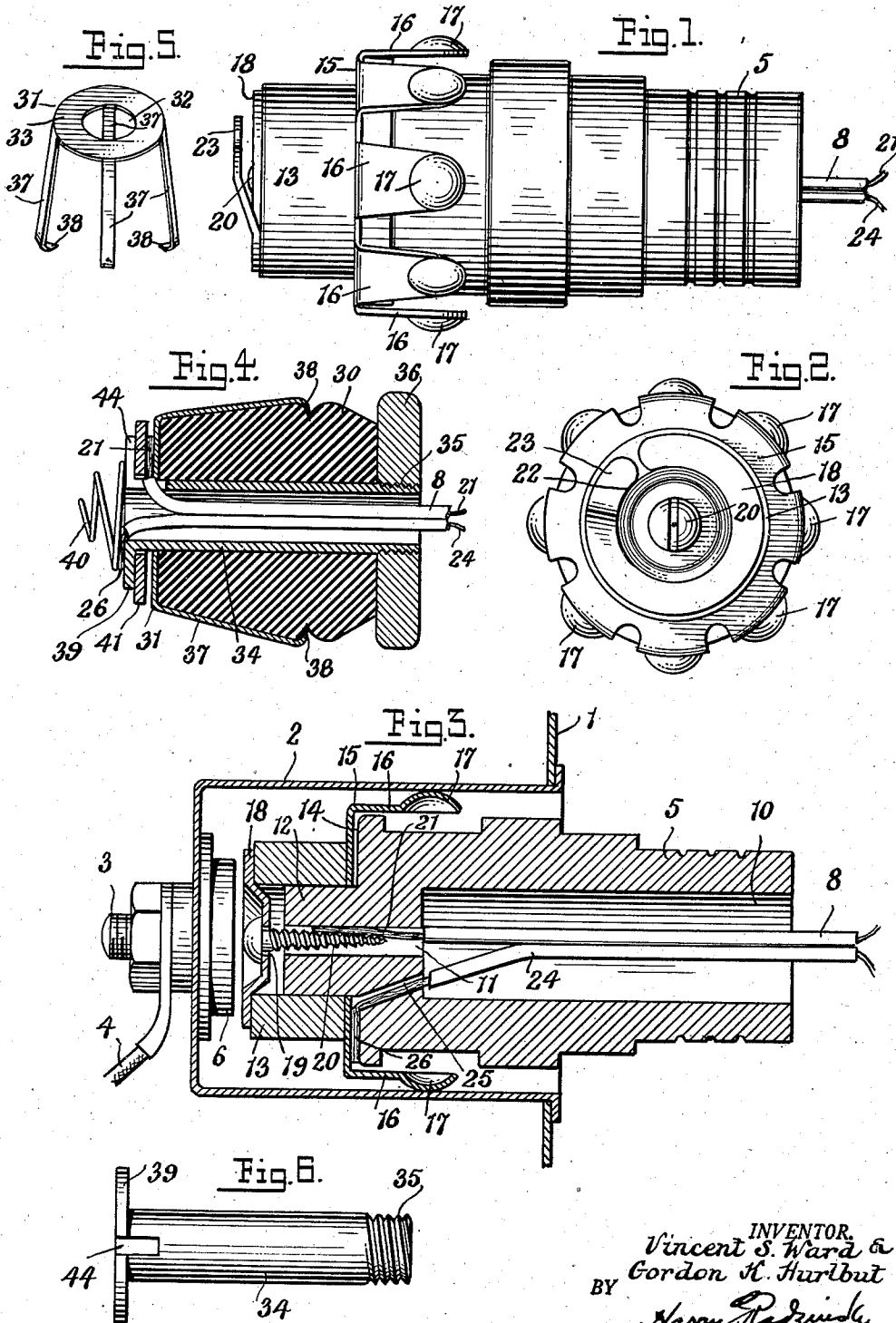


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AUTOMOBILE TROUBLE LIGHT

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## AUTOMOBILE TROUBLE LIGHT

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## 1 Claim. (Cl. 173-361)

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The present invention relates to automotive appliances and accessories and has particular reference to a novel trouble light or lamp embodying means to conveniently tap current from a conventional cigarette lighter socket such as is ordinarily embodied in the instrument panel of present day automobiles.

Briefly, and in carrying out the principles of the instant invention, we provide a simple and expedient appliance characterized by a standard low voltage electric lamp carried by the free usable end of a suitably insulated two-wire cord and a practical contact-equipped jack on the inner end of said cord, said jack to fit in the lighter socket after the lighter unit has been withdrawn from the socket.

In carrying out our aims and ideas we thus produce an efficient and reliable trouble light appliance which is characterized, particularly visualized, by a plug-type jack of a readily insertable and removable form making it possible and desirable to take advantage of an available cigarette lighter socket as a way and means of supplying electrical energy.

Further, as it is evident from the preceding remarks, the present invention has to do with an especially constructed adapter plug or jack, the plug being elongated and adapted to fit telescopically into the stock lighter socket, said plug serving as a hand-grip, and being centrally bored to accommodate one end of a current conducting cord and being further provided with an arrangement of special contacts. One contact serves to contact with the usual fixed contact in the lighter socket and the other contact is provided with expandable means functioning to complete the circuit and also performing as friction retaining means to hold the plug in the socket.

