

May 26, 1970

S. C. SCHANTZ
SOCKET FOR PLUG-IN ELECTRICAL COMPONENTS WITH SNAP-IN
ATTACHMENT TO MOUNTING PANEL

3,514,743

Filed Sept. 23, 1968

3 Sheets-Sheet 1

Fig. 1.

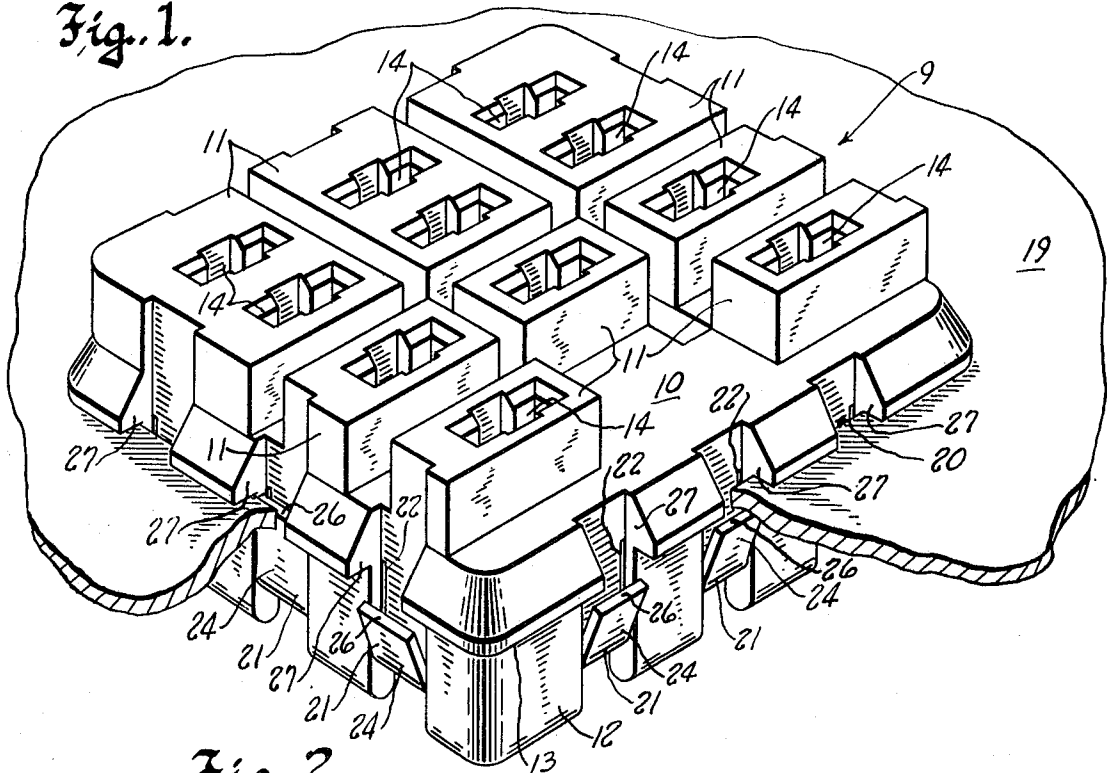
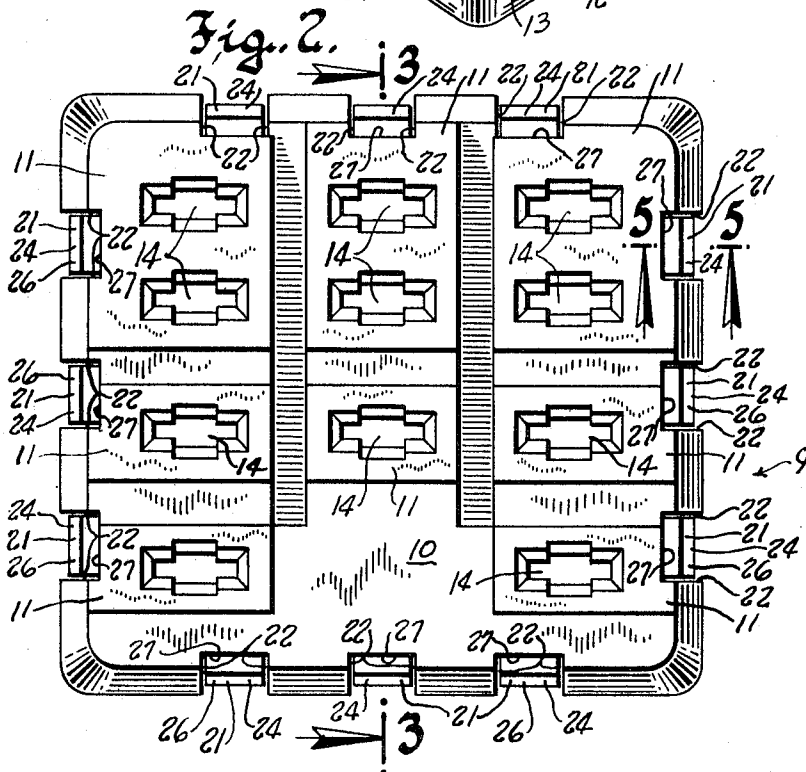


