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P. E. ASHTON ET AL

2,895,036

CIGAR LIGHTER

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FIG. 1.

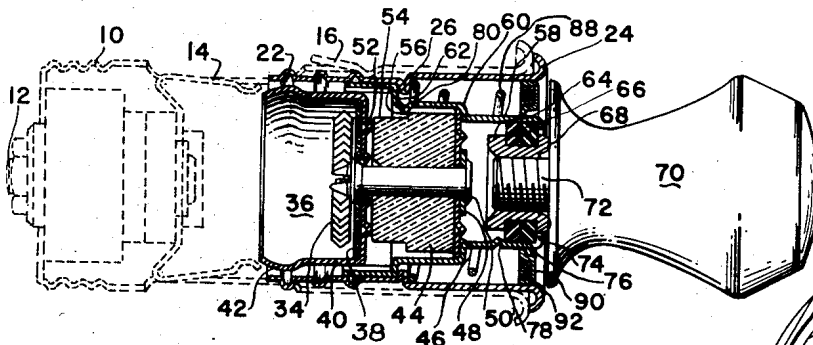


FIG. 5.

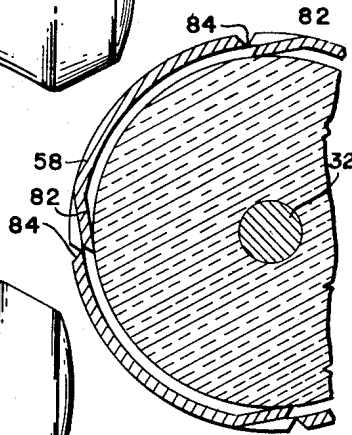


FIG. 2.

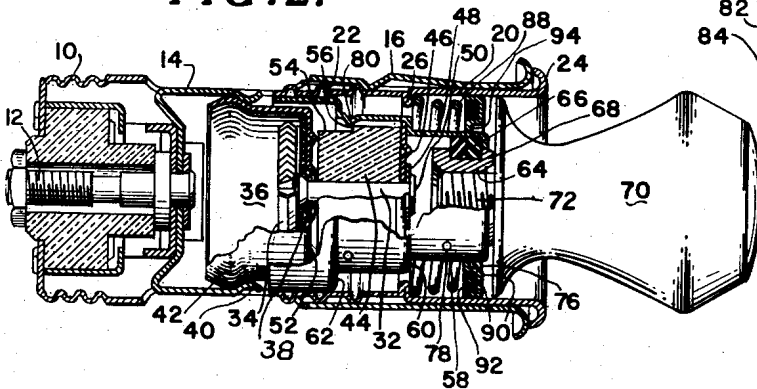


FIG. 3.

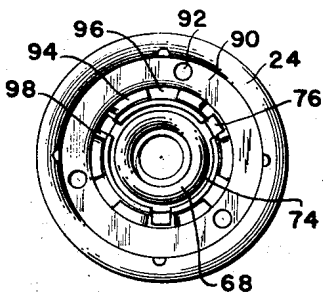
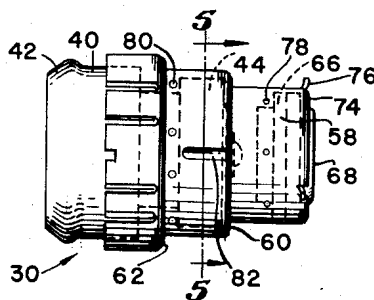


FIG. 4.



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2,895,036

CIGAR LIGHTER

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6 Claims. (Cl. 219--32)

This invention relates to electric cigar lighters, and in particular to removable plugs therefor.

A principal object of the invention is to provide a novel and improved cigar lighter plug in which the heating element is effectively guarded and protected for safety in use.

Another object of the invention is to provide a cigar lighter plug designed to materially reduce heat transmission to the plug shell.

A further object is to provide a cigar lighter plug of improved construction and configuration, adapted to simplify and facilitate manufacture and assembly. Related objects are to reduce dimensional tolerance requirements of some parts, and to eliminate screw thread connections. Further objects will be in part evident, and in part pointed out hereinafter.

