June 24, 1941. S. M. DEL CAMP 2,246,722

FASTENER MEMBER AND FASTENER SECURED INSTALLATION

Filed June 15, 1939 2 Sheets-Sheet 1

Fig. 1.

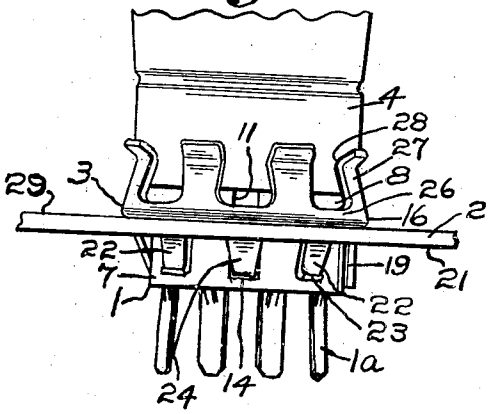


Fig. 2.

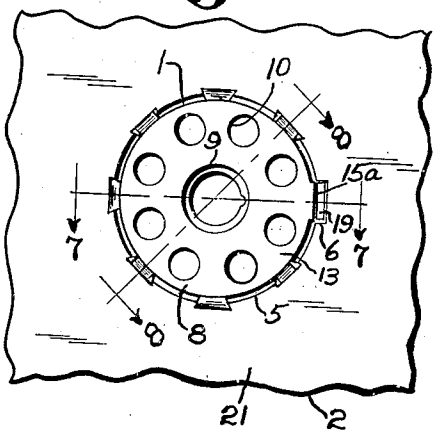


Fig. 3.

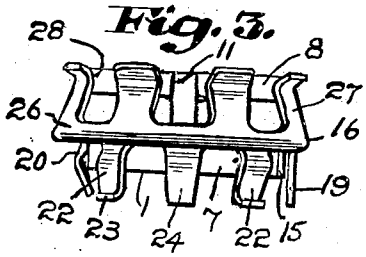


Fig. 4.

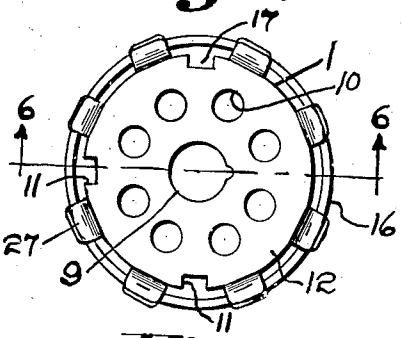


Fig. 5.

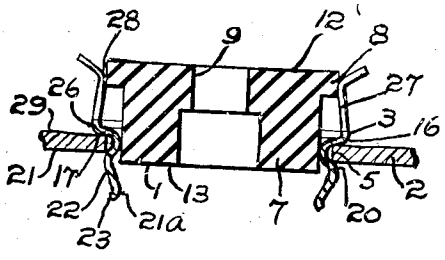
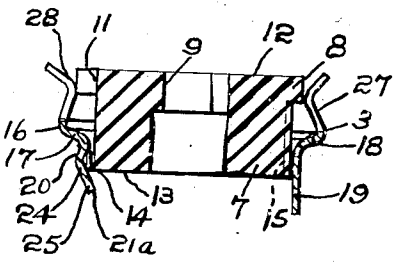


Fig. 6.



Inventor:
Scipione M. DelCamp.
By John Todd
Atty.

June 24, 1941. S. M. DEL CAMP 2,246,722

FASTENER MEMBER AND FASTENER SECURED INSTALLATION

Filed June 15, 1939 2 Sheets-Sheet 2

Fig. 7.

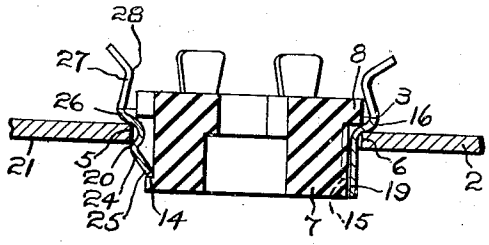


Fig. 8.

