June 10, 1941. K. A. BRAINARD 2,244,937

ELECTRICAL OUTLET

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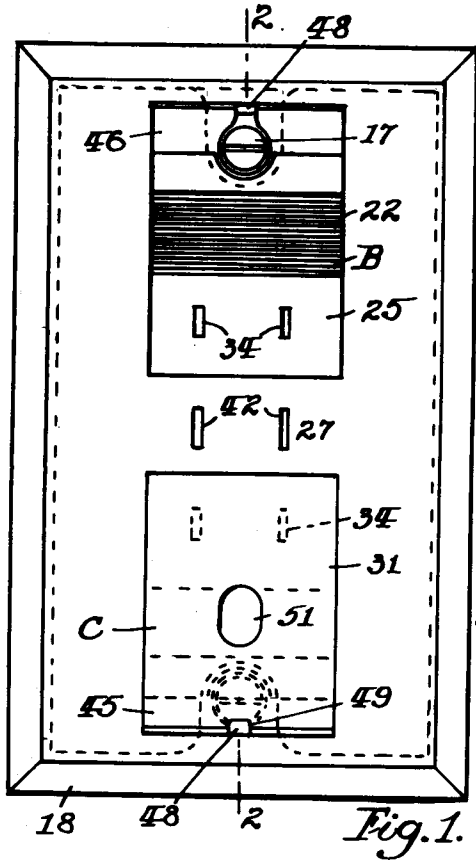


Fig. 1.

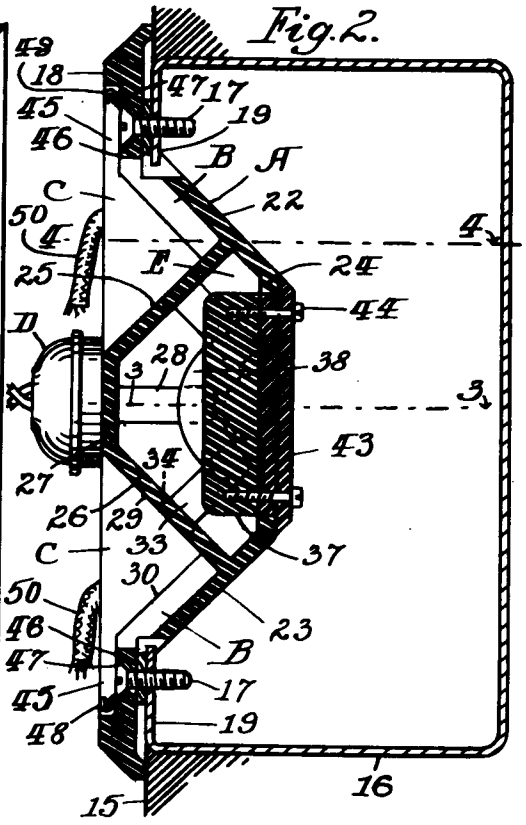


Fig. 2.



Fig. 5

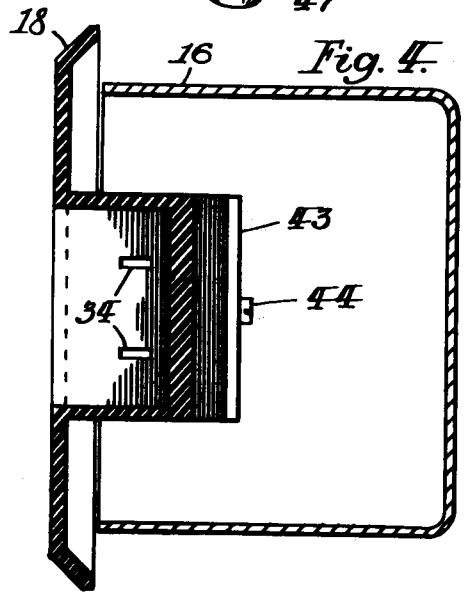


Fig. 4.