The invention and the novel features thereof may best be made clear from the following description and the accompanying drawing, in which:

Figure 1 is a sectional elevational view of a preferred embodiment of the invention, representing a lighter plug positioned in normal carrying position in a socket illustrated by broken lines;

Figure 2 is a sectional elevational view corresponding to Figure 1, showing the socket structure in greater detail and illustrating the plug in circuit closing position;

Figure 3 is a rear elevational view of the lighter plug of the previous figures, with the knob removed;

Figure 4 is a side elevational view of the plunger assembly of the lighter plug, and

Figure 5 is a sectional view taken on the line 5--5 of Figure 4, on enlarged scale.

Referring to the drawings in detail, Figures 1 and 2 illustrate an electric cigar lighter of the conventional cordless type, including a socket 10 which may be mounted in the dashboard of an automobile or elsewhere. In the base of socket 10 and insulated therefrom is mounted a terminal stud 12, which carries the bimetallic latch contacts 14. Contacts 14 constitute the live terminals of the socket, being connected in the usual manner through stud 12 to the ungrounded side of the electrical system of an automobile, for example. The socket 10 is grounded, and includes one or more spring fingers 16 biased inwardly and adapted to engage the plug shell and maintain it against inadvertent displacement, and to ground the plug shell.

The lighter plug includes a generally cylindrical shell 20 adapted to fit closely within the socket. The inner end of the shell is formed into a plurality of annular beads 22 adapted for retaining engagement by the socket spring finger 16, and the outer end of the shell is provided with a reversely turned flange 24 to impart a finished appearance, and to engage the similarly turned outer end of the socket and thereby limit the extent of insertion of the shell. Between its ends, the shell 20 is inwardly deformed to define a flange 26, for purposes presently apparent, and may be provided with one or more spring fingers (not shown) of the type illustrated in Kroll et al.

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U.S. Patent 2,648,758, to frictionally hold the plug in the socket.

Inside shell 20 is provided a plunger assembly 30, best illustrated in Figure 4, the plunger assembly being mounted for limited movement relative to the shell in axial direction. Referring to Figures 1 and 2, the plunger assembly comprises an axial stud 32 and a spiral resistance heating element 34 mounted on the inner end thereof, the inner end of the heating element being electrically connected to the stud. While for the purposes of the present invention the heating element 34 may be of any common type, a 12-volt element is illustrated and preferred. Close behind the heating element stud 32 carries a metal guard cup 36, the guard cup being insulated from the stud by a washer 38, of mica or equivalent material. The guard cup includes a skirt 40 of substantial depth as shown, the depth of the guard cup being several times as great as the width of the heating element whereby its skirt extends inwardly beyond the heating element a substantial distance, and the inner end of the guard cup skirt is generally beaded at 42 to facilitate engagement thereof by the socket latch contacts 14. The outer end of the heating element is electrically connected to the guard cup skirt.

Outwardly of the guard cup, stud 32 carries an insulating block or carrier 44, which may be unglazed porcelain, the carrier being retained on the stud by means of a multi-pronged metal contact 46, backed by a supporting washer 48 retained in place by upset head 50 on the outer end of the stud, or in similar fashion. The guard cup base is provided with a plurality of outwardly extending dimples 52, which serve to properly space the carrier therefrom and reduce heat transmission to the carrier. The generally cylindrical carrier is provided at its inner end with a reduced section 54, which defines a carrier shoulder 56.

The heating unit assembly described above is partially enclosed by a metal carrier sleeve 58 of stepped configuration, comprising shoulders 60 and 62. The outer small diameter portion of sleeve 58 encloses a knob carrier sub-assembly including an interiorly threaded bushing 64 and insulating washers 66 positioned thereabout, the washers being retained in place by the rolled over end 68 of the bushing. The bushing is adapted to engage a lighter plug knob 70 by means of its threaded stud 72, in conventional manner.