Then, too, and in addition to the above, novelty is predicated upon the centrally bored plug of insulation material equipped with the stated circuit make-and-break contacts and said bore serving to permit one end of the current conducting cord to be anchored in the plug with the wire-end electrically connected with the proper contacts.

In the accompanying drawing, forming a part hereof, Fig. 1 is an elevational view of the improved multiple-contact equipped plug or jack as it appears when removed from the lighter socket, a fragmentary portion of the current-conducting cord or cable being attached; Fig. 2 is an end elevation of the plug or jack, as viewed from the left end of Fig. 1; Fig. 3 is a longitudinal sectional view through the plug or jack as it

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appears when inserted in the conventional lighter socket of an automobile; Fig. 4 is a longitudinal sectional view of a modified form of plug or jack having a soft and compressible body of rubber or similar material; Fig. 5 is a perspective view of the spider constituting one of the contact members embodied in the plug or jack of Fig. 4, and Fig. 6 is a side elevation of the central sleeve of the plug or jack of Fig. 4.

With reference to the embodiment of the invention shown in Figs. 1 to 3 inclusive, 1 indicates a fragmentary portion of what is to be visualized as an instrument panel such as is used on present-day automobiles. Such a panel is conventionally equipped with a cup-like metal socket indicated at 2, this being the aforementioned cigarette or cigar lighter socket. Suitably secured to the inner closed end of the socket 2 is an electricity-conducting stud 3 to which the live current conducting cable 4 is connected, in the manner shown. The inner end of the stud 3 is in the form of a head 5 projecting into the interior of the socket 2 and said head thus provides a fixed contact member from which current is taken by the plug or jack to be inserted in the socket in the manner to be explained. It is apparent that when the light to be described is to be used, by the insertion of the improved plug into the socket 2, the cigar or cigarette lighter conventionally contained in said socket must be first withdrawn therefrom.

The trouble lamp or light per se is not shown in the drawings but, as is obvious, it is of ordinary low-voltage construction and is connected to the so-called free outer end of the current take-off and supply cord indicated at 8. In this connection, and in presenting the instant invention, the lamp has been omitted in order to focus attention on the present improvement, namely the adapter plug or jack 5 and its association with the cord 8 and the special circuit make-and-break contacts mounted on and carried by the plug.

The body 5 of the plug is preferably composed of suitable insulating or non-conducting material, such as any one of the many plastic substances now available. The plug is elongated and generally cylindrical in cross-sectional shape. As seen in Fig. 3, the plug is provided with a central longitudinal bore 10 extending through it, the forward end portion of the bore being substantially reduced in diameter, as indicated at 11. At its forward end, and surrounding the reduced-diameter portion 11 of the bore, is a neck portion 12 around which a bushing or sleeve 13 closely

fits, said bushing or sleeve being also of non-conducting or insulating material. Confined between one end of the bushing or sleeve 13 and an annular shoulder 14 formed on the plug, is a spider of metal 15 constituting a multiple contact member which establishes a resilient contact with the wall of the socket 2, when the plug or jack is inserted in the socket, the spider 15 not only making an electrical contact with the socket, but also serving, because of the nature of its resilient fingers 16, to hold the plug or jack firmly but removably in position within the socket 2. The spider 15 is formed with a central aperture which enables it to fit about the neck portion 12 of the plug, and it is also formed with a plurality of rearwardly-bent integral resilient fingers 16, each of which has its free end provided with a rounded head portion 17 that establishes a firm contact with the inner wall surface of the socket 2 yet permits the plug to be easily pushed into and normally withdrawn from the socket.

At the outer end of the sleeve or bushing 13 is located a dished metal washer or disk 18 formed with a central depressed portion having an aperture 19 through which a screw 20 or other equivalent fastening element extends, said screw serving to engage and hold one of the wires 21 of the cord or cable 8 tightly within the reduced end portion 11 of the bore as well as to convey current to said wire. The washer or disk 18 is arcuately slit as indicated at 22 (Fig. 2) to provide a free resilient tongue portion 23 which is bent away from the body of the washer 18 to a position offset from the body of the washer as clearly seen in Fig. 2. Said off-set tongue 23 thus constitutes a springy contact member which resiliently bears against the head 6 of the contact stud 3, when the plug is inserted within the socket 2.

The second wire 24 of the connecting cord or cable 8 has its bared end 26 directed through an angularly disposed passage 25 extending through the wall of the plug 5 so that said bared end 26 is located between the head of the spider 15 and the shoulder 14 as shown in Fig. 3 and is thus clamped between these parts by the screw 20 to thereby establish electrical contact with the spider.

