

March 5, 1957

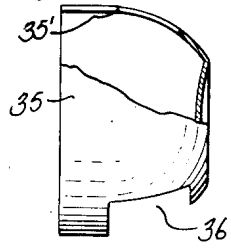
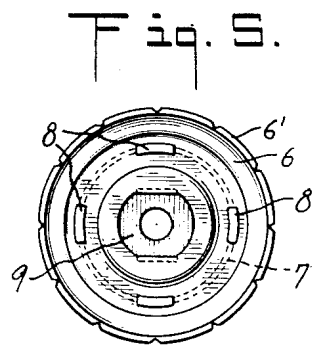
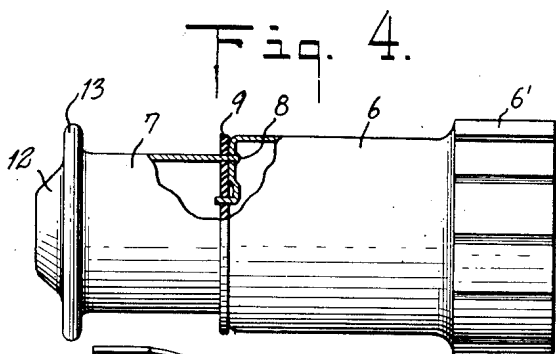
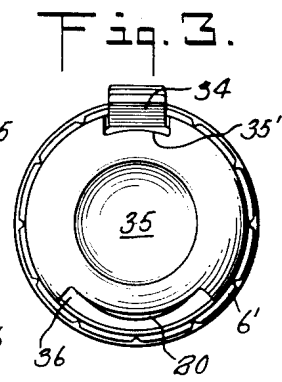
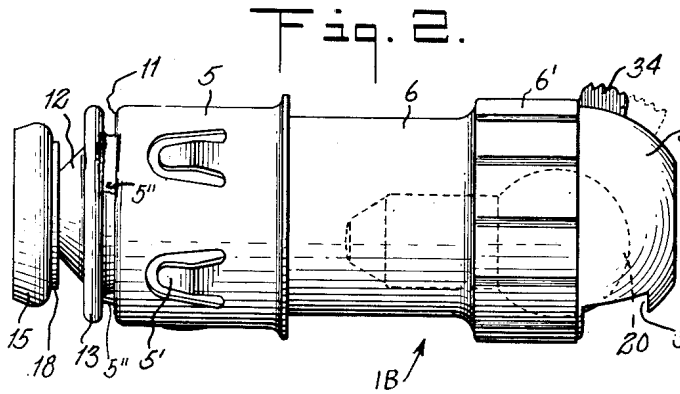
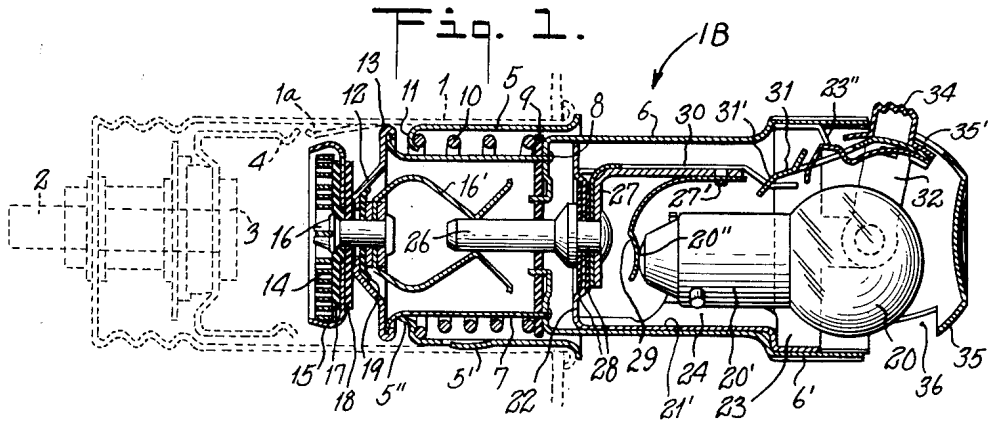
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2,784,290