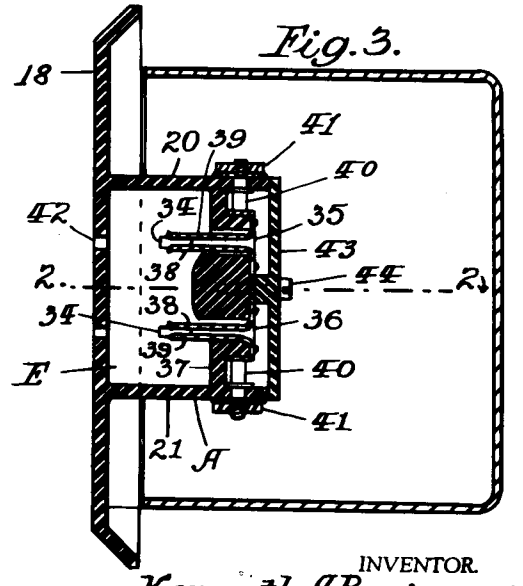


Fig. 3.

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Fig. 6.

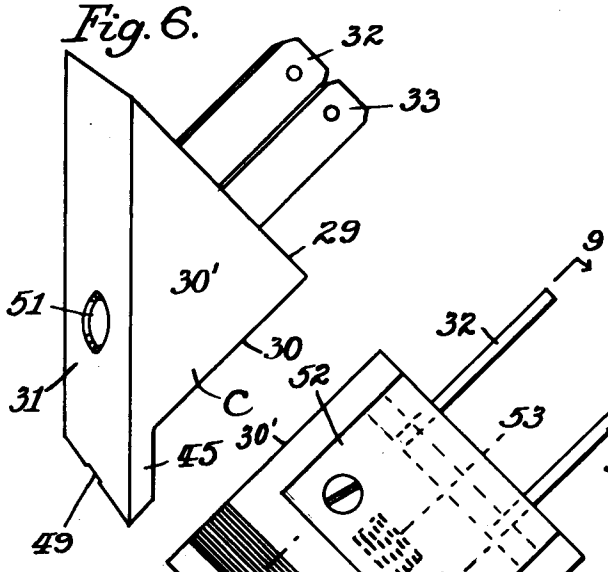


Fig. 7.

Fig. 8.

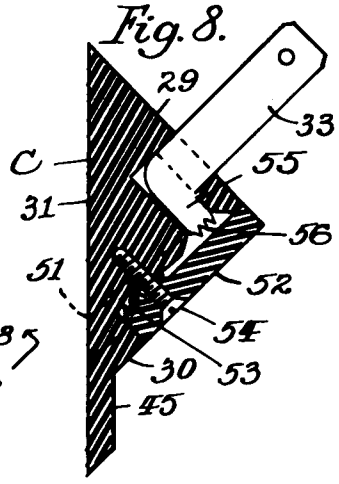


Fig. 9.

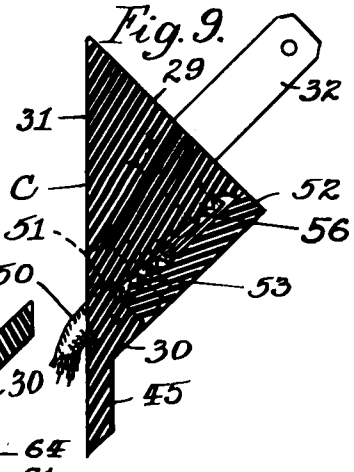


Fig. 10.

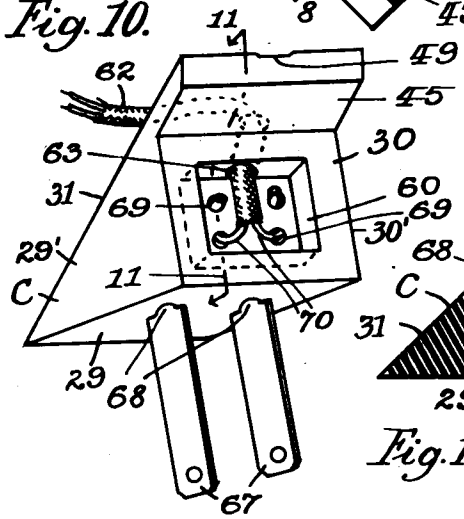


Fig. 11.