The outer end of sleeve 58 is inwardly turned to form a flange 74, and from this flange a plurality of lugs 76 are struck outwardly, see Figures 3 and 4. In assembling the plug plunger, the knob carrier sub-assembly is positioned inside the small diameter end of sleeve 58, against its flange 74, and then secured in place by forming a plurality of inwardly projecting dimples or stakes 78 in the sleeve wall. The stakes 78 are spaced evenly about the periphery of the sleeve, and located a suitable distance from the outer end thereof to engage the inner side of the inner washer 66 and hold the outer washer 66 firmly against the sleeve flange 74. Staking of the sub-assembly is highly advantageous, particularly in that it is suited for efficient automatic machine operation.

After placement of the knob carrier sub-assembly, the heating unit assembly may be positioned in sleeve 58, against the shoulder 60 thereof, and similarly secured in place by forming a plurality of evenly spaced inwardly projecting stakes 80 in the central portion of the sleeve body. The stakes 80 are located to overhang the reduced section 54 of carrier 44, and bear against the shoulder 56 thereof. As in the case of the knob carrier sub-assembly, staking of the heating unit assembly is an efficient, high speed operation, which insures proper positioning and retention of the heating unit assembly in the sleeve.

Ceramic elements of the nature of carrier 44 cannot

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readily be manufactured to close tolerances, and to assure proper fit and centering of the heating unit assembly in sleeve 58, the carrier 44 is made undersize, and the central portion of the sleeve is provided with a plurality of evenly spaced, longitudinally extending, inwardly displaced lips 82. The lips 82 are illustrated in detail in Figure 5, and are formed by scoring and splitting the sleeve as at 84, and deflecting them inwardly. The lips serve as deformable contact members, and adapt the sleeve to the undersized carrier 44, serving to center the carrier and grip it firmly. A force fit is thereby achieved without recourse to close tolerances, and the construction has the additional advantage of greatly reducing the contact area between carrier and sleeve, and accordingly reducing heat transmission therebetween. The large diameter portion of sleeve 58 may be cut away as illustrated in Figure 4, and is of adequate internal diameter to clear the guard cup 36. When mounted in the shell 20, sleeve 58 is in electrical contact therewith, and accordingly grounded.

To mount the plunger assembly in the shell, the assembly is inserted into the shell from the left hand end as illustrated in Figures 1 and 2, until the sleeve shoulder 62 encounters the internal shell flange 26. Thereafter, a suitable spring 88 is placed in the shell on the opposite side of flange 26, and an annular spring retainer 90, lined with an insulating layer 92, is positioned over the outer end of the spring and engaged to the sleeve lugs 76. To facilitate this assembly, the spring retainer may be formed into an inner offset flange 94, provided with cutouts 96 and depressed seats 98 (see Figure 3). The cutouts 96 correspond in number and spacing to the sleeve lugs 76, so that by aligning the cutouts with the lugs the spring retainer and insulator may be passed thereover. The retainer may then be rotated to position its seats 98 below lugs 72 and released, the seats 98 thereafter serving to prevent inadvertent relative angular displacement therebetween. As a final operation, the knob 70 may be screwed into the bushing 64.

The spring 88 constantly urges the plunger assembly outwardly with respect to the shell, the relative outward movement being limited by the shell flange 26 in cooperation with sleeve shoulder 62 of the plunger assembly. Inward relative movement of the plunger assembly is also limited by the shell flange 26, acting through spring 88 and the spring retainer 90.

Operation and function of the cigar lighter is conventional. Figure 1 illustrates the normal carrying position of the lighter plug in the socket, the socket spring finger 16 serving to retain the plug against inadvertent displacement. To use the lighter, the plunger assembly is moved inwardly by means of knob 70 to engage the guard cup end bead 42 in the thermostatic latch contacts 14. The plunger may then be released, and is held in inward circuit closing position by the latch contacts, as illustrated in Figure 2. Contact between the latch elements and the guard cup completes a circuit through the heating element to the grounded shell, and the resultant passage of current through the heating element raises its temperature until the heat causes outward movement of the bimetallic latch contacts, whereupon spring 88 returns the so released plunger to the position of Figure 1. This movement is accompanied by an audible click, which serves notice that the plug is hot and ready for use. The plug may then be removed from its socket and used to ignite cigarettes or cigars.