The arrangement described is such that all of the parts of the connection plug or jack may be held together without soldering or other permanent fastening means. Screw 20, when inserted into the reduced portion 11 of the bore, encounters the bare end of wire 21 which has been inserted therein, and the threads of the screw engage the wire and wedge it tightly within the bore-portion 11. As the screw is tightened, it will draw the washer or disk 18 firmly against the end of the bushing or sleeve 13 and thus will cause the latter to clamp the spider 15 between it and the shoulder 14 of the plug body 5. The bare end 26 of the wire 24 having been previously inserted between the spider and the shoulder 14 will thus be firmly held against the spider to establish electrical contact therewith.

To connect a lamp that is attached at the end of the cord or cable, to the source of current terminating at the lighter socket 2, it is merely necessary to withdraw the conventional cigar or cigarette lighter from the socket and insert the plug 5 into the socket. When this is done, the tongue 23 will come into contact with the head 6 and the fingers 16 will come into contact with the inner surface of the wall of the socket 2. Since the tongue 23 and the spider 15 are connected respectively to the wires 21 and 24 it will

be apparent that the conveyance of current to the lamp will take place. The resilient or springy nature of the fingers 16 is such that the same not only serve to establish electrical contact with the socket 2 but also provide frictional contact with the walls of the same whereby said fingers constitute retaining means by which the plug is securely, but removably, held within the socket and is unlikely to be jarred therefrom.

In the embodiment of the invention shown in Figs. 4 to 6 inclusive, the body 30 of the plug is composed of soft rubber, synthetic rubber, or some other similar compressible and resilient material. At 31 is shown a metallic spider (see Fig. 5) provided with an annular end portion 33 formed with a central aperture 32 through which a sleeve 34 of insulating material extends. The sleeve 34 (shown in Fig. 6) is externally threaded at one end, as indicated at 35, to threadably receive a relatively large nut 36 constituting a knob or hand-engaging part by means of which the plug may be inserted into the socket 2 and withdrawn therefrom. The spider 31 is provided with a plurality of rearwardly-extending resilient fingers 37 having in bent pointed ends or terminals 38 which penetrate or are indented into the soft and compressible body of the plug, as shown in Fig. 4 to thereby maintain the spider in place and attached to the body of the plug.

Provided on the forward end of the sleeve 34 is a flange 39, which extends radially of the sleeve, and confined between the flange 39 and the head 33 of the spider 31 is a washer 41 of non-conducting or insulating material. To the end of the flange 39 is secured a metallic coil spring 40 and secured to said spring by soldering or otherwise, is the bared end 26 of wire 24. The bared end of the wire 21 is located and is clamped between washer 41 and the head 33 of the spider 31 thereby establishing electrical contact with the spider. A slot 44 is provided in the wall and flange of the sleeve 34 to enable the end of the wire to be positioned between washer 41 and the head of the spider 31.

With the plug of this embodiment it will be seen that when the nut 36 is tightened, flange 39 will clamp washer 41 between it and the head 33 of the spider 31, and the washer 41 will, in turn, clamp the bared end of wire 21 between it and the spider. When this plug is inserted in the socket 2 the compressible and resilient nature of the body of the plug will enable the plug to be fitted tightly within the socket and it will retain its position therein by the snugness of its frictional fit. The fingers 37 will be firmly held against the wall of the socket to thus establish electrical contact therewith. At the same time, the spring 40, to which the bared end 26 of the wire 24 is attached, will bear against the head 6 thereby establishing electrical contact therewith. A plug of this character will, because of its resilience, readily adapt itself to sockets of slightly varying diameters.

While we have described several embodiments of the invention, it will be obvious that the same is not to be restricted thereto, but is broad enough to cover all structures coming within the scope of the annexed claim.

In the embodiments of the invention as herein described, consideration has been given to the fact that the cigarette lighter sockets or receptacles as used in various makes of automobiles often may vary in diametrical size as well as in depth. Accordingly, in the several structures herein shown, the means for establishing electri-

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cal contact between the socket body, or grounded side of the line, and the contact fingers on the plug, is such that the springiness or expansive characteristics of the contact fingers 16, or that inherent in the plug body 30, plays an important part and assures positive contact regardless of variation in diameter of the lighter sockets employed. Also, since the contact of the fingers 16 and 37 with the inner surface of the socket 2 can be secured at any point on the socket for the depth of the socket, the plug may be pushed into the socket to any extent required to assure contact of the end member 23 or 40 with the current-conveying stud 3. Thus, the devices presented are of universal use since they readily accommodate themselves to lighter sockets of various sizes as embodied in present-day automobiles.

What we claim is:

In an appliance of the character described, a plug having a body composed of a pair of tubular sections of insulating material, the first of said sections constituting a body section, said first section having a part fitted within a part of the other section, a ring-like metal contact member fitted around the first section and presenting a peripheral surface for contact with the interior wall of a cigar-lighter socket of an automobile, a two-wire cord extending through the body of the plug, the first section having an aperture through one of its walls and through which the

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bared end of one of the wires in said cord is passed to be thereby disposed between the outside of the body section and an inner surface of said metal ring, a resilient contact disk mounted at the forward end of the plug, the second section of the body plug being interposed between said ring and contact member a screw extending axially of the plug and threaded into one of the body sections for holding the contact disk and second section in place, the second wire of the cord having a bared end electrically connected to the disk by means of said screw.

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