

May 19, 1942.

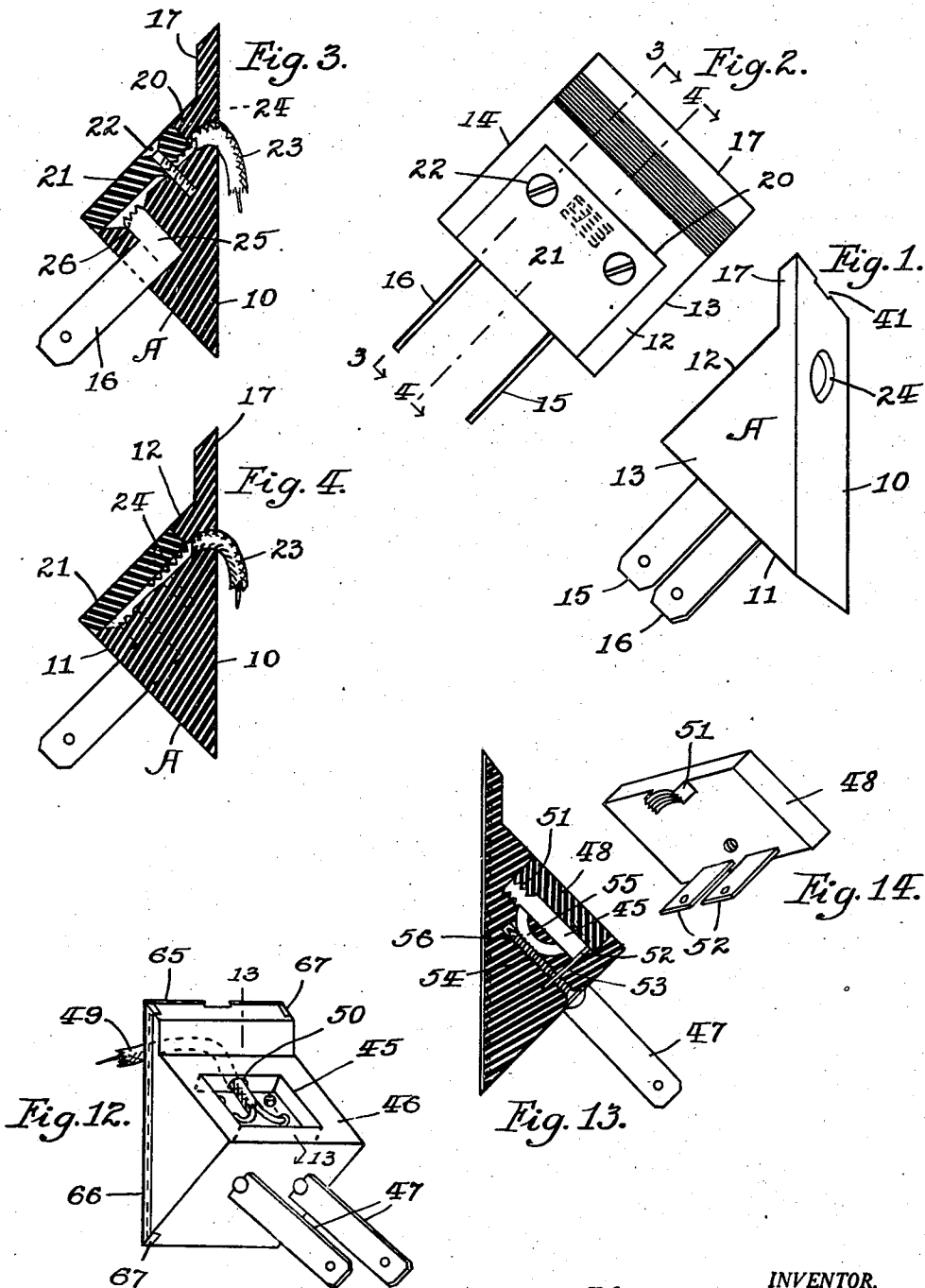
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2,283,177

ELECTRICAL PLUG CONNECTION

Filed Aug. 2, 1940

3 Sheets-Sheet 1



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Fig. 5.