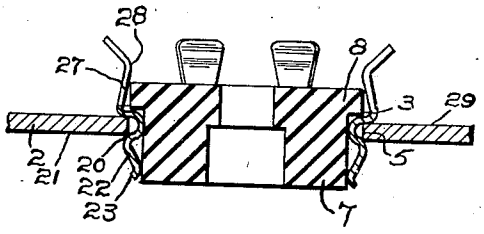


Fig. 9.

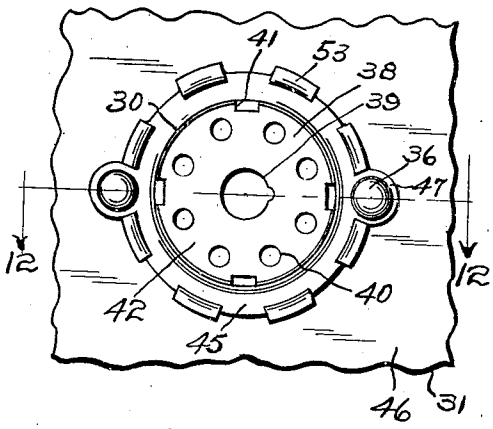


Fig. 10.

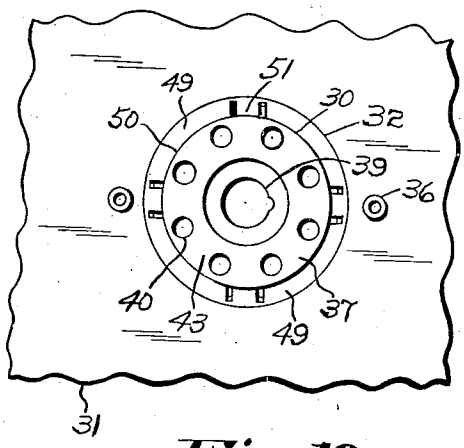


Fig. 11.

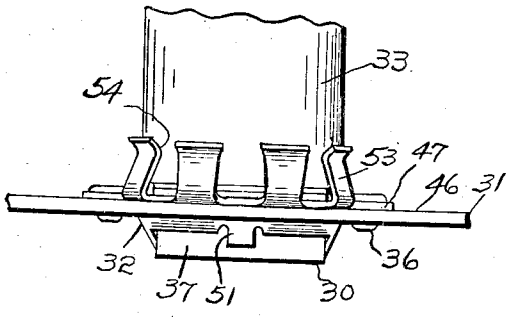
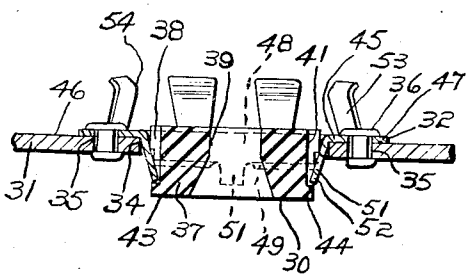


Fig. 12.



Inventor:
Scipione M. DelCamp.
By John Todd
Att'y.

Patented June 24, 1941 2,246,722

UNITED STATES PATENT OFFICE

2,246,722

FASTENER MEMBER AND FASTENER SECURED INSTALLATION

Scipione M. Del Camp, Maywood, Ill., assignor to Cinch Manufacturing Corporation, Chicago, Ill., a corporation of Illinois

Application June 15, 1939, Serial No. 279,317

9 Claims. (Cl. 173—339)

This invention relates to improvements in fastener secured installations and particularly those wherein an electrical unit such as a socket member is secured to a supporting panel.

One of the objects of my invention is directed to an improved installation wherein a dielectric socket member is secured to a support by means of an improved fastener member with the fastener member providing resilient portions adapted to engage a vacuum tube at its base to prevent the tube from being ejected from the socket if subjected to substantial jar and vibration.

Another object of my invention is an improved installation providing a fastener member having means for retaining a socket member in assembly with a supporting panel with the fastener member providing yieldable fingers adapted to furnish uninterrupted electrical connection between the panel and a tube envelope in the case of a steel envelope tube or a metal shielding device in the case of a glass bulb tube.

