixed contact is in the form of a contact plate 80 of bimetallic construction having contact fingers 82 which extend to the left toward the element 40 and are adapted to be engaged by said element 40 when the igniter unit is manually moved to the right by the user. Some or all of the fingers 82 are bent inwardly, as at 84, and form

latch members which engage the enlargement 74 of element 40 to hold the igniter unit in circuit closing position until the igniting coil is heated to the desired extent. When this takes place, the fingers 82 move outwardly, by reason of the bi-metallic construction automatically releasing the igniter unit which will be moved back to the position shown in Fig. 1, by means which will be later described.

The plate 80 is supported on a stud 86 adjacent a flange 88 projecting therefrom and the end of the stud is riveted over the plate as indicated at 90 to hold the plate in place. The flange engages a washer 92 which has four tangs 93 extending to the left in opposite ends of plate 80, for a purpose explained later. The washer 92 is engaged by an insulating washer 94 which contacts the closed end of a metal cap 96 that has an enlarged portion 98 and a shoulder 100, the latter engaging and being secured in any suitable way, as by welding, to a flange 102 which projects inwardly from the sleeve 12. The closed end of element 96 has an opening 104 therein which surrounds stud 86 and larger than the stud so that it does not contact therewith, and an insulating washer 106 separates the element 96 from a metal washer 108 which is engaged by a flange 110 projecting from the stud 86. A bimetallic contact 112 is secured to the end of the stud 86 by a screw 114 or other suitable means. The contact 112 is engaged by a contact 116 carried by a pin 118 and adapted to engage a contact 120 to which current from a source of electrical energy is conducted by any suitable means. With the parts in the position shown in the drawings, current can flow from the source to contact 120 through contact 116 to contact 112 and through stud 86 to fixed contact plate 80, then to contact fingers 82. If the igniting plug is then moved so that element 40 engages fingers 82, current will pass to such element, then through the coil 38 to stud 36 and through washer 46 to sleeve 12 and to ground.

The contact 116 and pin 118, which is normally urged to the right by spring 122 in Fig. 1, forms part of a circuit breaker which is adapted to open the circuit automatically in case of overload. In the latter event, the bimetallic contact 112 will release contact 116 when a predetermined temperature is reached and the pin 118 will be moved to the right by the spring 122. This will open the circuit, which cannot be reclosed until the pin 118 is restored to its previous position. This can be effected manually.

Current from a suitable source such as the vehicle battery is supplied to contact 120 by a conductor cable which is not shown, but is in electrical contact with the closed end 124 of a metal tube 126 which is normally held in engagement with a metal plug 128 that has a reduced portion 130 extending through a washer 132 of suitable insulating material and also through an opening in a part of the contact 120. This washer fits relatively tightly in the enlarged part 98 of cup 96 and immediately to the right of the washer is a retaining plate, 136, the washer and the retaining plate being held in position against a shoulder 138 and held against rotation in any suitable way. The tube 126 is surrounded by an insulating tube 140 which is secured to the tube 126 and fits within a tubular neck extending from the retaining plate 136 and having latch fingers 142 projecting therefrom. The end of the conductor which engages the tube 126, and is not shown, extends into a cylindrical housing (not shown) which has a bayonet slot connection with the fingers 142 and holds the conductor in contacting relation with the tube 126. When the parts are in assembled position, current from the conductor referred to to the tube 126, then to contacts 120, 116 and 112.

When the circuit breaker operates and it is necessary to restore contact 116 to the position shown in the drawings, it is only necessary to remove the outer tube which engages fingers 142 and take out tube 126, which is readily removable, and push the pin 118 back to the position shown.

The conductor and the outer cylindrical tube are not shown herein because the specific construction is not material to the present invention and is the same as that shown in the copending application of Jorgensen and Dermond, Serial No. 123,642, filed October 26, 1949, now Patent 2,704,318.

While two or more contact fingers 82 can be used in the device disclosed, there are only two and the plate 80 from which the fingers extend lies between two tangs 93 on one side of such plate and two similar tangs 93 on the opposite side thereof. The purpose of these tangs is to effect closing of the heating circuit in the event that it is desired to reheat the igniting coil 38 after a heating of the coil and before the contact fingers 82 have cooled off sufficiently to reengage the movable contact element 40. The diametric distance between the tangs 93 is the same as the diameter of the open end of contact 40, so that if the igniter unit is moved far enough to the right, such tangs will be engaged by the end of contact 40 so that current will flow through the tangs 93 to the contact 40 when the unit is in such position. There is no means to hold the unit in this position, so that it has to be held in such position manually until heated to the desired degree.