ELECTRIC CIGAR LIGHTER

Filed Aug. 16, 1951

3 Sheets-Sheet 1



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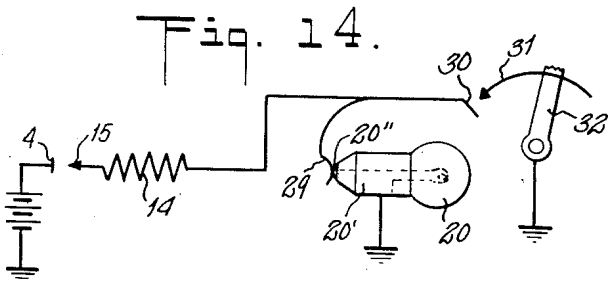
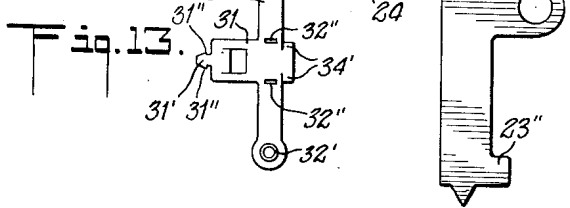
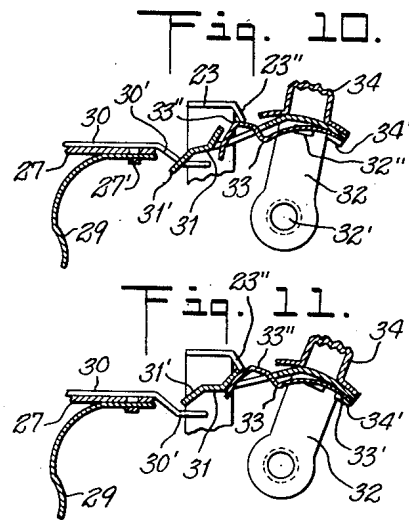
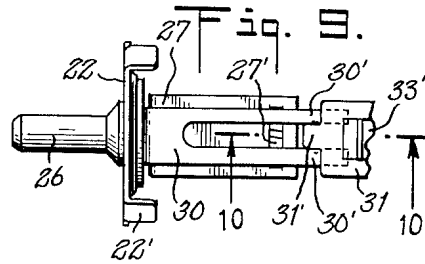
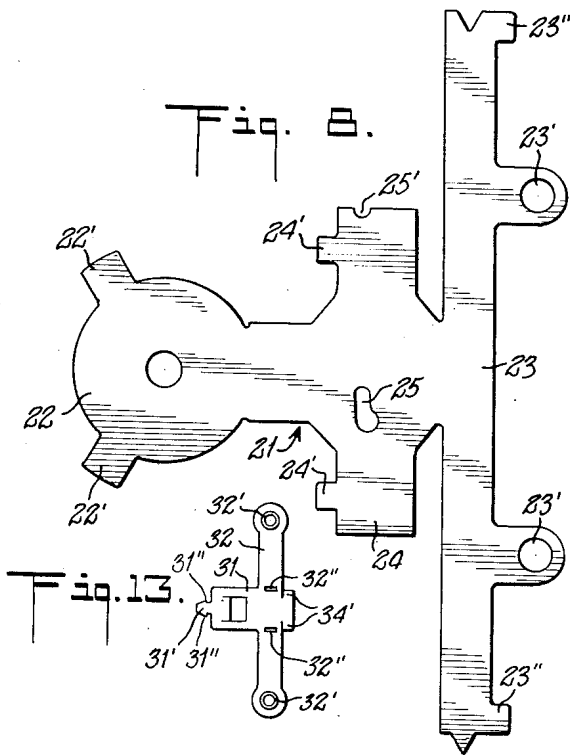
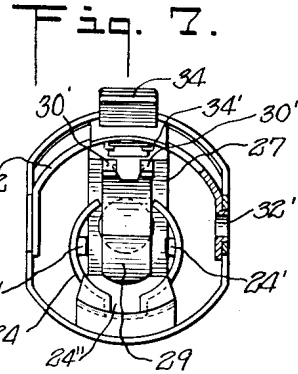
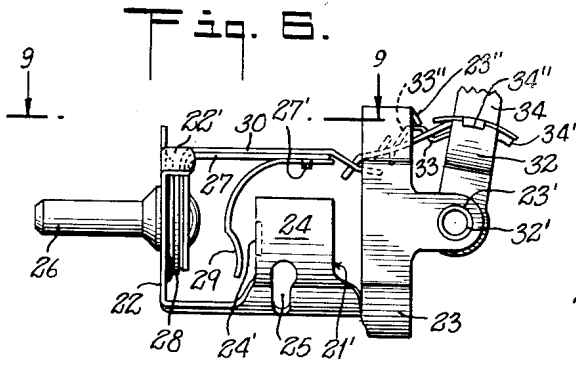
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ELECTRIC CIGAR LIGHTER