A further object of my invention is the provision of a fastener installation providing a fastener member and an electrical unit such as a socket member adapted to be shipped in semi-assembled relation and then quickly and easily secured to a supporting panel, when it is desired to use the unit, by a relatively simple operation.

Another object of my invention relates to a fastener secured installation providing a supporting panel and an electrical unit such as a socket member secured to the supporting panel by means of an improved fastener member wherein the fastener member has means rigidly securing the socket member to the panel, but enabling the socket member and fastener member to be removed from the panel without physical damage should it be desired.

Other objects and uses of my invention will be apparent from inspection of the drawings and specification hereinbelow set forth.

Referring to the drawings, in which I have illustrated a preferred embodiment of my invention:

Fig. 1 is a plan view showing a supporting panel, a socket member carrying contact members and secured to the supporting panel by means of my first form of fastener member, and a vacuum tube in cooperating electrical engagement with the socket member and having a metal shielding device grounded to the supporting panel;

Fig. 2 is a bottom plan view of the installation shown in Fig. 1 but omitting the contact members of the socket member and the vacuum tube;

Fig. 3 is a plan view of an installation including a socket member in initial or semi-assembled position with my first form of fastener member;

Fig. 4 is a top plan view of the installation shown in Fig. 3;

Fig. 5 is a sectional view showing the manner in which the socket member is secured to the support by means of my first form of fastener member with the socket member in initial assembled position relative to the other parts of the installation;

Fig. 6 is a sectional view taken along the line 6—6 of Fig. 4;

Fig. 7 is a sectional view taken along the line 7—7 of Fig. 2;

Fig. 8 is a sectional view taken along the line 8—8 of Fig. 2;

Fig. 9 is a top plan view showing a socket member secured to a supporting panel by means of my second form of fastener member;

Fig. 10 is a bottom plan view of the installation shown in Fig. 9;

Fig. 11 is a front elevation of the installation shown in Figs. 9 and 10 showing the manner in which my second form of fastener member engages a metal shield or envelope of a cooperating vacuum tube to ground this part with the panel; and

Fig. 12 is a sectional view taken along the line 12—12 of Fig. 9.

Referring to my preferred form of fastener installation illustrated in Fig. 1, I have shown an article of manufacture such as a socket member 1 of dielectric material secured to a metal supporting panel 2, which may be the chassis of a radio set, by means of my first form of fastener member 3. The fastener member 3, which is formed of metal, engages the support 2 in assembled position and provides resilient portions engaging the metal shield 4 (Fig. 1) of a vacuum tube in coupled engagement with the socket member 1 for grounding the shield 4 to the support. The metal supporting panel 2 is in the form of a thin metal plate having an opening 5 therein and providing a notch 6 at one side of the opening 5 for a purpose to be described. The fastener member 3 and socket member 1 are constructed in a way enabling the same to be initially or semi-assembled together, in which relative positions they may be shipped to points at which the parts of the radio set are to be finally assembled. When the parts are to be used they may be quickly and easily installed with the radio chassis by hand or by means of

a suitable tool (not shown) in a manner to be hereinbelow more fully described. It should be understood that although I have preferred to show the part 4 as a metal shield of a vacuum tube of the glass bulb type, this part may also be the envelope of a so-called all-metal tube without departing from the scope and spirit of my invention.

Referring in detail to the socket member 1, I have shown one of molded dielectric material having a body portion 7 and a flange portion 8 at the upper end of the body portion. The portions 7 and 8 preferably have a substantially circular circumferential shape. The socket member has a central noncircular opening 9 extending therethrough for receiving a guide pin (not shown) of a cooperating vacuum tube in a manner well known in the art. Disposed around the central opening 9 are a series of openings 10 of any suitable shape for receiving any desired form of prong-receiving contact portions 1a (Fig. 1). As a means for securing the socket member in assembly with the fastener member 3 I have provided three slots 11 in the circumferential surface of the socket 1, in my preferred form, which extend from the upper end face 12 of the socket through the flange portion 8 and the body portion 7 and terminate short of the lower end face 13 of the socket member. Thus an abutment or shoulder 14 is provided adjacent the end of each of the slots 11 nearest the face 13 substantially facing the flange portion 8 of the socket for a purpose to be described. In my preferred form I have provided a positioning portion 15 integral with the circumferential surface of the body portion 7 and extending laterally beyond the normal circumference of the body portion 7 on one side of the socket member. The positioning portion 15 provides an outer flat face 15a (Fig. 2) adapted to cooperate with the fastener member 3 and the opening 6 of the support 2 to prevent relative rotation of the parts of the installation in a manner to be described.