As already stated, the coil 38 is much longer than that used in conventional lighters for use with a 6-volt circuit and in order to get the desired proportion of the length of such coil wound in the flat part 38b thereof, this part of the coil is wound tighter than in earlier conventional lighters, in fact, the coil is wound so tight that adjacent turns will be in contact. In order that the coil can be wound in this way without short-circuiting, which would result in burning out the coil, the coil is heated sufficiently to form an oxide on the surface thereof in form of an oxide film of sufficient thickness to prevent the passage of current between adjacent turns of the coil. To form this oxide the ribbon of the coil is heated either before or after the coil is formed by the passage of a current of high voltage therethrough to raise the temperature to approximately 1900° F. for a time sufficient to form an oxide film of the required thickness. If heated after the coil is formed, the heating to the degree required cannot be continuous because the coil would be burned out, and the passage of current must be for exceedingly brief intervals which are repeated until the oxide film is thick enough to meet requirements.

As previously stated, the washer 46 and the closed end of cup 40 are provided with holes 47 and 41, respectively, for the passage of air therethrough. This passage of air is desirable to prevent over-heating of the coil and contacts in the event that the igniting unit is held in circuit-closing position too long and also to facilitate cooling of the contact fingers so that the latter will reach a position to reengage the contact 40 as soon as possible, so as to permit reheating without holding the igniting unit in circuit-closing position manually.

Whenever the igniting unit is moved to normal circuit closing position or to the reheat position, above described, a return spring 150 is compressed. This spring is positioned between the flange 102 and an annular flange 152 formed at the right end of a slidable member formed of two arcuate plates 154 which are positioned on opposite sides of the fixed contact plate 80 and extend to the left a considerable distance beyond the end of the contact fingers 82. This slidable member is prevented from rotation by tangs 156 which project inwardly from the edges 158 of openings in the sleeve 12, and such member is engaged by the washer 46 as the igniter unit is moved to the right so that the annular flange 152 is also moved to the right to compress the return spring. This spring expands when the igniter unit is released to return such unit to the position shown in the drawings.

As already stated, the washer 46 and the contact element 40 have holes 47 and 41 therein for the passage of air therethrough and the washer 62 also has holes 63

therein to permit air to pass therethrough, while air may pass through the wall of sleeve 12 and through the openings at edges 158. These various openings permit a circulation of air through the lighter, which tends to prevent over-heating and possible burning of the contacts if the igniting unit is held too long in circuit-closing position. Also, this passage of air tends to prevent the washer 46 from getting hot enough to burn the plastic block 23 and over-heating of the igniting coil, particularly that part of the coil which is positioned in the ceramic cup 66 in the event that the heating circuit is closed longer than it should be.

The surfaces of the several contact elements may be coated with a thin coating of silver, particularly adjacent the points of contact, such coating being preferably .0005" to .001" in thickness. Other metals, such as nickel, can be used but silver gives much the best results due to its very high heat conductivity.

As previously indicated, there is a definite relationship between the parts 33a and 33b of the coil in one respect, that is, there is a maximum limit with reference to the part 33b. This part of the coil cannot be more than a certain proportion of the total length without danger of damage from over-heating. Of course, the part 33b may be less than such maximum percentage of the total length without running into the difficulty referred to, but it is desirable to have the part 33b as long as is practical because it is desirable to retard the cooling of the igniting as much as possible after opening of the heating circuit. Therefore, as constructed, the part 33b is as long as it can be made with safety and it has been found that this is approximately one-third of the total length.

It should be noted that the ceramic cup 66 is formed of two separate halves so that such halves can be assembled within the cup 40 after the heating coil is positioned therein as it would be difficult, if not impossible to assemble the device if the element 66 was made in one piece.

While the embodiment of the present invention as herein disclosed constitutes a preferred form, it is to be understood that other forms might be adopted.

What is claimed is as follows:

1. In an electric cigar lighter, a supporting member, an igniting unit insertable in said supporting member to be supported thereby and completely removable therefrom for use, a heating element at the insertable end of said igniting unit, said igniting unit being movable in said supporting member to a position to effect completion of a circuit through said heating element, said heating element comprising a spiral coil having a substantially flat portion forming an igniting element and a substantially conical portion through both of which current is adapted to pass when the igniter element is moved to a position to bring the heating element in circuit with the current source, the apex of said conical portion of the coil being positioned adjacent the flat portion thereof.

2. In an electric cigar lighter, a supporting member, an igniting unit insertable in said supporting member to be supported thereby and completely removable therefrom for use, a heating element at the insertable end of said igniting unit, said igniting unit being movable in said supporting member to a position to effect completion of a circuit through said heating element, said heating element comprising a substantially flat spiral coil forming an igniting element and a substantially conical coil through both of which current is adapted to pass when the igniter element is moved to a position to bring the heating element in circuit with the current source, and a heat insulating housing surrounding the conical coil to retard cooling of the coil after the heating circuit for such coil is opened.

