

Aug. 29, 1944.

H. M. DEYSHER

2,356,752

ELECTRIC PLUG AND RECEPTACLE

Filed Dec. 16, 1942

2 Sheets-Sheet 1

FIG. I.

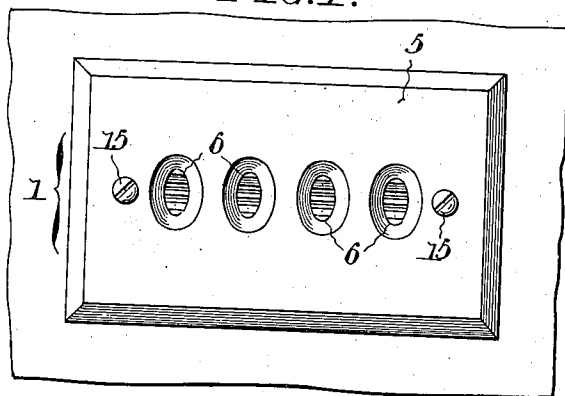


FIG. II.

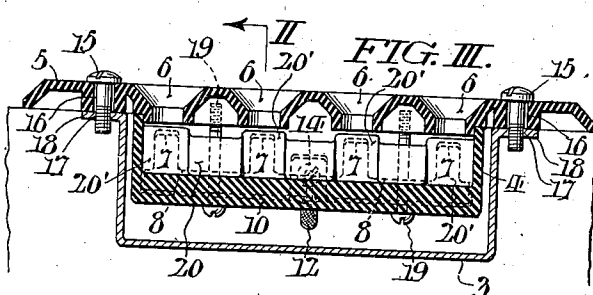
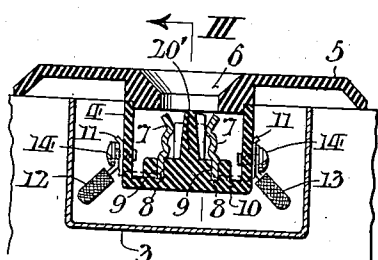


FIG. IV.

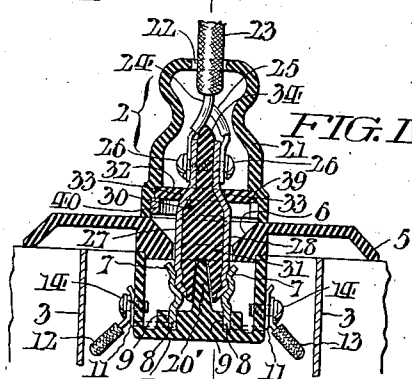


FIG. V.

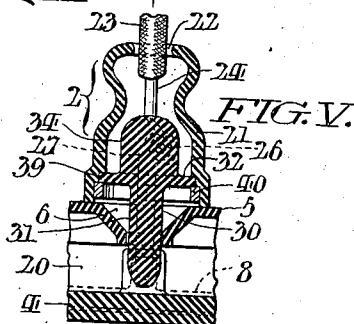
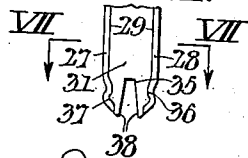


FIG. VI.