Referring in detail to my first form of fastener member, I have provided one made of one piece of sheet metal having a base portion 16. The base portion 16 comprises a bottom or socket supporting wall 17 having an opening 18 therein of a diameter which is less than the diameter of the flange portion 8 of the socket member but greater than the diameter of the body portion 7 wherein the flange portion 8 may be supported by the bottom wall 17 with the body portion 7 extending through the opening 18 thereof in final assembly of the parts. An annular series of attaching portions or finger portions integrally joined to the bottom wall 17 adjacent the opening 18 extend downwardly beneath the base 16. In my preferred form of fastener member, eight of these fingers are provided. One of the fingers 19 is relatively straight and is adapted to cooperate with the portion 15 and the notch 6 of the panel in a way to prevent relative rotation of the parts of the installation. Seven of the fingers are yieldable and of bowed formation providing shoulders 20 for fastener engagement behind the lower surface 21 of the support 2. Portions 21a (Figs. 5 and 6) adjacent the free ends of the seven yieldable fingers extend inwardly and form an imaginary circle at their innermost points which is of less diameter than the diameter of the opening 18 of the base 16 for a purpose to be described. Four of the yieldable fingers, which I have preferred to indicate by the numeral 22, are intended solely for cooperation with the support 2 for securing the fastener member in fixed engagement with the support. The fingers 22 have outermost free end portions 23 which extend outwardly relative to the axial passage of the fastener member. Three of the yieldable fingers, which I have preferred to indicate by the numeral 24, are adapted for cooperating fastener engagement with the socket member for securing the socket member in assembly with the support and provide outermost free end portions 25 (Fig. 7) which are relatively straight for cooperative fastener engagement behind the shoulders 14 of the body portion 7 of the socket member in a way to limit vertical movement of the socket member, as will be described. In my preferred form of fastener member a peripheral wall 26 extends upwardly from the bottom wall 17 in a direction opposite to that taken by the downwardly-extending fingers. An annular series of upwardly-extending yieldable fingers 27 project from the peripheral wall 26 in a direction opposite to that taken by the fingers 22 and 24. The yieldable fingers 27 converge and then diverge providing inwardly-extending portions 28 for resilient engagement with the part 4 of the tube member. The imaginary circle defined by the innermost points of the inwardly-extending portions 28 has a diameter which is less than the diameter of the flange portion 8 of the socket member 1 for a purpose to be described.

Initial or semi-assembly of the socket member and fastener member for purposes of handling and shipping is carried out through inserting the socket member 1 part way into the fastener member so that the inwardly-extending portions 28 of the upwardly-extending fingers 27 resiliently engage the flange portion 8 of the socket member in the manner shown in Figs. 3, 4 and 6. In this position of the parts the straight finger 19 is disposed opposite the flat face 15a of the positioning portion 15 and the fingers 24 are disposed opposite the slots 11. Thus the parts are maintained in secure enough assembly to hold them together against the abuses of transportation until they are ready to be assembled with the radio chassis. Assembly of the socket member with the radio chassis is a relatively simple matter and is carried out through first inserting the downwardly-extending fingers of the fastener member 3 into the opening 5 of the supporting panel 2 with the finger 19 disposed within the notch 6. Yieldability of the fingers effects engagement of the shoulders 20 of the seven shouldered fingers behind the surface 21 of the support. After this action the parts are disposed in the relative positions shown in Fig. 5. It will be seen that in this relative position of the fastener member and supporting panel the base portion 16 of the fastener member engages material of the upper surface 29 of the panel 2 adjacent the opening 5 wherein the fastener member and panel are in electrical connection one with another. Next the socket member 1 is moved from semi-assembled position shown in Fig. 5 downwardly axially of the fastener member to engage the lower end of the body portion 7 with the innermost portions 21a of the fingers 22 and 24. This engagement is effected through reason of the fact that the diameter of the body portion 7 is greater than the imaginary circle defined by the portions 21a of the shouldered fingers. As pressure is exerted on the socket member the yieldable fingers 22 and 24 are moved outwardly thus locking the shoulders 20