3. In an electric cigar lighter, a supporting member, an igniting unit insertable in said supporting member to be supported thereby and completely removable therefrom for use, a heating element at the insertable end

of said igniting unit, said igniting unit being movable in said supporting member to a position to effect completion of a circuit through said heating element, said heating element comprising a substantially flat spiral coil adapted to be engaged by the cigar or cigarette to be lighted and a substantially conical coil integral therewith and a heat insulating housing forming an approximately closed chamber in which said conical part of the heating coil is positioned and having an opening through which that part of the heating element connecting the two coils extends.

4. In an electric cigar lighter, a supporting member, an igniting unit insertable in said supporting member to be supported thereby and completely removable therefrom for use, a heating element at the insertable end of said igniting unit, said igniting unit being movable in said supporting member to a position to effect completion of a circuit through said heating element, said heating element comprising a substantially flat spiral coil adapted to be engaged by the cigar or cigarette to be lighted and a substantially conical coil integral therewith and a heat insulating housing surrounding the conical part of the coil and forming an approximately closed chamber in which said conical part of the heating coil is positioned, said conical part of the coil being of less length than the flat portion of the coil.

5. In an electric cigar lighter, a supporting member, an igniting unit insertable in said supporting member to be supported thereby and completely removable therefrom for use, a heating element at the insertable end of said igniting unit, said igniting unit being movable in said supporting member to a position to effect completion of a circuit through said heating element, said heating element comprising a substantially flat spiral coil adapted to be engaged by the cigar or cigarette to be lighted and a substantially conical coil integral therewith and a heat insulating housing surrounding the conical part of the coil and forming an approximately closed chamber in which said conical part of the heating coil is positioned, said conical part of the coil being of approximately half the length of the flat portion of the coil.

6. In an electric cigar lighter, a supporting member, an igniting unit insertable in said supporting member to be supported thereby and completely removable therefrom for use, a heating element at the insertable end of said igniting unit, said igniting unit being movable in said supporting member to a position to effect completion of a circuit through said heating element, said heating element comprising a substantially flat spiral coil adapted to be engaged by the cigar or cigarette to be lighted and having adjacent spirals thereof so close together that they may contact with each other and a substantially conical coil integral therewith, said spiral coil and being formed of a metallic alloy having suitable resistance to the passage of current therethrough and having an oxidized surface, whereby passage of current between adjacent spirals of said coil is prevented in case there is contact between said adjacent spirals.

7. In an electric cigar lighter, a supporting member, an igniting unit insertable in said supporting member to be supported thereby and completely removable therefrom for use, a heating element at the insertable end of said igniting unit, said igniting unit being movable in said supporting member to a position to effect completion of a circuit through said heating element, said igniting element having a cup secured at one end thereof and forming a movable contact movable into engagement with a fixed contact in circuit with a suitable current source, a heating element positioned within the cup, said element comprising a flat spiral coil positioned adjacent the open end of said cup and a substantially conical coil integral therewith and extending therefrom into the cup toward the closed end thereof.

8. In an electric cigar lighter, a supporting member, an igniting unit insertable in said supporting member to

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be supported thereby and completely removable therefrom for use, a heating element at the insertable end of said igniting unit, said igniting unit being movable in said supporting member to a position to effect completion of a circuit through said heating element, said igniting element having a cup secured at one end thereof and forming a movable contact movable into engagement with a fixed contact in circuit with a suitable current source, a heating element positioned within the cup, said element comprising a flat spiral coil positioned adjacent the open end of said cup and a substantially conical coil integral therewith and extending therefrom into the cup toward the closed end thereof, and a heat insulating housing positioned within the cup and surrounding the conical portion of the heating coil to retard the dissipation of heat therefrom.

9. In an electric cigar lighter, a supporting member, an igniting unit insertable in said supporting member to be supported thereby and completely removable therefrom for use, a heating element at the insertable end of said igniting unit, said igniting unit being movable in said supporting member to a position to effect completion of a circuit through said heating element, said igniting element having a cup secured at one end thereof and forming a movable contact movable into engagement with a fixed contact in circuit with a suitable current source, a heating element positioned within the cup, said element comprising a flat spiral coil positioned adjacent the open end of said cup and a substantially conical coil extending from the flat coil into said cup toward the closed end thereof, said conical coil being integral with the flat coil and so formed that the apex thereof is adjacent said flat coil, and a heat insulating housing surrounding said conical coil and forming a substantially closed chamber in which said conical coil is positioned.