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ELECTRIC CIGAR LIGHTER

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Fig. 12.

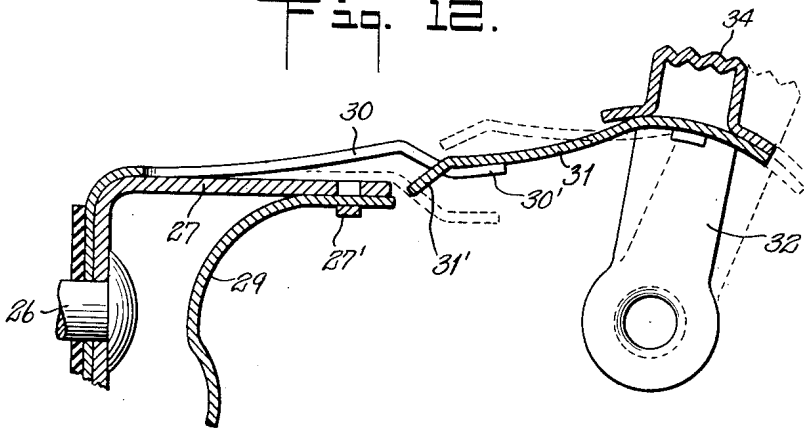


Fig. 15.

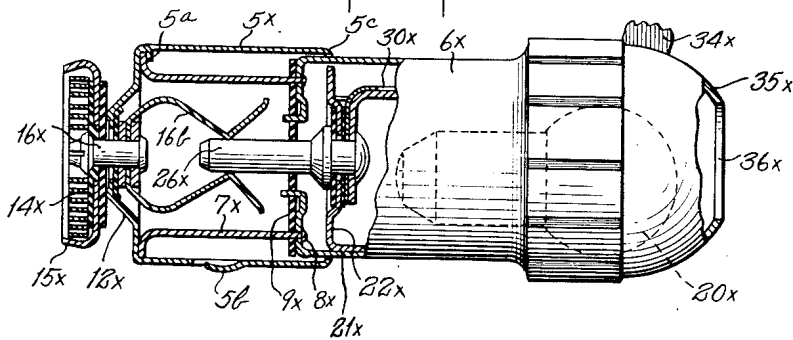


Fig. 17.

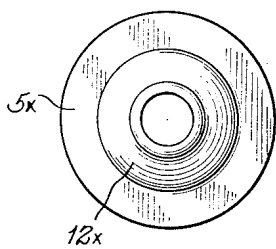


Fig. 18.