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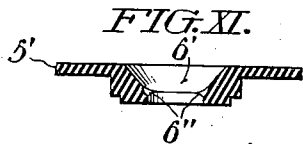
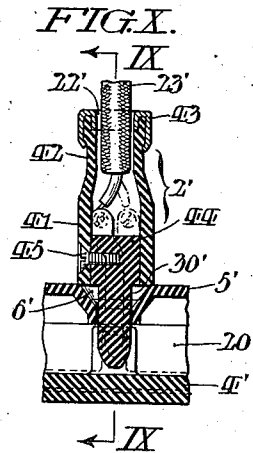
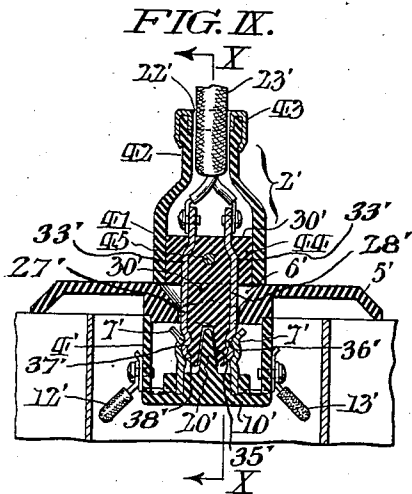
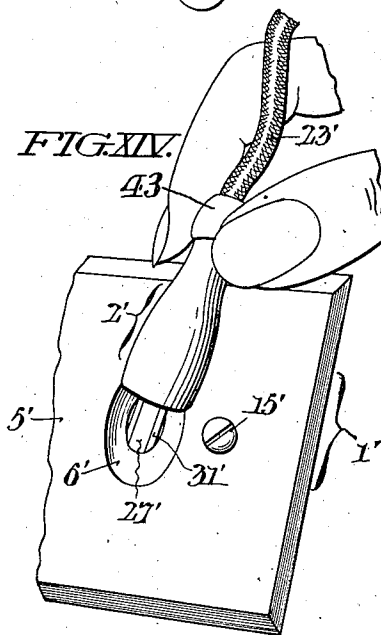
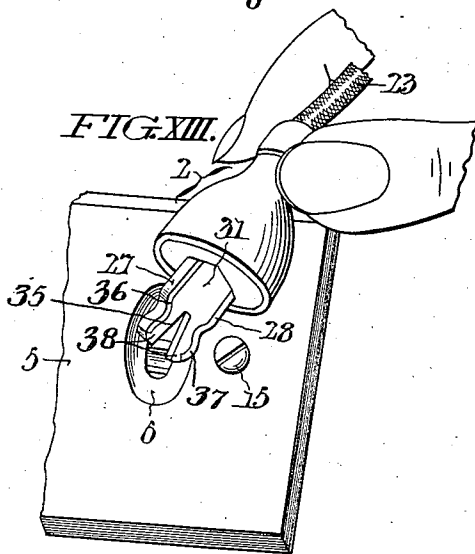
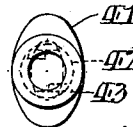


FIG. XII.



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ELECTRIC PLUG AND RECEPTACLE

Harvey M. Deysher, Lansdale, Pa.

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9 Claims. (Cl. 173—330)

This invention relates to electrical connectors and has, more particularly, reference to the plug-and-receptacle type useful for attaching lamps and domestic appliances to an electric supply circuit.

Connectors of the type referred to as heretofore generally constructed involve a plug with two prongs designed to effect separation between the positive and negative sides of the circuit conductor included in the "outlet" or receptacle. Furthermore the top of each receptacle is usually provided with a suitable insulation between the two openings through which the plug prongs are entered to effect the desired electrical connection. Such structures possess, in general, one serious disadvantage; to wit, the difficulty encountered in getting the plug prongs initially entered, and more frequently, when the receptacle is located in a baseboard, for example, and troublesome to reach, the difficulty of "plugging-in" is considerably increased.

The primary object of this invention is to overcome the above noted disadvantages by provision of a novel form of electric plug and associated receptacle wherein the plug is, in effect, self-centering, irrespective of the location of the receptacle, even though the latter be in an obscure corner and somewhat inaccessible.

Another object is to provide an improved electric plug and receptacle wherein the plug is definitely self-centering with respect to the receptacle slots, so that the operation of plugging-in is effected with a minimum of effort.

A further object of this invention is the provision of what may be conveniently termed, a unit plug necessitating but one opening in the associated receptacle plate; the same being simple in construction, durable in character, and which positively prevents "shocking" incidental to effecting the electric connection.

While the stated objects are indicative in a general way of the aims of this invention others, with ancillary advantages, will become apparent to those skilled in the art upon an understanding of said invention hereinafter disclosed; while it will be evident that changes in the details may be effected without departing from the spirit and scope of the concluding claims.

In the drawings:

Fig. I is a face view of an electric outlet embodying the present improvements.

Fig. II is a section through the same, or, as taken on the plane II—II of Fig. III.

Fig. III is a section on the plane III—III of Fig. II.

Fig. IV is a section on the plane IV—IV of Fig. V, with the improved plug of this invention in active position in respect to the receptacle.