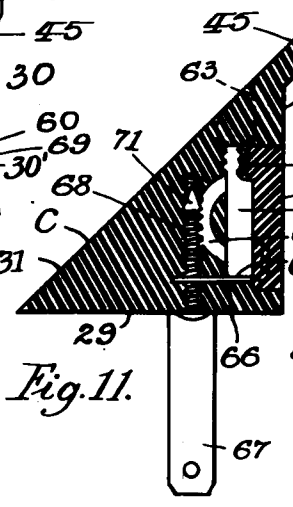
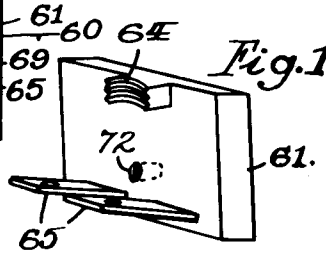


Fig. 12.



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Fig. 13.

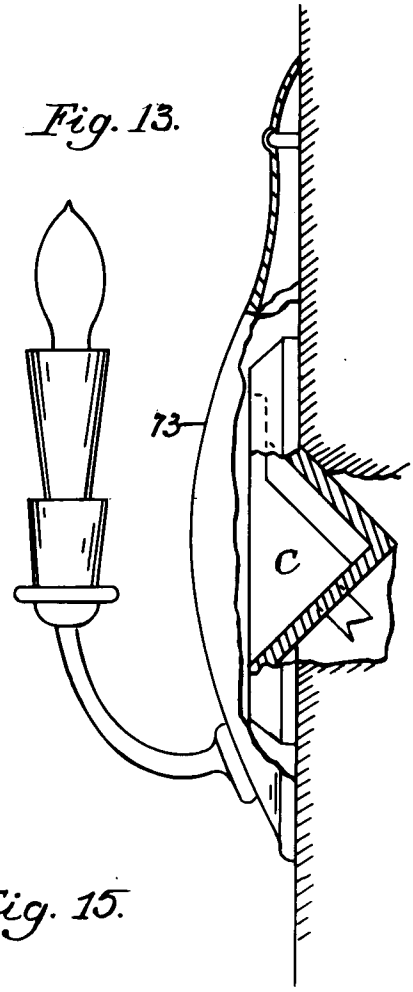


Fig. 14.

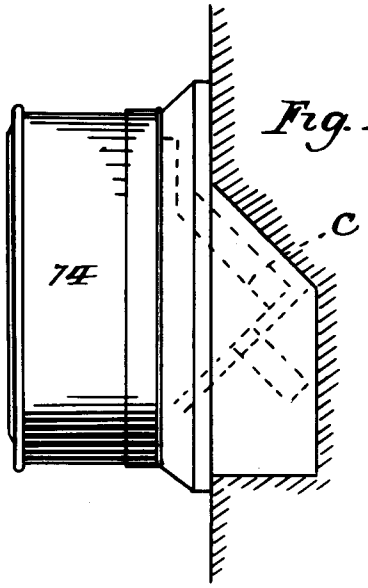
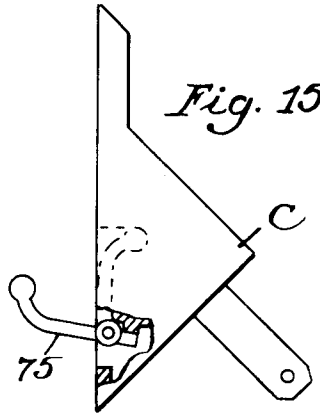


Fig. 15.



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UNITED STATES PATENT OFFICE

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ELECTRICAL OUTLET

Kenneth A. Brainard, Altadena, Calif.