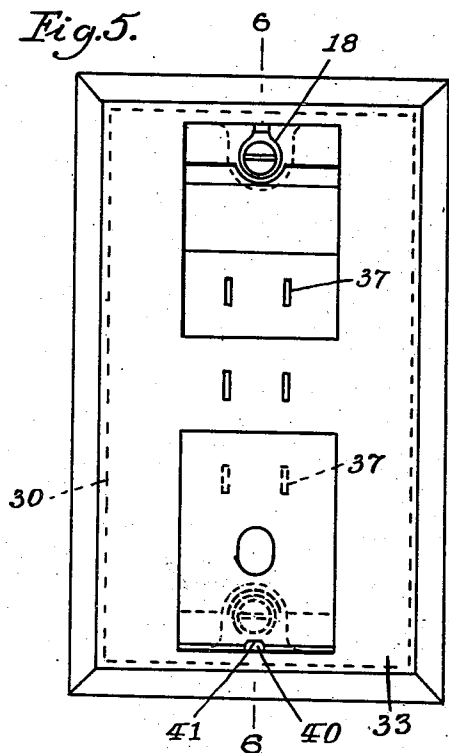


Fig. 6.

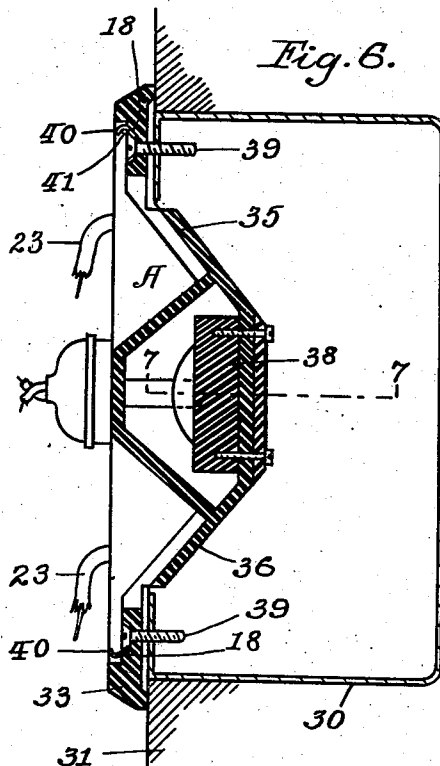


Fig. 8.

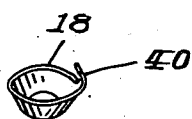
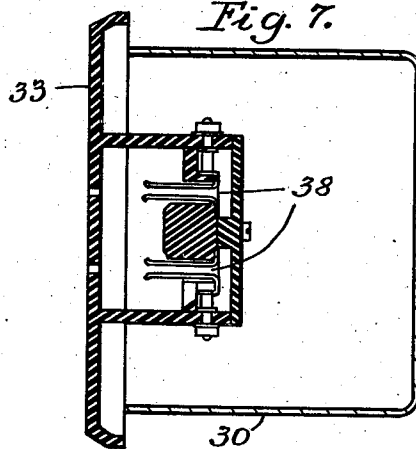


Fig. 7.



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Fig. 10.

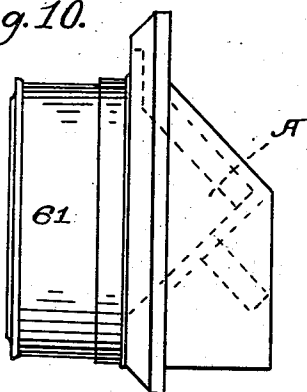


Fig. 9.

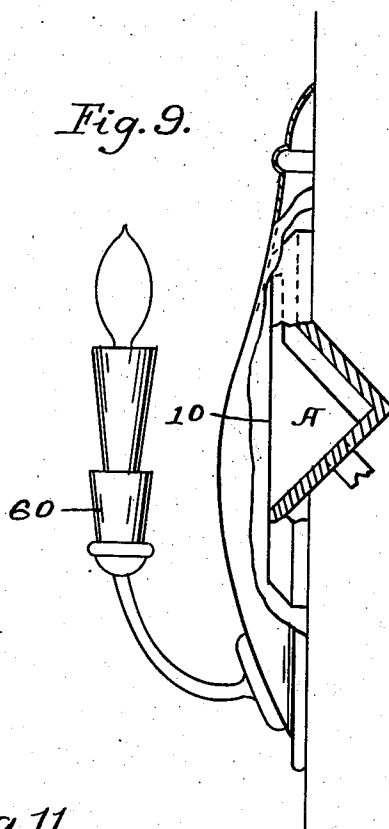
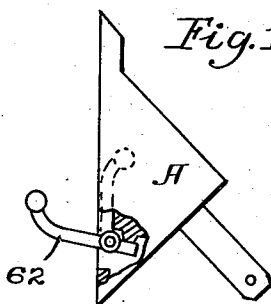


Fig. 11.