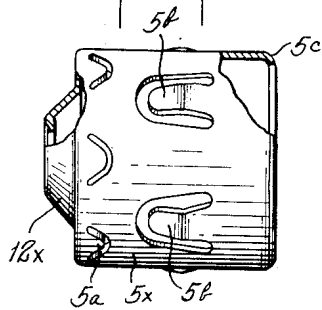
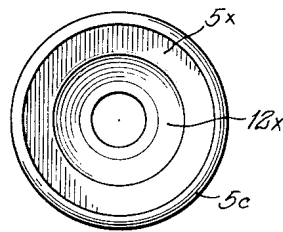


Fig. 18.



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2,784,290

## ELECTRIC CIGAR LIGHTER

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Application August 16, 1951, Serial No. 242,133

7 Claims. (Cl. 219—32)

My invention relates particularly to portable devices intended for use, especially in automotive vehicles, for lighting cigars, cigarettes and pipes and also for illuminating maps or the like.

One object is to provide a satisfactory plug which eliminates molded insulation.

Another object is to provide a combination igniter and illuminating plug which can be used as an igniter plug even if the lamp bulb fails.

Another object is to provide a plug-in device with a switch actuating member which is visible and thus serves as an indicator.

Another object is to provide a construction which can utilize parts common with other plugs.

A further object is to provide a construction which is interchangeable in sockets for conventional, non-illuminating plugs of current commercial design.

Yet another object is to furnish a combined igniter and illuminating plug having a very simple quick break switch which can safely handle relatively heavy currents.

Still another object is the provision of a novel switch in which the point of mutual contact engagement of the circuit controlling members is remote from the point of disengagement and which members are arranged to separate at high speed when circuit breaking, without the assistance of toggle mechanisms or other spring loaded devices.

A source of early failure in devices of this type is that if electrical contact members for the making and breaking of a circuit for the lamp are located near the igniter element they deteriorate rapidly from oxidation and other effects of heat. They also get clogged with tobacco ashes.

I accordingly provide a plug having two hollow, preferably tubular metal parts, one part having an igniter element at its outer end and the other part having a lamp bulb and switch. Contacts are provided so that when the plug is inserted in a socket in closed circuit position, the igniter coil and lamp filament are connected in series. One of the parts however has separate manually operable switching mechanism remote from the igniter element for shunting the lamp bulb circuit when it is desired to use the igniter.

The drawings illustrate a device of the plug-in type adapted for use in conventional sockets such as are found in many motor cars and is intended to provide not only for ignition but for illumination. A socket of the type mentioned is shown and described in Patent 2,495,657 to Kroll et al.

Fig. 1 is a longitudinal sectional view showing the improved device and in dotted lines a conventional socket.

Fig. 2 is a side view of the device of Fig. 1.

Fig. 3 is an end view of the same.

Fig. 4 is a side view and partial section of the moving plug body.

Fig. 5 is an end view of the parts shown in Fig. 4.

Fig. 5a is a side view of the cap of the plug-in device of Figs. 2 and 3, parts being broken away.

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Fig. 6 is a side view of the frame which carries the lamp bulb and the switch parts.

Fig. 7 is an end view of the parts of Fig. 6, parts being shown in section.

Fig. 8 is a view of the blank from which the frame work of Figs. 6 and 7 is formed.

Fig. 9 is a plan view of parts of Fig. 6 taken on the plane of the line 9—9 of Fig. 6, the switch parts being shown in the closed circuit position.

Fig. 10 is an enlarged fragmentary sectional view taken on the plane of the line 10—10 of Fig. 9, with parts of the switch in the closed circuit position.

Fig. 11 is a view similar to Fig. 10 but showing the switch in open circuit position.

Fig. 12 is a fragmentary view of the contact element of the switch in the position just before opening the circuit.

Fig. 13 is a plan view of the blank from which the movable switch member is formed.

Fig. 14 is a circuit diagram.

Fig. 15 is a side view and partial section of a plug embodying a modified form of my invention.

Fig. 16 is a side view and partial section showing one of the parts of the plug of Fig. 15.