Application November 27, 1939, Serial No. 306,349

7 Claims. (Cl. 173—330)

This invention relates to improvements in electrical outlets of that type having one or more pairs of openings for engaging the respective pairs of electric terminals of one or more plugs. More particularly this invention relates to that type of outlet employing a receptacle built in the wall of a building structure and in which the terminal unit is removably held and to which the feed wires of an electric supply circuit leading into the outlet box are adapted to be connected.

One of the principal objects of the invention is to provide an outlet having a socket fitting held in a wall receptacle and a cooperating plug, said elements being so constructed that the face plate and plug when united and in use present a flush outer surface and avoid being disturbed or disconnected by objects striking the plug.

A further object is to provide an outlet so constructed that it cooperates with the sides of the plug in such manner as to hold the cooperating plug in fully connected and protected position, thereby assisting in maintaining the plug tightly connected at all times when in use.

A further object is to provide an improved plug for use in the receptacle which is adapted to hold the wires of a circuit to be connected securely and in efficient electrical contact with terminals therein without loose or broken electrical connection.

A still further object is to provide improved means for fastening and connecting the ends of a circuit to the terminals of my improved plug in such manner as to avoid the use of tools.

The invention also possesses other objects and advantages some of which will be pointed out in the following description.

In the accompanying drawings forming part of this specification Fig. 1 is a front elevation of my improved electrical outlet showing one of my improved cooperating terminal plugs inserted therein; Fig. 2 is a section taken on line 2—2 of Fig. 1 and on line 2—2 of Fig. 3, when two of my improved terminal plugs are inserted and showing the simultaneous application of an ordinary plug; Fig. 3 is a horizontal section taken on line 3—3 of Fig. 2; Fig. 4 is a horizontal section taken on line 4—4 of Fig. 2 when my improved plug is removed; Fig. 5 is a top perspective view of the spring catch for removably holding my improved terminal plug in the receptacle; Fig. 6 is a side perspective view of one of my improved terminal plugs; Fig. 7 is a plan looking at the inner face of the terminal plug shown in Fig. 6; Fig. 8 is a section taken on the line 8—8 of Fig. 7; Fig. 9 is a section taken on line 9—9 of Fig. 7; Fig. 10 is a side perspective view of an alternative construction of my improved terminal plug; Fig. 11 is a vertical section taken approximately on line 11—11 of Fig. 10; Fig. 12 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. 10 and 11; Fig. 13 is a side elevation partly broken away and in section illustrating my improved plug supporting a lamp fixture; Fig. 14 is a side elevation partly in section showing a clock mounted upon my improved plug to be supported thereby, and Fig. 15 is a side elevation partly broken away and in section showing a folding hook built into my improved plug for supporting an object when the hook is turned into unfolded position as shown.

Referring to Fig. 2 of the drawings, the wall 15 of a building structure is partially illustrated, in which the customary outlet box 16 is built therein in the usual manner. Secured in this outlet box by screws 17 or other suitable means is my improved electrical receptacle element A, which is formed with a face plate 18. The heads of said screws are suitably countersunk into the face plate and the shanks of the screws are threaded through the usual flanges 19 on the outlet box so as to secure the face plate substantially flush with the outer surface of the wall 15.

My improved electrical receptacle has integral with its face plate 18, a body which extends into the outlet box 16 and is formed with a pair of vertical parallel end walls 20 and 21 and a pair of transverse upper and lower inwardly converging walls 22 and 23, which cooperate in forming an open inner rectangular body end 24. Arranged in this structure are upper and lower transverse walls 25 and 26 which diverge inwardly in a vertical plane and cooperate with walls 22 and 23 in producing wedge or triangular shaped wall sockets B in which my improved terminal plugs C are adapted to seat. The outer ends of the walls 25 and 26 are connected by the vertical web 27 which is also integral with said side walls 20 and 21 and through which the terminal blades 28 of an ordinary terminal plug D may be inserted to make connection with the circuit terminals held within the receptacle element as will be hereinafter described. Thus a terminal chamber E is produced within the receptacle element for the supply of electrical current to the plugs.