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UNITED STATES PATENT OFFICE

2,283,177

ELECTRICAL PLUG CONNECTION

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Application August 2, 1940, Serial No. 349,715

7 Claims. (Cl. 173—361)

This invention relates to improvements in electrical plug connections and particularly to that type in which the necessary insulated conductor may be secured by simple manual manipulation without the use of tools and by which the plug when inserted in a socket is caused to lie substantially flush with the surface of a surrounding wall to avoid being unintentionally disturbed or disconnected. More particularly this application is a continuation in part, of my companion application filed November 27, 1939, bearing Serial Number 306,349, which on June 10, 1941, matured into Patent No. 2,244,937, for electrical outlets in which this plug is shown and described. In said prior application the objects and advantages of my improved plug are fully disclosed and will be further pointed out in the following specification.

In the accompanying drawings, forming part of this specification, Fig. 1 is a side perspective view of my improved terminal plug; Fig. 2 is a plan looking at the inner face of the terminal plug shown in Fig. 1; Fig. 3 is a section taken on line 3—3 of Fig. 2; Fig. 4 is a section taken on the line 4—4 of Fig. 2; Fig. 5 is a front elevation of one form of a suitable electrical outlet receptacle showing one of my improved terminal plugs inserted therein; Fig. 6 is a section taken on line 6—6 of Fig. 5, showing two of my improved terminal plugs inserted therein; Fig. 7 is a section taken on line 7—7 of Fig. 6; Fig. 8 is a top perspective view of the spring catch used for removably holding my improved terminal plug in the receptacle; Fig. 9 is a side elevation partly broken away and in section illustrating my improved terminal plug supporting a lamp fixture; Fig. 10 is a side elevation partly in section showing a clock mounted upon my improved terminal plug to be supported thereby; Fig. 11 is a side elevation partly broken away and in section showing a folding hook built into my improved terminal plug for supporting an object when the hook is turned into unfolded position as shown; Fig. 12 is a side perspective view of an alternate construction of my invention; Fig. 13 is a vertical section taken approximately on line 13—13 of Fig. 12; and Fig. 14 is a perspective view of the electrical conducting cord clamping element employed as a receptacle closing element in the type of terminal plug shown in Figs. 12 and 13.

My improved terminal plug has a wedge shaped body A defined by a substantially flat base 10, which forms the outer face of the plug, a pair of converging opposite sides 11 and 12 extending from the base, and a pair of parallel opposite ends

13 and 14 adjacent to said base and sides. The body of the plug thus extends angularly from its base, its axis being substantially normal to the plane of its base or outer face. Extending normally from one of the sides 11, that is obliquely from the plug, is a pair of electrical contact blades 15 and 16, as will be hereinafter described, and extending from the opposite side 12 in the plane of the base or face of the plug is a lip 17, the outer face of which is an extension of the face of the plug. This lip is used to engage a spring catch 18 for removably securing the plug in a receptacle and for simultaneously obscuring the fastening means as will be hereinafter more fully described.

The body of the plug is preferably made out of insulating material and the electrical contact blades are held rigidly therein in separated parallel relation. The angular side 12 opposite the side from which the blades project is formed with a terminal receptacle 20 which is normally closed by an electrical conductor clamping cover plate 21. This plate is removably secured in closed position under compression by screws 22 or other suitable means. When closed its exposed faces conform with the opposite angular sides of the plug. The electrical conducting cord such as 23, which contains the pair of conductors to be connected to the plug is received through the passage 24 in the face of the plug into the terminal receptacle 20 and is anchored securely to the plug by clamping cover plate 21. This plate has a toothed boss 24 (see Fig. 4), on its inner surface, the teeth of which bite into and impinge the conducting cord to the plug through the tightening of screws 22. In making electrical connection with the conductor cord, the end of the cord beyond the portion engaged by the boss is stripped of its outer covering and the two conductors therein thus exposed are spaced apart. Each of the inner ends of the contact blades 15 and 16 of the plug is formed with a short angular arm 25 which is firmly secured in the body of the plug and the terminus of this arm is provided with sharp teeth 26 which face inwardly toward the inner face of the clamping plate 21. These teeth are arranged so that when the insulated conductors of the conducting cord are trained over the teeth and the clamping plate is secured tightly by screws 22, the teeth bite through the insulation of the cord conductors and make effective electrical contact. Thus when both conductors of the cord are connected to the pair of contact blades of a plug, electrical connections are made by properly adjusting the cord