of the yieldable fingers 22 in engagement with the support 2 adjacent the aperture 5. At the same time the outermost free end portions 25 of the fingers 24 engage behind the shoulders 14 of the body portion so as to prevent vertical movement of the socket member in a direction opposite to that of its insertion. The flange portion 8 of the socket member is supported by the bottom wall 17 of the fastener thereby limiting vertical movement of the socket member in the direction of its insertion. It will be seen that when the parts of the installation are in final fixed position, the downwardly-extending finger 19 is disposed within the notch 6 of the panel so as to limit relative rotative movement of the parts.

When the parts of the installation are in final assembly, the yieldable fingers 27 extend above the flange 8 of the socket member for resilient engagement with the metal shield or metal envelope of the cooperating vacuum tube when the same is coupled with the socket member so as to ground the shield or envelope to the support and aid to hold the tube member in place.

The entire socket assembly may be removed from the supporting panel 2 without damage to either the fastener member or the socket member through first releasing the three socket-engaging fingers 24 and then removing the socket member completely from the fastener member. After this the support-engaging fingers 22 of the fastener may be easily released from engagement with the support.

Although assembly of the socket installation with the support may be accomplished by hand, I prefer to effect this action by a tool (not shown) which in one stroke secures the fastener member in initial snap fastener engagement with the support 2 and pushes the socket member into final position to lock the fastener member in engagement with the support and secure the socket member in final fixed assembly with the fastener member.

Referring to the second form of my invention illustrated in Figs. 9–12, I have shown a socket member 30 of dielectric material secured to a metal supporting panel 31 by means of my second form of fastener member 32. The fastener member 32 is permanently secured in electrical engagement with the supporting panel 31 and provides fastener means maintaining the socket member 30 in assembly with the supporting panel and yieldable means extending beyond one surface of the panel 31 for resilient engagement with a shield 33 (Fig. 11) of a vacuum tube to ground the shield to the panel. The support 31 is in the form of a relatively thin sheet metal panel having a large circular opening 34 therein and smaller openings 35 on opposite sides and spaced from the opening 34 for receiving rivets 36 whereby the fastener member 32 is secured in fixed engagement with the support. The socket member 30 is formed of molded dielectric material and comprises a body portion 37 and a flange portion 38 at one end of the body portion, each of which has a substantially cylindrical circumferential surface. The socket member has a central non-circular opening 39 for receiving a guide pin (not shown) of a cooperating vacuum tube and an annular series of openings 40 disposed around the central opening 39 for receiving any suitable form of socket contact members (not shown). A number of slots 41 (Figs. 9 and 12), herein shown as four, are formed in the outer circumferential surface of the socket member and extend from the upper end face 42 of the socket member through the flange 38 and the body portion 37 and terminate short of the lower end face 43 of the socket member providing shoulders 44 (Fig. 12) facing in the direction of the flange 38.