My improved terminal plug C is formed with a wedge shaped or triangular body which is adapted to seat in either of the wedge shaped sockets. This plug has a pair of converging sides 29 and

30 and vertical parallel ends 29' and 30', which correspond with and are adapted to coincide with the walls of the socket when the plug is inserted in the latter. The plug also is formed with a back or base wall 31 which is adapted to lie substantially flush with the outer surface of the face plate 18 when the plug is inserted and in use as will be hereinafter described. The plug also carries a pair of electrical contact blades 32 and 33 which when the plug is inserted in a socket project through terminal receiving openings 34 in either of the walls 25 and 26 and into contact with a pair of corresponding circuit supply spring terminals 35 and 36. These spring terminals are mounted upon a bridge 37 which is integral with and spans the space between the side walls 20 and 21 in the terminal chamber E. Each of the terminals 35 and 36 consists of a pair of parallel semi-circular spring metallic discs 38 and 39 spaced apart and between which one of the contact terminal blades of the plug is adapted to be inserted and make contact. A binding post 40 is provided on each pair of contact discs and extends through the companion side wall of the terminal receptacle. By means of a nut 41 or other suitable means the binding post is adapted to be connected with one of the conductors of a supply electrical circuit with which the outlet box is adapted to be associated. The pairs of plug terminal receiving openings 34 in walls 25 and 26 and terminal receiving openings 42 in the web 27 and the pairs of spring contacts of the corresponding circuit terminals 35 and 36 are arranged in juxtaposition so that any one of the plugs inserted in any pair of said terminal receiving openings will connect with the single pair of supply terminals 35 and 36 to tap the circuit with which said supply terminals are connected through binding posts 40. The direction in which the plug is inserted in its socket is at an obtuse angle to the plane of the surface plate 18. In other words the axes of the sockets and their plugs, when the latter are inserted are normal to the plane of the face plate, which causes the plugs to remain inserted without working loose or becoming disconnected. A suitable cover 43 is secured over the inner open end 24 of the terminal receptacle E by the screws 44 or other suitable means.

My improved wedge shaped terminal plug is provided with a supporting lip 45 in extension of the face 31 of the plug, said lip fitting and being held in a recess 46 in the face plate so that the entire back of the plug including the lip lies flush with the surface of the face plate. Each of the fastening screws 17 is provided with a cupped washer 47 in which the head of the screw seats tightly and this washer has a spring catch 48 (see Fig. 5) which is arranged to automatically spring into and out of engagement with an edge of the supporting lip in a notch 49 and releasably hold the plug fully inserted in its cooperating plug socket A.

The electrical conducting cord such as 50, which has its conductors connected to the plug is received through the passage 51 in the back of the plug and is secured tightly to the plug by a clamping cover plate 52 in one of its converging walls. This plate has a toothed boss 53 (see Fig. 9) on its inner surface, the teeth of which bite into and secure the conducting cord 50 to the plug. The plate is clamped by the use of screws 54. In making electrical connection with the conductor 50, the end of the cord beyond the portion engaged by the boss is stripped of its covering and the two conductors therein thus exposed are spread apart. Each of the inner ends of the contact blades 32 and 33 of the plug is formed with a short angular arm 55 which is firmly secured in the body of the plug and the terminus of this arm is provided with sharp teeth 56 which face inwardly toward the inner face of the clamping plate 52. These teeth are arranged so that when the insulated conductors of the conducting cord are trained over the teeth 56 and the clamping plate 52 is tightly secured by screws 54, 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 connection is 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 disconnecting from the plug.