conductors and by applying the clamping plate as described. Also the clamping plate serves to fasten the body of the conductor cord to the plug ahead of the conductors so as to relieve pulling strain from the electrical contacts in the plug and allow the plug to be pulled out of its socket by the cord without breaking the electrical connections in the plug.

In Figs. 5 and 6 I have illustrated my improved terminal plug applied to a double form of terminal receptacle, such as is described in my copending application for patent Serial Number 306,349. In this illustration the usual outlet or junction box 30, seated in the wall 31 is provided with a face plate 33 which is constructed with a pair of wedge shaped plug sockets 35 and 36, each of the latter substantially coinciding with the shape of my improved plug so that when the plug is inserted its base or face lies flush with the outer surface of the face plate leaving no objectionable projection which might cause moving objects to catch and release or loosen the plug from its connection in the socket. This is a distinct advantage. Each of the sockets has a pair of plug terminal blade receiving slots 37 in one of its angular walls which are adapted to receive the terminal blades into connection with suitable circuit connection assemblies 38 provided in the sockets. The direction in which the plug is inserted in its socket is normal to one of its base sides and at an oblique angle to its base which when the plug is inserted in a downward angular direction tends to cause the plug to remain inserted and electrically connected without working loose, which is also an advantage. Due to the wedge shape of the plug, downward and direct outward pulling of the conductor cord 23, which leads into the plug also tends to force the plug into its socket rather than to loosen the plug.

The spring catch 18 resembles a cupped washer with a spring arm 40 (see Fig. 8) extending from its rim. This washer is secured by one of the screws 39 by which the face plate 33 is fastened on the outlet box 30, and its spring arm 40 is so shaped and held positioned as to spring into engagement with an edge of the supporting lip 17 in a notch 41 and hold the plug inserted in its socket. The plug is released when desired by releasing the spring engaging arm.

In Figs. 12 to 14 inclusive, I have shown a modification of my improved plug for use in the plug receptacle described in my companion application Serial Number 306,349. The outward shape of the plug remains substantially the same as above described. The conducting cord fastening and connecting means is varied in detail. The wedge shaped body of the plug is formed with a rectangular chamber 45 in its angular side 46, opposite the side from which the pair of contact blades 47 project. This chamber is closed by the cord clamping plate 48. The electrical conducting cord 49 enters this chamber through a passage 50 which opens outwardly through the base of the plug and is positioned so that the body of the cord is engaged and held firmly by the serrated boss 51 on the inner surface of the forward end of the clamping plate 48. The heel of the clamping plate opposite the end on which the serrated boss is formed has a pair of laterally projecting spring fastening blades 52 secured thereto, which are adapted to be inserted into a close fitting channel 53 in the body of the plug. The fastening blades 52 are arranged normally at a slightly obtuse angle to

the plane of the inner wall of the clamping plate 48 so that when the plate is inserted and pressed tightly into a position closing chamber 45, the spring blades 52 tend to force the free end of the plate, with its serrated boss 51, tightly engaging and holding the conducting cord. The electrical contact blades 47 extend right angularly from one of the angular walls of the plug as in the preferred construction but each is formed with a supporting shank 54 which is threaded into the body and passes freely through one of the blades 52. The fastening elements 54 are placed so that each shank penetrates one of the spring blades 52 and holds the clamping plate 47 in a position closing the chamber 45 and holding the conductor cord. A small curved channel 55 is provided in the body of the plug adjoining each shank of the contact blades 47. This passage has its opposite ends connected upwardly into the chamber 45 through the floor of the chamber and its portion between its ends is intercepted by the threaded shank 54 of one of the contact blades 47 when the blade is screwed through its companion cover fastener 52 and fully into the body of the plug. A pointed end 56 on the tip of the shank 54 serves to assist in penetrating the insulation on the conductor held in the companion channel 55 so that the screw threads of said shank will impinge the conductor against the wall of the channel and make close electrical contact therewith.