10. In an electric cigar lighter, a supporting member, an igniting unit insertable in said supporting member to be supported thereby and completely removable therefrom for use, a heating element at the insertable end of said igniting unit, said igniting unit being movable in said supporting member to a position to effect completion of a circuit through said heating element, said igniting element having a cup secured at one end thereof and forming a movable contact movable into engagement with a fixed contact in circuit with a suitable current source, a heating element positioned within the cup, said element comprising a flat spiral coil positioned adjacent the open end of said cup and a substantially conical coil extending from the flat coil into said cup toward the closed end thereof, said conical coil being integral with the flat coil and so formed that the apex thereof is adjacent said flat coil, and a heat insulating wall of ceramic material surrounding the conical coil and having a small opening surrounding the apex of said coil, whereby the conical coil is positioned in a nearly closed chamber.

11. In an electric cigar lighter, a supporting member, an igniting unit insertable in said supporting member to be supported thereby and completely removable therefrom for use, a heating element at the insertable end of said igniting unit, said igniting unit being movable in said supporting member to a position to effect completion of a circuit through said heating element, said igniting element having a cup secured at one end thereof and forming a movable contact movable into engagement with a fixed contact in circuit with a suitable current source, a heating element positioned within the cup, said element comprising a flat spiral coil positioned adjacent the open end of said cup and a substantially conical coil extending from the flat coil into said cup toward the closed end thereof, said conical coil being integral with the flat coil and so formed that the apex thereof is adjacent said flat coil, a heat insulating wall of ceramic material surrounding the conical coil and having a small opening surrounding the apex of said coil, whereby the conical coil is positioned in a nearly closed chamber and

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the closed end of said cup having an opening therein, said opening and the opening surrounding the apex of the conical coil forming means permitting a limited flow of air through the chamber in which the conical coil is positioned.

12. In an electric cigar lighter, a supporting member, an igniting unit insertable in said supporting member to be supported thereby and completely removable therefrom for use, a heating element at the insertable end of said igniting unit, said igniting unit being movable in said supporting member to a position to effect completion of a circuit through said heating element, said igniting element having a cup secured at one end thereof and forming a movable contact movable into engagement with a fixed contact in circuit with a suitable current source, a heating element positioned within the cup, said element comprising a flat spiral coil positioned adjacent the open end of said cup and a substantially conical coil extending from the flat coil into said cup toward the closed end thereof, said conical coil being integral with the flat coil and so formed that the apex thereof is adjacent said flat coil, a heat insulating wall of ceramic material surrounding the conical coil and having a small opening surrounding the apex of said coil, whereby the conical coil is positioned in a nearly closed chamber, an insulating washer positioned between the closed end of said cup and said heat insulating wall and provided with one or more openings therein to permit the passage of air therethrough, and the closed end of said cup also having one or more openings therein, the opening around the apex of the conical coil and the two last mentioned openings constituting means for permitting a limited flow of air through the chamber in which the conical coil is positioned.

13. In an electric cigar lighter, a supporting member, an igniting unit insertable in said supporting member to be supported thereby and completely removable therefrom for use, a heating element at the insertable end of said igniting unit, said igniting unit being movable in said supporting member to a position to effect completion of a circuit through said heating element, a block of insulating material forming a part of the igniting unit and supporting a metal stud to which the heating element is connected, said block of insulating material having a recess therein defined by a flange, and a metal washer supported on the stud in electrical connection therewith and engaging the flange of said block of insulating material to form an air chamber between said washer and the walls of said recess, said washer having one or more openings therein to permit circulation of air through said chamber and prevent the washer becoming hot enough to damage said block of insulating material.

14. In an electric cigar lighter, a supporting member, an igniting unit insertable in said supporting member to be supported thereby and completely removable therefrom for use, a heating element at the insertable end of said igniting unit, said igniting unit being movable in said supporting member to a position to effect completion of a circuit through said heating element, a block of insulating material forming a part of the igniting unit and supporting a metal stud to which the heating element is connected, a metal cup insulatingly supported on said stud in which the heating element is positioned, said heating element comprising a spiral coil having its end connected to the cup and a substantially conical coil integral therewith and having its end secured to said stud, said conical coil being under tension when so connected, so as to exert at the center of the spiral coil a force in an axial direction with respect to the stud to maintain the spiral coil in substantially flat form.

15. In an electric cigar lighter, a supporting member, an igniting unit insertable in said supporting member to be supported thereby and completely removable therefrom for use, a heating element at the insertable end of said igniting unit, said igniting unit being movable in said

supporting member to a position to effect completion of a circuit through said heating element, a block of insulating material forming a part of the igniting unit and supporting a metal stud to which the heating element is connected, a metal cup insulatively supported on said stud in which the heating element is positioned, said heating element comprising a spiral coil having its end connected to the cup and a substantially conical coil integral therewith and having its end secured to said stud, said conical coil being under tension when so connected, so as to exert at the center of the spiral coil a force in an axial direction with respect to the stud, and a member of non-conducting material within the cup against which the spiral coil is held by the force exerted

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by the conical coil, so that the spiral coil is substantially flat in form.

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