The wedge shape of the plug permits the contact blades to be inserted at such an angle into the socket or receptacle so that by a downward pull upon the conductor cord leading into the socket the plug will not readily pull out of connection. The lip 45 with the fastener 48 locks the plug in operative position although the releasability of the lock permits the plug to be withdrawn under a substantial pull outwardly upon the conducting cord. However under normal conditions the plug will remain fully inserted in its socket. It is obvious the device can be variously modified and constructed with a single socket within the spirit of the invention instead of the multiple type shown and described. Also that it can be used in horizontal instead of vertical position as shown. Primarily the wedge shape of the plug and its socket enables the plug to be inserted with its back flush with the surface of the face plate which prevents objects from catching and releasing the plug out of operative connection which is a distinct advantage.

In Figs. 10 to 12 inclusive, I have shown a modification of my improved plug for use in my improved plug receptacle above described. The outward shape of the plug remains the same. The conductor cord fastening and connecting means is varied. The wedge shape body of the plug is formed with a rectangular chamber 60 in its side 30 opposite the side from which the terminal blades project, which is closed by a cord clamping plate 61. The electrical conducting cord 62 enters this chamber through a passage 63 which opens outwardly through the back face 31 of the plug and is positioned so that the body of the conducting cord is engaged and held firmly by the serrated boss 64 on the inner surface of the forward end of the clamping plate 61. The heel of the clamping plate opposite the end on which the serrated boss is formed has a pair of laterally projecting spring fasteners 65 secured thereto which are adapted to be inserted into a close fitting channel 66 in the body of the plug. The fasteners as shown in Fig. 12 are arranged normally at an obtuse angle to the plane of the inner wall of the clamping plate 61 so that when the plate is inserted and tightly pressed into a position closing the chamber 60, the springs tend to force the free end of the plate, with its serrated boss 64, tightly engaging and holding the conducting cord. The electrical contact blades 67 extend right angularly from the inner wall 29

of the plug as in the preferred construction but each is formed with a supporting shank 68 which is threaded into the body to support the contact blade. The fastening elements 66 are placed so that one of these shanks penetrates one of the fasteners and holds the clamping plate 61 in a position closing the chamber 60 and holding the conductor cord 62 tightly clamped. A small curved duct 69 is provided in the body of the plug adjoining each shank of the contact blades 67. This passage has its opposite ends connected upwardly into the chamber 60 through the floor of the chamber and its portion between its ends is intercepted by the threaded shank of one of the contact blades when the blade is screwed through its companion cover fastener 65 and fully into the body of the plug. One of these ducts is arranged on each side of the conductor cord in the chamber 60. The conductor cord 62 is led into the chamber 60 through passage 63 and its body is held securely by the boss 64 on plate 61. The end of the cord beyond the clamping boss 64 is stripped and the insulated wires 70 thus exposed are passed downwardly and backwardly through the ducts 69. The threaded shanks are adapted to cut through the insulation and contact the metallic conductors in said ends thus connecting the conductors with the plug terminal blades 67. The inner ends of the shanks 68 are pointed at 71 so as to readily guide through and engage the fasteners 65 and cut through the insulation on and contact the conductors 70 when the shanks are screwed into the body of the plug. This type of construction provides an effective means for fastening the conductor cord and making contact with its conductors without the use of hand tools, the blades being easily screwed into the plug by hand. Its simplicity commends its use on any type of plug irrespective of the outward configuration of the plug. When it is desired to open the chamber 60 and in the event the clamping plate sticks, the terminal blades can be unscrewed and removed. The shank of one of the blades can then be screwed into a threaded opening 72 in the clamping plate and the latter then lifted out of the chamber by using the blade as a handle, (see Fig. 12). It will be noted that this improved construction of plug provides a self contained fastening means by which the body of the cord is firmly secured to the plug, the conductors in the cord are efficiently contacted to make electrical connection with the contact blades or terminals of the plug, the cover of the receptacle containing said connections is locked closed, and the cover of the container can be readily removed, all without the use of tools.

In Fig. 13 I have shown a lamp fixture 73 mounted upon the base wall of my improved terminal plug C, 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 clock 74 is shown mounted upon the plug in Fig. 4. These illustrations are typical of many other objects that can be mounted upon the plug with equal effectiveness. In Fig. 15 I have shown my improved terminal plug constructed with a folding supporting hook 75 recessed when folded into the base wall of the body of the plug. In outstanding position any object such as an electric 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.