Figs. 17 and 18 are end views of the plug shown in Fig. 16.

The so-called cordless lighter in common use has a stationary socket 1 and a portable member in the form of a plug 1B such as shown and described in my Patent 2,531,901 and which is adapted to be mounted in the socket such as shown in Fig. 1. Such a socket is grounded in a circuit and provided with a terminal 2 to which are connected stationary contact members 3 and 4.

In the form shown in Figs. 1 and 2, the plug device has a slidable friction ring 5 adapted to be inserted into the mouth of the socket where the device is normally frictionally held by spring fingers 5'. The plug has two hollow members 6 and 7 which are secured together by riveting over lugs 8 which project from member 7. Member 6 serves as the handle of the plug 1B.

An insulating washer 9 is mounted on the lugs 8 and extends radially outwards at the end of the hollow member 6 to constitute an abutment for one end of the spring 10. The other end of the spring presses against the inner or flanged end 11 of the ring 5. A disc or cup 12 has an edge or rim 13 which serves to contact spring fingers 1a of the socket when the plug body is pushed in for the purpose of closing the circuit. The lugs 5' on the flange 11 abut against the flared portion of member 7 when the plug is inactive in its shallow position in the socket.

The igniter coil 14 is mounted in and has its outer end attached to cup 15 which serves to engage the contacts 3 or 4 when the plug is moved into deep position in the socket for the purpose of closing the circuit. The inner end of the coil 14 is secured at the center to the stud 16. The washers 17 and 18 insulate the cup 15 from the stud 16. The washer 19 insulates the end disc 12 from the stud 16. The disc 12 constitutes a transverse wall of plug 1B.

The present invention provides a lamp bulb for illuminating maps and the like in a car, and switching mechanism for shunting or short circuiting the lamp bulb when it is desired to use the igniter.

The lamp bulb 20 has terminals 20' and 20'' of the usual character. The lamp bulb and its switch are carried by a frame which is inserted into the hollow member 6. This frame is formed of a single blank 21, Fig. 8, of metal including a disc 22 at one end having lugs 22', 22'' which position the frame in the hollow member 6. The other end of the frame has a split band portion 23 which fits into the mouth 6' of the hollow

member 6. The frame includes a socket 21' for the lamp bulb formed by bending the wings 24 of the blank so as to constitute a cylindrical socket which is provided with an opening 25 and a notch 25' to accommodate the usual lamp bulb projections, and with inwardly extending lugs 24' forming stops to prevent too deep insertion of the bulb. This arrangement of the bulb carrying means forms a socket of the bayonet catch type and opening 25 serves as a J-shaped slot to engage one of the conventional bulb retaining pins, clearance for the other pin being afforded by notch 25'. It will be noted that the gap 24'' between the edges of wings 24, Figure 7, and also the channel formed where they merge into the frame 21 constitute clearances to permit passage of the bulb's pins.

The frame 21 supports in insulated relationship a projecting pin 26 adapted to connect with the igniter coil as shown in Fig. 1 where the pin engages spring jaws 16' connected to the stud 16 at the center of the igniter coil. An L-shaped metal support 27 and switch member 30 are riveted on one end of the pin 26 and the disc 22 is insulated from the pin 26 by washers 28. A spring contact finger 29 is secured at one end to the support 27 by a loop 27' on one end of the support 27. The other end of the spring finger resiliently contacts the center contact 20'' of the lamp bulb when the bulb is in the socket 21'.

The switch member 30 has two fingers 30' extending beyond the support 27 to serve as a resilient stationary contact of the switch. A movable switch contact 31 is carried by a saddle-like movable switch member 32 having tubular pivots 32' which fit in the opposed bearings 23' in the frame portion 23. This contact 31 has a projecting tongue 31' adapted to interlock with the fingers 30' of the stationary spring contact. A spring 33 has one end fastened at 33' by lugs on ears 34' to the swinging switch member 32 and has a boss 33'' projecting through a slot in the member 31 to interlock with a lug 23'' on the frame member 23 for resiliently holding the contact 31 in moved position.