Fig. V is a similar section on the plane V—V of Fig. IV.

Fig. VI is a fragmentary side view of the insert portion or prong of the improved plug.

Fig. VII is an edge view of the same.

Fig. VIII is a section taken as indicated by the angle-arrows VIII—VIII in Fig. VI, and drawn to larger scale.

Fig. IX is a sectional view, similar to Fig. IV, of a modified form of the invention and taken on the plane IX—IX of Fig. X.

Fig. X is a section taken substantially as indicated by the angle-arrows X—X in Fig. IX.

Fig. XI is a fragmentary sectional view to better illustrate an alternate form of plug-entering bevel included in the receptacle of Figs. IX and X.

Fig. XII is a top plan view of the plug-in body component with the electric cord removed.

Fig. XIII is a perspective view illustrative of how the improved plug of this invention, shown by Figs. IV and V more particularly, may be initially placed with respect to one of the receptacle openings; and,

Fig. XIV is a similar illustration, to the preceding, but showing how easily the entering portion of the plug may be said to self-center itself, as hereinafter more fully explained.

In describing the forms of this invention exemplified by the above captioned drawings, specific terms will be employed for the sake of clarity, but it is to be understood the scope of said invention is not thereby limited, each such term being intended to embrace all reasonable equivalents which perform the same function for an analogous purpose.

Referring more in detail to the drawings, the outlet of this invention is comprehensively designated by the reference character 1, and the novel plug similarly characterized 2. The outlet 1, it is to be observed, includes a rectangular metal junction box 3, for reception of the plug-receptacle 4, preferably made of suitable insulation material, and having attached thereto the wall-plate 5 of corresponding material. The wall-plate 5 is shown in Fig. 1, by way of example only, as of the multi-slot or gang type; that is to say, it is provided with four elliptical inwardly-tapering holes 6 in registration above a complementary series of spring contacts, 7, 7, projecting from conductor strips 8, 8, seated in grooves 9 in the body portion 10 of the plug-receptacle 4.

Each contact 7 has an associated contact prong 11 to which the respective conductor wires 12, 13 for supplying electric current to the plug receptacle 4 are secured by appropriate means 14. The wall-plate 5 is attached to the junction-box 3 by screws 15, passed through apertures 16 therein, engaging in threaded holes 17 in end flanges 18 laterally projecting from said box; while the plug-receptacle 4 is secured to the wall-plate 5 by screws 19, Fig. III in an obvious manner; and, it is to be particularly noted the said plug-receptacle embodies a medial division or separator partition 20 intermediate the spring contacts 7, said partition having longitudinally spaced taper-section reductions 20' in register below the wall-plate holes 6, and the purpose of which is hereinafter fully explained.

Referring now to the novel plug 2, see Figs. IV and V, the same consists of a hollow body portion 21, of suitable insulating material, having an axial aperture 22 at one end for free entrance of a conventional electrical cable 23, the individual conductors 24, 25 of which are coupled by means 26 to the terminals 27, 28 of said plug. The terminals 27, 28 are in the form of strips suitably secured to the flat paralleling sides 29 of an insulate material spacer unit 30, conveniently of the section best understood from Figs. IV and V; that is to say said spacer unit 30 embodies an approximately elliptical-section shank 31 with the opposed minor arcs planed down, or otherwise reduced, as best understood from Fig. VIII, to define the parallel sides 29, above referred to; an intermediate discous portion 32 with appropriate holes 33 for snug passage of the terminals 27, 28; and a flat key-portion 34 for attachment thereto of the upper ends of the respective terminals 27, 28 by the coupler means 26. Particular attention is directed, at this point, to the fact that the free end portion of the shank 31 is medially slotted at 35 to a cross-section complementary with respect to, and for coaction with, the selected partition separator portion 20' of the plug receptacle 4, as readily understandable on reference to Figs. IV and IX of the drawings; whereas the sides of the free end portion of the shank 31 are transversely corrugated and pointed, at 36, 37 respectively, see Figs. VI and VII to best advantage, with the confronting portions of the terminal strips 27, 28 matingly-shaped for inset relation in respect to the forward point or tip 38 of said shank 31. The shaping of the free end portion of the shank 31, as just described, greatly assists the spacer unit 30 in automatically turning about its longitudinal axis and finding the proper position to slide into the selected elliptical hole 6 in the receptacle wall-plate 5, as hereinafter explained.