An inherent danger in the use of common cigar lighters is the falling of hot ashes or similar particles, which may damage stockings, other clothing or upholstery. The guard cup of the present invention is effective to prevent this possibility, and catches and retains glowing particles which may fall from the heating element, or from a cigarette being ignited thereby. The guard cup is further advantageous in that it prevents any inadvertent touching of the heating element by the user. The guard cup being rigidly mounted with respect to the heating element, it re-

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mains always in protective position. The guard cup cannot be displaced from protective position, even if the plug is dropped to the floor thereon, and the plug may be picked up from the floor with relative safety.

It will thus be seen that there has been provided by this invention a structure in which the various objects hereinbefore set forth, together with many practical advantages, are successfully achieved. As various possible embodiments may be made of the mechanical features of the above invention, all without departing from the scope thereof, it is to be understood that all matter hereinbefore set forth or shown in the accompanying drawing is to be interpreted as illustrative, and not in a limiting sense.

We claim:

1. An electric cigar lighter plug including a shell and a plunger assembly mounted in said shell for axial movement relative thereto, said assembly comprising a heating element, a metal guard cup fixedly mounted with respect to said heating element, the skirt of said guard cup enclosing said heating element and being extended therebeyond a substantial distance, one end of said heating element being electrically connected to said guard cup, the outer edge of said guard cup being annularly beaded at a point axially offset with respect to said heating element, spring means operative on said assembly and said shell to urge said assembly relatively outwardly, and means extending radially inwardly from said shell limiting the relative outward movement of said assembly.

2. An electric cigar lighter plug including a shell and a plunger assembly mounted in said shell for axial movement relative thereto, said assembly including an axially extending stud, a heating element mounted on the inner end of said stud, a metal guard cup mounted on said stud adjacent said heating element, a mica washer interposed between said heating element and said guard cup, an insulating carrier enclosing the outer end of said stud, the base of said guard cup being outwardly dimpled to space said carrier therefrom, and a metal sleeve enclosing said carrier, said carrier being fitted and centered in said sleeve by means of a plurality of angularly spaced lips deflected inwardly from said sleeve.

3. An electric cigar lighter plug including a shell and a plunger assembly mounted in said shell for axial movement relative thereto, said assembly comprising an axially extending stud, a heating element mounted on the inner end of said stud, one end of said heating element being electrically connected to said stud, a metal guard cup mounted on said stud adjacent said heating element, said guard cup being insulated from said stud and electrically connected to the other end of said heating element, a ceramic carrier enclosing the outer end of said stud, a metal sleeve enclosing said carrier, said carrier being fitted and centered in said sleeve by means of a plurality of angularly spaced lips deflected inwardly from said sleeve, spring means operative on said sleeve and said shell to urge said assembly relatively outwardly, and means extending radially inwardly from said shell limiting the relative outward movement of said assembly.

4. An electric cigar lighter plug including a shell and a plunger assembly mounted in said shell for axial movement relative thereto, said assembly comprising an axially extending stud, a heating element mounted on the inner end of said stud, a guard cup mounted on said stud adjacent said heating element, an insulating carrier enclosing the outer end of said stud, the inner end of said carrier being of reduced diameter to define a shoulder, and a metal sleeve enclosing said carrier, the outer end of said sleeve being of reduced diameter to define a sleeve shoulder, said carrier being fitted and centered in the large diameter portion of said sleeve by means of a plurality of spaced lips deflected inwardly from said sleeve, and said carrier being retained in said sleeve against said sleeve shoulder by means of a plurality of stakes projecting inwardly from said sleeve adjacent said carrier shoulder.

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5. An electric cigar lighter plug as defined in claim 4, including means for mounting a knob secured in the reduced diameter outer end of said sleeve.	1,756,013
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6. An electric cigar lighter plug as defined in claim 4, wherein the outer end of said sleeve is inwardly flanged, and including knob mounting means retained in the reduced diameter outer end of said sleeve against said sleeve flange by means of a plurality of stakes projecting inwardly from said sleeve adjacent the inner edge of said knob mounting means.	2,326,333
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