In accordance with the patent statutes I have described the principles of operation of my invention together with the construction thereof 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 uses other than those above set forth within the scope of the following claims.

I claim:

1. An electrical outlet, comprising, an outlet box adapted to be seated in the wall of a building structure, a face plate over the open end of the outlet box having a wedge shaped socket entering said outlet box, electrical plug connecting elements within said box and associated with said socket by which current is adapted to be fed to the socket, means for fastening the face plate to the outlet box, and means carried by the face plate for releasably securing a plug inserted in said socket.

2. An electrical fitting, comprising, an outlet box adapted to be seated in the wall of a building structure, a face plate over the open end of the outlet box having a wedge shaped socket entering said outlet box, and an electrical plug connecting assemblage within said outlet box, below said socket, said face plate being suitably passaged through one of its converging sides to receive the electrical connecting elements of a wedge shaped plug inserted in said socket into electrical connection with said plug connecting assemblage, and said socket providing means by which said plug is insertable therein at an oblique angle to the plane of the surface of the face plate.

3. An electrical fitting, comprising, an outlet box adapted to be seated in the wall of a building structure, a face plate secured over the open end of the outlet box and provided with a wedge shaped socket therein, said face plate having plug terminal receiving openings in one of the converging sides of said socket, and electrical connecting elements associated with said socket below said terminal openings for electrical connection with said plug, said socket providing means by which a terminal plug is insertable therein at an oblique angle to the plane of the surface of the face plate.

4. An electrical fitting, comprising, an outlet box adapted to be seated in the wall of a building structure, a face plate over the open end of the outlet box having a plurality of wedge shaped sockets entering said outlet box, each socket having a pair of inwardly converging sides, one of said sides of each pair being disposed opposite one of said sides of a companion socket, and said opposite sides being passaged to receive plug terminals therethrough, and an electrical connecting assemblage associated with said sockets below the passages therethrough for electrical connection with said plug terminals, said sockets providing means by which the plugs are insertable therein at oblique angle to the surface of the face plate.

5. An electrical fitting, comprising, an outlet box adapted to be seated in the wall of a building structure, a face plate secured over the open end of the outlet box and provided with a wedge shaped socket therein with a recess to receive a lip on a wedge shaped plug while the back of the plug including the lip lies substantially flush with the surface of said face plate, means for fastening the face plate to said box in said recess and adapted to be obscured from view in front by the lip of said plug when the latter is in-

serted in said socket, and an electrical connecting assemblage associated with said socket with which the terminals of said plug are adapted to connect when the plug is inserted in said socket, said socket providing means by which the terminal plug is insertable at an oblique angle to the plane of the surface of the face plate.

6. An electrical outlet, comprising, an outlet box adapted to be seated in the wall of a building structure, a face plate over the open end of the outlet box having a wedge shaped socket entering said outlet box and a recess for receiving the lip of a terminal plug when the latter is inserted in said socket with the entire back of said plug including its lip lying substantially flush with the surface of the face plate, means associated with said plate for releasably engaging the lip of the plug and holding the plug inserted in said socket, an electrical plug connecting assemblage within said outlet box and associated with said socket by which current is adapted to be supplied to the terminal plug when the latter is inserted in said socket, said socket providing means by which the terminal plug is insertable therein at an oblique angle to the plane of the surface of the face plate.

7. An electrical fitting, comprising, an outlet box adapted to be seated in the wall of a building structure, a face plate over the open end of the outlet box having a plurality of sockets entering said outlet box, each of said sockets having a pair of inwardly converging sides forming a wedge shape, one of said sides of each pair being disposed opposite one of said sides of a companion socket with a web between said sockets, said opposite sides and said web being passaged to receive plug terminals therethrough into said terminal box, and an electrical connecting assemblage in said box below said terminal receiving passages through the walls of said sockets and said web for electrical connection with plug terminals inserted therethrough.

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