In order to accommodate turning movement of the terminal spacer unit 30, relative to the plug body portion 21, the discous part 32 thereof is conveniently seated in a stepped-boring 39 in said body portion, with retention against axially-directed shifting by means of a spring-ring 40, in an obvious manner.

In the modified form of the invention, shown by Figs. IX—XII inclusive, parts corresponding with those previously described are similarly designated with a prime exponent, and only those differing will be explained in detail in order to obviate unnecessary repetitive description. In this form of the invention the hollow plug body-portion, 21', is of a modified cross-section, that is to say, it embodies a main elliptical part 41 and a relatively reduced cylindrical extension

42, the latter fitted with a rotative ferrule-like cap or grasp 43 which permits all of the associated parts to turn in order to enter the spacer unit 30' into the selected wall-plate hole 6. Attention is also directed to the fact that the spacer unit or plug-in part 30' embodies a main section 44 for fitment into the plug elliptical-part 41, with securement therein as by a set-screw 45, and the shank extension 31'; while the terminals 27', 28' project through the holes 33' spacedly outward and beyond the main section 44.

Having detailed the structural aspects of the invention, the ease and facility with which the plug 2 or 2' is engaged to the receptacle 4 or 4' is, as follows: When the plug spacer unit 30 or 30' is placed on any part of the wall-plate 5 and moved about until the point or tip 38 or 38', Fig. IX, thereof hits the bevel of any one of the elliptical holes 6 or 6' of said wall-plate—see Fig. XIII, regardless of what the position of shank portion 31 or 31' may be, if the top of the body portion 21 of the plug 2 or the grasp 43 of the plug 2', be held between the fingers, as shown, and a very slight pressure exerted thereon, the tip 38 or 38' of said plug will be caused to automatically revolve and assume the position illustrated in Fig. XIV, or enter the hole 6 or 6' respectively. Inward pressure on the plug 2 or 2' next causes the terminals 27, 28 or 27', 28' to automatically coact between the spring contacts 7 or 7', with the shank slot 35, or 35' Fig. IX, straddling the partition taper-section associated reduction 20', in an obvious manner. It is to be here noted the spring-contacts 7 and 7' are approximately shaped for mating with the parts 36, 37, or 36', 37' of Fig. IX, of the terminals 27, 28, or 27', 28', so as to ensure efficient electric conductivity and snap-retention of the plug 2 or 2', in operative position. Should the elliptically-shaped end portion of the plug shank 31 or 31' happen to coincide immediately with the correspondingly shaped wall-plate hole 6 or 6', the above-described manipulation of the plug 2 or 2' becomes unnecessary. In this connection the plate holes 6 or 6' may be formed with opposed relatively-inclined slight recessions as indicated at 6'' in Fig. XI, aligned with the major axis of the plug shank 31 or 31' of Fig. IX to facilitate passage of the parts 36, 37 and 36 or 38', 37' and 36' into entering position between the spring contacts 7 or 7'; while it will be self-evident the plug 2 or 2' can be easily seated by anyone, even though the outlet 1 or 1' is located in a dark corner.

From the foregoing it is thought the merits and advantages of this invention will be readily understood; while it is to be noted the insulation that formerly was exterior in respect to the wall-plate 5 or 5' is, in accordance with said invention, now located below said plate, see the part or partition 20 or 20', which provides positive insulation between the spring contacts 7 or 7', when the plug 2 or 2' is in position and thereby prevents the placing of any article between or across said contacts. This feature is highly important as it effectively eliminates the possibility of transmission of any "shocks." Furthermore it will be observed from Figs. XIII and XIV that the position of the hand, while inserting the plug 2 or 2', remains practically stationary after the tip 38 or 38' of the shank 21 or 31' has once contacted the bevel surface of any one of the wall-plate holes 6 or 6', incident to the fact that in both forms of the plug shown, said tip and adjoining parts 36, 37 or 36', 37' enable the unit

39 or 30' to revolve about its longitudinal axis while the body portion 21, or the ferrule-like cap 42, is held stationary. Again, the plug-receptacle 4 or 4' may be made in two parts and assembled into one unit as shown; or it may be formed as two units similar to conventional receptacles and have a separate wall plate: however both types are designed for fitment into standard metal outlet boxes.