The movable switch member 32 is provided with an operating finger piece 34 which has lugs 34'' interlocked in the slots 32'' in the side arms of the swinging switch member.

During the closing of the switch, the resilient fingers 30' are laterally deflected as the wide portion 31'', Figure 13, of projection 31' passes between them. They then spring back so as to grip the necked part joining 31' to 31, transverse bending of the fingers being prevented by the support 27 toward which they are pre-biased.

During opening of the switch, the movement of arm 32 carries projection 31' through an arcuate path in a clockwise direction (when viewed in Figs. 10 and 11), while the tips of fingers 30' move through an arcuate path in a counter-clockwise direction almost as though they were transversely hinged at their left hand ends. This movement of fingers 30' is counter to their bias toward support 27 and is occasioned by their grip on the neck of projection 31'. The concurrent movements of parts 31' and 30' continue through divergent arcs with the neck part sliding slightly along the edges of fingers 30' until the tips of the latter come into contact with the underside of the movable contact 31. Prior to this, the tips of parts 30' had been moving faster than the point of engagement between parts 30' and 31' due to their being at a greater distance from the center of the arc of their movement, while the underside of contact 31 moved slower than part 31' due to its being nearer to the center of the arc of their movement. After contact is so made, the tips can only travel at the same speed as the point of contact 31 on which they bear. This results in a difference in the relative speeds of the mutually engaging portions of parts 30' and the neck of part 31', the former now being constrained to move slower than the latter. This en-

forced relative movement causes the fingers 30', 30' to deform laterally and, releasing their grip on the neck of part 31', they rapidly return under the urge of their spring bias, to their normal position in contact with support 27. As parts 30' and 31' follow divergent paths there is of necessity a relative sliding movement which cleans the cooperating contact surfaces each time the switch is opened by movement from the position shown in Fig. 10 to that shown in Fig. 11, and as appreciable pressure is developed between the tips of fingers 30' and the points of their engagement with the underside of contact 31 this, in addition to the more obvious spring contact pressure between the neck of part 31' and the fingers 30', results in the maintenance of effective contact pressure up to the very instant of separation of the mutually contacting switch surfaces. The position of the parts just before the break is shown in Fig. 12.

This construction affords a very reliable, simple and inexpensive switch and I have found in practice that a switch having bronze fingers 30',  $\frac{1}{16}$ " wide, .015" thick and  $\frac{2}{32}$ " long and a hard brass projection 31' will handle and break an inductive direct current circuit of 6-8 volts and a load in excess of 30 amperes without overheating or any appreciable arcing.

A cap 35 fits removably in the mouth of the hollow member 6 and has a slot 35' to allow for the movement of the switch finger piece 34 and has an opening 36 through which light is thrown for the purpose of reading a map or the like. The "on" and "off" positions of the finger piece 34 indicate the condition of the switch parts. The cap 35 may be removed in case it is necessary to replace a bulb.

Figures 1 and 10 show the movable switch contact 31 in closed circuit position, and Fig. 11 shows the switch parts in open circuit position.

In Fig. 1, the switch is shown in the closed circuit position and the plug itself is shown in the open circuit position in the socket. If it is desired to use the plug as a cigar lighter, the plug is moved inwardly in the socket until it contacts 3 or 4. This closes a circuit through the igniter coil 14 and switch as follows: from the cup 15, to coil 14, stud 16, jaws 16', pin 26, stationary switch member 30, movable contact 31, switch member 32 and frame portion 23 to ground.

If it is desired to use the device as means for illuminating a map or the like, the plug is moved inward of the socket as above described and the switch is opened so that the current will flow as follows: cup 15, coil 14, stud 16, jaws 16', pin 26, support 27, spring finger 29, lamp terminal 20'', lamp filament, lamp terminal 20', lamp socket 21' to ground. Since the resistance of the lamp bulb is much greater than the resistance of the coil 14, the lamp bulb will be illuminated and the coil 14 will not be heated.