My second form of fastener member 32, which is preferably made from one piece of sheet metal, comprises a base portion having an axial passage therethrough. The base portion comprises an annular ring portion 45 adapted to engage the upper surface 46 of the panel 31 adjacent the opening 34. Ears 47 are formed on opposite sides of the ring 45 having openings for receiving the rivets 36 whereby the fastener member is secured to the supporting panel. A peripheral wall 48 (Fig. 12) extends downwardly from the inner margins of the ring-like portion 45 through the opening 34 of the support. Inwardly-extending portions 49 are provided at the lower end of the wall 48 with their inner edges defining an opening 50 (Fig. 10) which is smaller in diameter than the diameter of the body portion 37 of the socket member whereby the inwardly-extending portions 49 support the flange portion 38 with the body portion 37 extending through the opening 50 in final assembly of the parts. A number of yieldable lug portions 51 extend downwardly from the peripheral wall 48 normally in a plane substantially parallel to the axis of the fastener member. The lug portions 51 have outermost free end portions 52 adapted to engage behind the shoulders 44 of the socket member when the parts of the installation are finally secured together to limit vertical movement of the socket member. A plurality of yieldable fingers 53 extend from the outer marginal edges of the ring-like portion 45 upwardly in a direction substantially opposite to that taken by the lugs 51. The yieldable portions 53 converge and then diverge forming inwardly-extending portions 54 for resilient engagement with the shield 33 of the tube member.

In assembling the parts of my installation, the fastener member 32 is first secured in fixed assembly with the support 31. Next the socket member 30 is moved through the axial opening of the fastener member with the slots 41 opposite the lug portions 51. After the socket member has been moved into final relative position with the flange portion 38 supported by the inwardly-extending portions 49 of the fastener base and the body portion 37 extending through the opening 50, the lug portions 51 are bent inwardly by a suitable tool to engage the end portions 52 behind the shoulders 44 of the body portion. Thus the socket member is maintained in secure assembly with the panel and is incapable of either vertical or rotative movement. The innermost points of the inwardly-extending portions 54 of the yieldable portions 53 define an imaginary circle having a diameter less than the diameter of the metal shield 33 of the cooperating tube member with the result that when the tube member is coupled with the socket member, the inwardly-extending portions 54 engage the shield under tension thereby effecting a good grounding connection between the support and the shield device. The socket member 30 may be easily removed from assembly with the support through releasing the lug portions 51 from behind the shoulders 44 of the body portion.

Although I have illustrated and described preferred forms of my invention, I do not wish to

be limited thereby because the scope of my invention is best defined by the following claims.

I claim:

1. A fastener secured installation comprising a socket member and a fastener member for securing said socket to a support, said fastener member having fastener means engaging said socket for maintaining said parts in initial assembled position prior to securing said socket to a support, and said fastener member having yieldable attaching portions adapted to extend through an opening of said support to engage said support and means securing said socket in final fixed assembly with said support on moving said socket from said initial assembled position relative to said fastener member to final position.

2. A socket installation comprising a socket and a fastener member for securing said socket to a support, said fastener member having yieldable fastener means in spring engagement with said socket for maintaining said parts in initial relative assembly prior to securing said socket to a support, and said fastener member having yieldable attaching portions adapted to extend through an opening of said support, said attaching portions being adapted to engage said support to secure said socket thereto and said fastener member having means for engaging said socket to hold said socket in final fixed assembly with said support on moving said socket from said initial assembled position relative to said fastener member to final position.

3. A fastener secured installation comprising an apertured support, a member of a plug and socket device and a fastener member for securing said member to a support, said fastener member having a base portion surrounding an opening in the fastener member, said base portion having an integral set of annularly arranged upwardly-extending yieldable fingers and annularly arranged downwardly-extending fingers, said upwardly-extending fingers engaging said member under spring tension for maintaining said parts in initial assembled position prior to securing said member to a support, said downwardly-extending fingers adapted to extend through an aperture of said support to secure said fastener member in final fixed assembly with said support, and said fastener member and said member having co-engaging fastener means to hold said article in final fixed assembly with said support on moving said article from said initial assembled position relative to said fastener member to final position.

4. A socket installation comprising a socket member and a fastener member for securing said socket member to a support, said fastener member providing a base portion having an opening therein, a set of yieldable fingers extending upwardly from said base and a set of yieldable fingers extending downwardly from said base, said upwardly-extending fingers engaging said socket member under spring tension for maintaining said parts in initial assembled position prior to securing said socket member to a support, said fastener member having means for engaging said support whereby it is secured in fixed assembly with said support, and said downwardly-extending fingers being adapted for engaging said socket member to hold said socket member in final fixed assembly with said support on moving said socket member from said initial assembled position relative to said fastener member to final position.