In Fig. 9 I have shown lamp fixture 60 mounted upon the base wall of my improved terminal plug, said fixture being supported flush with the face plate and its weight tending to hold the plug tightly inserted in its socket. In a similar manner the utility article 61 such as a clock, thermostat or any other article desired is shown mounted upon the plug in Fig. 10. In Fig. 11 I have shown my improved terminal plug constructed with a folding supporting hook 62, recessed when folded into the base wall of the body of the plug. In outstanding position any object such as a clock, for instance can be suspended from the plug on the hook, the weight of the object tending to hold the plug tightly inserted in its socket. These illustrations are typical of many other objects that can be mounted upon the plug with equal effectiveness.

When desired the exposed base of the plug can be provided with a separable surface plate 65, colored or designed to harmonize with the finish of a room in which the plug is used, said surface plate being gibbed at 66 along its side edges to the body of the plug and held at its ends by clips 67, bent or swaged over the body of the plug.

In accordance with the patent statutes, I have described the principles of operation of my invention together with the apparatus which I now consider to represent the best embodiment thereof, but I desire to have it understood that the construction shown is only illustrative and that the invention can be carried out by other means and applied to other uses within the spirit of the invention and within the scope of the following claims.

I claim:

1. A wedge shaped plug body for use in cooperation with a wedge shaped wall socket, said plug body having a base and opposite converging sides and a connector mounted upon the plug body normal to and projecting from one of said sides, said plug body being insertable in the wall socket at an oblique angle to the plane

of said base and with said connector entering an inner wall of said socket longitudinally of the axis of the connector to assist in holding the plug body inserted with said base flush with the outer surface of the wall socket.

2. A wedge shaped plug body for use in cooperation with a wedge shaped wall socket, said plug body having a base and opposite converging sides, a connector mounted upon the plug body normal to and projecting from one of said sides, and a fastening lip in extension and in the plane of said base by which the plug body can be engaged with the socket, said plug body being insertable in the wall socket at an oblique angle to the plane of said base and with said connector entering an inner wall of the socket longitudinally of the axis of the connector to assist in holding the plug body inserted with said base flush with the outer surface of the wall socket.

3. A wedge shaped plug body for use in a wedge shaped wall socket, said plug body having a base and opposite converging sides and a pair of electrical contact terminals entering the plug body normal to and extending outwardly from one of said converging sides, said plug body being insertable in said wall socket at an oblique angle to the plane of said base and in longitudinal alignment with said connecting terminals and said base having a passage adapted to receive an electrical conductor into connection with said contact terminals in the plug body.

4. In a structure as defined in claim 3, the plug body having means therein for fastening said conductor to prevent outward pulling strain upon the connections between the conductor and the inner ends of the contact elements.

5. A wedge shaped plug body for use in a wedge shaped wall socket, said plug body having a base, a pair of opposite converging sides and a chamber entering one of said sides, a pair of electrical contact terminals normal to and extending outwardly from one of said sides with their inner ends entering said chamber and be-

ing pointed, an electrical conductor entering said chamber through the base of the plug body having branches extending over the pointed inner ends of the contact terminals, and a clamping plate closing said chamber and impinging said conductor branches upon said pointed terminal ends and engaging and holding said conductor to prevent outward pulling strain by the conductor upon the connections between said branches and said pointed terminal ends.

6. A wedge shaped plug body for use in a wedge shaped wall socket, said plug body having a base, a pair of opposite converging sides and a chamber entering one of said sides, a pair of electrical contact terminals normal to and extending outwardly from one of said converging sides with their inner ends entering said body, an electrical conductor having branches entering said chamber through said base, a cover element over said chamber, and means interposed between the cover element and the contact terminals for connecting said branches to the contact elements.

7. A wedge shaped plug body for use in a wedge shaped wall socket, said plug body having a base, a pair of opposite converging sides and a pair of electrical contact terminals entering the plug body normal to and extending outwardly from one of said converging sides, said base having a passage adapted to receive an electrical conductor into connection with said contact terminals in the plug body, and said body having a fastening lip in extension and in the plane of said base by which the plug body can be engaged with the socket, said plug body being insertable in the wall socket at an oblique angle to the plane of said base and with said contact terminals entering an inner side of said socket longitudinally of the axes of said terminals to assist in holding the plug body inserted with said base flush with the outer surface of the wall socket.

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