It will therefore be noted that in order to use the plug as a device for a cigar or cigarette lighter, the switch must be closed so that the lamp is shunted and the current passing through the igniter coil 14 will heat it sufficiently for igniting purposes.

To use the plug as a device for illuminating maps or the like, the switch must be in the open circuit position so that the current will pass through the lamp bulb. When the parts are in this position, the igniter coil is not heated.

The finger piece 34 serves to indicate the position of the switch. For instance, the switch in Fig. 1 is in closed circuit position and the finger piece so indicates. Fig. 2 shows in dotted lines the position of the finger piece when the switch is in the open circuit position.

In the form shown in Fig. 1, the contacts 4 of the socket are of bimetal and serve as latches to hold the plug in the active position, and the contacts 3 serve to facilitate a relight.

The same general construction and arrangement may be provided in a plug of the non-automatic release type,

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or for use in the types of socket where the spring loading the latch is located in the bottom of the socket. Fig. 15 shows such a plug having a hollow body 5x for sliding in the socket (not shown). This may have spring fingers 5b for frictional sliding contact with the wall of the socket. The igniter coil 14x is mounted on the stud 16x within the cup 15x. The end 12x of the body 5x supports the igniter, which is insulated from it, at one end. A flanged metallic tubular member 7x is located within the body 5x and is secured thereto by crimping the lugs 5a over the flanged portion of 7x as shown in Fig. 15. Member 6x and insulating washer 9x are attached to 7x by riveting over lugs 8x which project from member 7x. The rigidity of this construction is enhanced by providing body 5x with an intumed lip 5c which engages the outer surface of member 6x.

Member 6x constitutes the handle of the plug and serves as a housing for a lamp bulb 20x supported in a frame 21x having disc 22x which supports contact pin 26x, switch contact 30x, finger piece 34x, and other parts exactly as has been hereinbefore described. In the present case, however, the cap 35x having the same functions as the cap 35 differs therefrom by having an opening 36x in its end wall for the emission of light from the lamp bulb, instead of an opening in the side wall.

It will be noted that member 6x is in electrical connection with body 5x through its riveted connection with the lugs 8x of flanged tubular member 7x and the crimped lugs 5a of body 5x.

Other modifications will be obvious to those skilled in the art who are desirous of constructing a combined igniting and illuminating plug having circuit controlling means carried entirely by the plug to afford a choice between the illuminating and igniting functions thereof.

I claim:

1. A combination igniter and illuminator comprising a hollow body member having an igniter coil at one end and a contact rim adjacent but insulated from said coil, a second hollow body member secured end to end to the first body member, a friction ring slidable on said hollow body members, a spring surrounding the first hollow member within said ring and compressed between said ring and said second hollow member, a lamp bulb in said second hollow member and permanently connected in series with said igniter coil, and a switch mounted in said second hollow member adjacent said bulb and having contacts for shunting said lamp bulb and a finger piece protruding from said second hollow member for actuating said switch.

2. In a combined igniter and lamp plug, a lamp-socket-and-shunting-assembly, said assembly comprising a disc-shaped base, a pin extending from one side of the base, a lamp socket extending from the opposite side of the base, a contact for said lamp socket secured to the base, a band formed integrally with and supported by said socket and disposed concentrically of the disc, opposed perforated lugs on said band, a switch member connected to said base and projecting toward said band, a semi-annular member hinged to said lugs, a switch member carried by said hinged member and adapted to be moved into and out of engagement with said projecting switch member and a finger piece secured to said hinged member for operating the switch.

3. As an article of manufacture, a supporting frame formed of a single blank of metal for mounting in a hollow cigar lighter plug and comprising at one end a band for mounting the frame in the mouth of the plug, a disc at the other end for fitting in the body of the plug, a lamp socket connecting said disc and said band, a spring arm providing a central contact for a lamp bulb and an angle member having one arm supported by said disc and another arm supporting said spring arm and a switch having a contact supported by said angle member and a coacting contact member hinged to said band.