5. A fastener secured installation comprising a socket member and a fastener member for securing said article to a support, said fastener member providing a base portion having an opening therein, a set of yieldable fingers extending upwardly from said base and a set of yieldable fingers extending downwardly from said base, said socket member having a flange portion of greater diameter than the opening of said base and a body portion of less diameter than said opening, said body portion having shoulders in the exterior thereof facing said flange, said upwardly-extending fingers engaging said socket member under spring tension for maintaining said parts in initial assembled position prior to securing said socket member to a support, said fastener member having means for engaging said support whereby it is secured in final fixed assembly with said support, and said downwardly-extending fingers adapted to enter cooperating fastener engagement with said shoulders of said body portion to hold said socket member in final fixed assembly with said support on moving said socket member from said initial assembled position relative to said fastener member to final position with said body portion extending through said opening of the base of said fastener member.

6. An electrical socket installation comprising a support having an opening, a socket member and a metal fastener member securing said socket to said support, said fastener member having a base portion secured in electrical engagement with said support, said base portion having an opening in alignment with said opening of said support, said socket member having a body portion extending through said opening of said base, said body portion and said fastener member having co-engaging fastener means limiting movement of said socket member in one direction through said opening of said base, and said fastener member having a set of fingers extending upwardly from said base portion, said fingers being adapted to engage a shielding device of an electrical unit to be connected electrically with said socket member whereby said shielding device is grounded to said support.

7. An electrical socket installation comprising a support having an opening, a socket member and a metal fastener member securing said socket member to said support, said fastener member having a base portion comprising a bottom wall having an opening in alignment with said opening of a support and a peripheral side wall extending upwardly from said bottom wall, a set of yieldable fingers extending upwardly from said base portion for engaging another part, and fingers extending downwardly from said base portion through said opening of said support, said socket member having a body portion extending through said opening of said bottom wall and a flange portion having a greater diameter than said opening of said bottom wall and supported by said bottom wall, said body portion having shoulder means facing said flange, and said downwardly-extending fingers being in fastener engagement with said shoulders of said body portion to limit movement of said socket member through said opening in a direction opposite to that of its insertion.

8. An electrical socket installation comprising a metal support having an opening, a socket member and a metal fastener member securing said socket member to said support, said fastener member providing a base portion in engagement with said support, said base portion providing a

bottom wall, said bottom wall having an opening in alignment with said opening of said support, a set of yieldable fingers extending downwardly from said base portion through said opening of said support and a set of fingers extending upwardly from said base portion, said upwardly-extending fingers being adapted for electrical engagement with an electrical plug unit whereby said shielding device is grounded to said support, at least two of said downwardly-extending fingers projecting through said opening of said support and engaging said support to secure said fastener member thereto, said socket member having a body portion extending through said opening of said body portion and said opening of said support and a flange portion having a greater diameter than said opening of said bottom wall and supported by said bottom wall, said body portion having shoulder means facing said flange, and one of said downwardly-extending fingers being in fastener engagement with said shoulder of said body portion to limit movement of said socket member through said opening in a direction opposite to that of its insertion.

9. An electrical installation comprising a support having an aperture, a fastener member having an axial passage therethrough, said fastener having a base in engagement with a surface of said support adjacent said aperture, said base providing an article-supporting portion having an opening therein, yieldable fingers extending from said base through said aperture of said support, said fingers having inwardly-disposed portions within said axial passage, and an electrical member carrying contact portions, said electrical member having a body portion extending through said axial passage of said fastener member and engaging said inwardly-disposed portions of said fingers to move at least two of said fingers into locking engagement with said support, a flange portion at one end of said body portion having a greater diameter than said opening of said article-supporting portion and supported by said article-supporting portion thereby to limit movement of said electrical member through said axial passage in the direction of its insertion, said body portion of said electrical member having a shoulder portion facing the flange portion thereof and one of said yieldable fingers being in cooperative fastener engagement with said shoulder to limit movement of said electrical member through said opening in a direction opposite to that of its insertion.

SCIPIONE M. DEL CAMP.