Finally it is obvious the receptacle 4 or 4' and wall-plate 5 or 5' may be made individual, and that changes may be effected in the details of construction, without departing from the spirit and scope of the following claims.

Having thus described my invention, I claim:

1. An electric plug and receptacle comprising an insulating material hollow body; a similar material unit in said body with an elliptical-section extension embodying spaced flats, for support of current-conductive terminals, and having an undulate-tapering free end; and a receptacle having a plug-in aperture of inclined elliptical contour for coaction with the free end of the plug extension, to impart rotary self-centering motion to said unit in respect to the receptacle aperture.

2. An electric plug and receptacle comprising an insulating material hollow body; a similar material plug-in unit in said body with an elliptical-section axial extension, said extension having spaced flats aligned with its major axis for support of current-conductive terminals, an undulate-tapering free end including a medial slot; and an insulating material receptacle having an aperture of inclined elliptical contour with a subjacent partition of conformatory section to that of plug-in unit slotted free end whereby, when said unit's free end is moved into coaction with elliptically contoured aperture, rotary self-centering motion is imparted to the plug-in unit and its free end slot is engageable across the partition aforesaid.

3. An electric plug and receptacle in accordance with claim 2 wherein the hollow body and plug-in unit are relatively rotatable, the elliptical-section extension medial slot is of wedge-formation, and said extension embodies longitudinal flats with lateral corrugations adjoining its outer end for application thereto of corresponding portions of the current-conductive terminals.

4. An electric plug and receptacle in accordance with claim 2 wherein the plug-receptacle embodies an inverted wedge shape partition for coaction with the medial slot in the plug-in unit free end, and spring contacts parallel such partition, said contacts embodying undulate-portions for mating coaction with complementary parts of the current-conductive terminals.

5. An electric plug and receptacle in accord-

ance with claim 2 wherein the hollow body includes a main elliptical part with a relatively-reduced cylindrical extension, the plug-in unit embodies a section for attachment in the hollow body main elliptical part, and said hollow body is provided with a free ferrule like grasp which permits the hollow body and attached unit to rotate in respect to said grasp.

6. The combination with an electric receptacle of the type described, of a plug-in unit comprising a tubular body of insulating material including sections of differential diameter, a terminal carrying member of similar material rotatively mounted in the larger section of the tubular body, said member having an elliptical-section axial extension with an undulate-tapering free end and an open medial slot, and means whereby said plug-in unit is rotatively held in the tubular body.

7. An electric plug and receptacle as defined in claim 2 wherein the terminal carrying portion of the plug-in unit comprises an approximately elliptical-section shank with the opposing minor arcs longitudinally-reduced to define parallel flats, for application thereto of terminal strips; a discous portion having appropriate holes for snug passage therethrough of said strips; a flat key portion for joint attachment of the terminal strips and the lead-off wires; lateral corrugations with mergent taperings are formed across the free end of the shank aforesaid to define an insulating tip for the unit; and an open-end inwardly convergent slot is formed across the free end of said shank for the purpose specified.

8. An electric plug and receptacle as defined in claim 2, wherein the terminal carrying member embodies an integrally formed discous portion; the tubular body is provided with a stepped portion in its bore; and a spring ring coacts with said discous portion to retain the terminal carrying member in the tubular body against axial shifting.

9. In an electrical plug and receptacle, of the type described, a plug-in unit comprising a tubular body, of insulating material, a main elliptical-section and a relatively reduced cylindrical portion, a ferrule-like grasp at the outer end of said cylindrical portion affording rotation of the unit relative thereto; a conformatory section terminal carrying member of similar material for engagement in the tubular body main section; means whereby said tubular body and terminal carrying member are held against relative movement; and an axial elliptical-section shank extending outwards from the carrying member, said shank having an undulate-tapering free end including a medial wedge-shaped slot, for the purpose specified.

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