4. In a device of the character described comprising a

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plug supporting socket having an insulated terminal and a grounded terminal for current carrying cooperation with mating terminals on a removable plug when said plug is in deep operative position and at least one of said socket terminals being separated from its mating terminal when said plug is in shallow non-operative position, and said plug having handle means at one end and an igniting unit at the other end, said unit comprising a metallic member insulated from its supporting means and adapted for engagement with said insulated terminal in said socket, an igniter coil having one end connected to said metallic member and the other end connected to a stud wherewith the igniting unit is both attached and electrically connected to a transverse wall of the plug, said transverse wall being at its perimeter formed to serve as a contact to mate with said grounded terminal, the novel improvement in which said stud is insulated from said transverse wall, means mounting within said plug an incandescent lamp having two terminals, electrically connecting means extending from the terminal of said lamp to said stud and electrical connecting means extending from the other terminal of said lamp to said perimeter and comprising circuit controlling switch means whereby E. M. F. passing through said metallic member, said igniter coil and said stud will pass through the filament of said lamp to cause the incandescence thereof and thence to said perimeter when said switch means is in one condition and whereby E. M. F. passing through said metallic member, said igniter coil and said stud will pass thence to said perimeter without effecting the incandescence of said filament when said switch means is in another condition, said switch means having means whereby the circuit controlling functions may be effected and said last mentioned means comprising a digitally movable member accessible from the exterior of said handle means and movable relative thereto to both effect said circuit controlling functions and to indicate the condition of the circuit.

5. A device of the class described constituting a combined igniting and illuminating plug adapted for use with a known type of socket serving to carry said plug and having terminals to afford electrical connection with cooperating terminals thereon, said plug comprising a plurality of aligned hollow sections, one section carrying at one end and in insulated relationship thereto an igniting unit comprising an annular contact, a resistance coil and a central contact, said annular contact and said central contact being connected in series through said coil, said one section affording a first plug terminal for cooperation with a first terminal of said socket and said annular contact affording a second plug terminal for cooperation with a second terminal of said socket, another section of said plug housing a lamp bulb having two terminals, means including lamp supporting means for connecting the terminals of said lamp to said first and second plug terminals, said second-mentioned section serving as a handle for the manipulation of said plug, switch means within said plug to control a circuit including said first and second plug terminals through said lamp bulb and having an actuating finger piece accessible from the exterior of said handle means and manually movable relative thereto to "on" and "off" positions whereby the condition of said circuit through said lamp may be indicated and controlled.

6. An electric switch comprising a stationary contact member including two parallel resilient metal strips, each supported at one end and spaced apart from each other and a manually movable contact member having a tongue insertable between the strips, said tongue having shoulders for engaging and interlocking with edges of the strips, said movable contact member having a part overlying the free ends of said strips and forming a fulcrum for coacting with said ends upon moving said movable contact member to open the circuit and for

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biasing said strips to separate them from said movable contact member with a snap action.

7. In a substantially cylindrical igniter and illuminator plug for use in a cylindrical socket of the type provided with a live terminal located at its inner end and a circumferentially located ground terminal, said plug having at its inner end an igniter element connected to terminals mating with the socket terminals, said plug further having at its outer end a lamp and a lamp socket, the improvement comprising an on and off switch adjacent the filament of said lamp and a finger piece protruding from said outer end and controlling said switch, said lamp socket being connected to ground in said plug and the live terminal of said lamp being in permanently closed series connection with said igniter element, one contact member of said switch being interposed electrically between said terminal of said lamp and said igniter ele-

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ment, the other contact member of said switch being connected to ground in said plug, whereby said lamp is operative whenever said switch is open and said lamp is shunted whenever said switch is closed.

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