Fig. 2.



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Fig. 3.

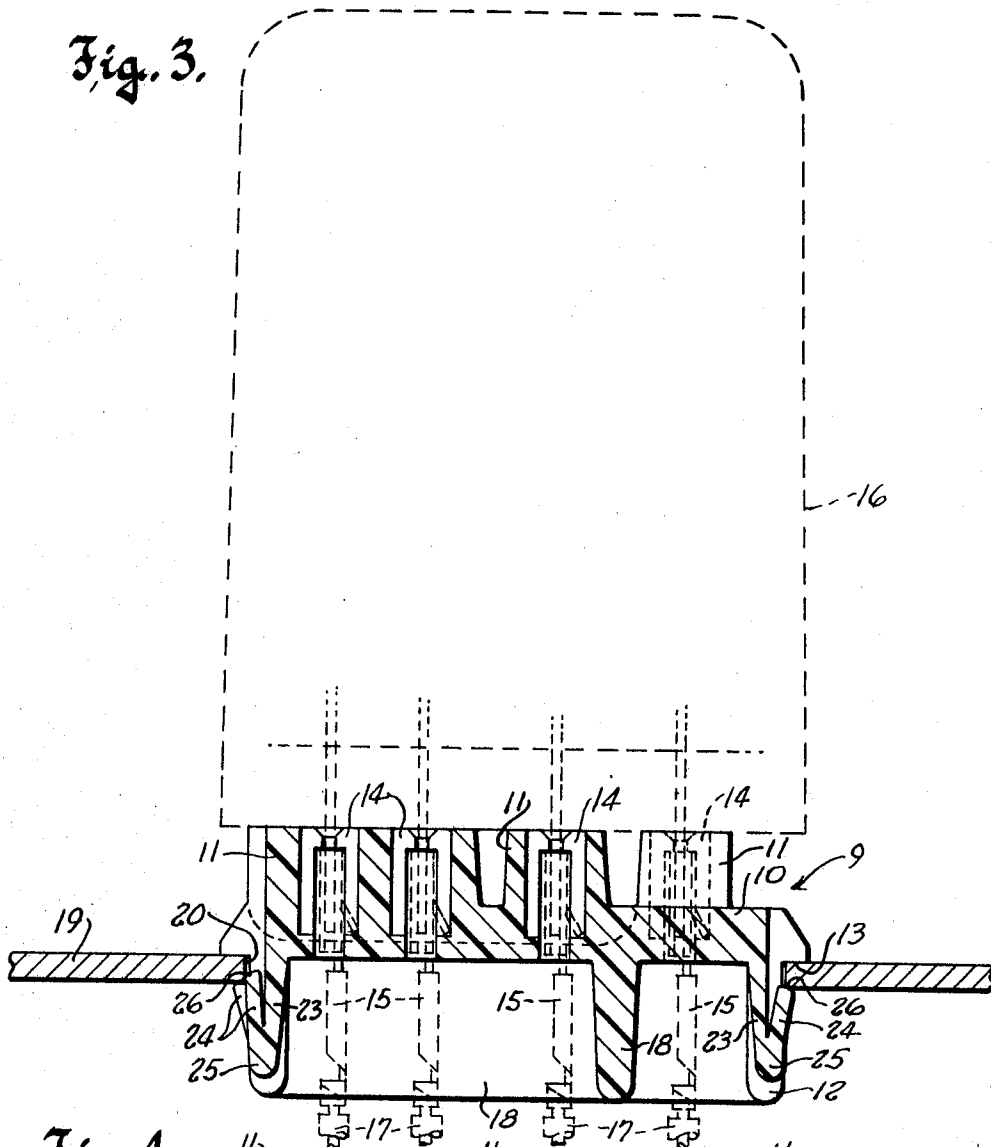
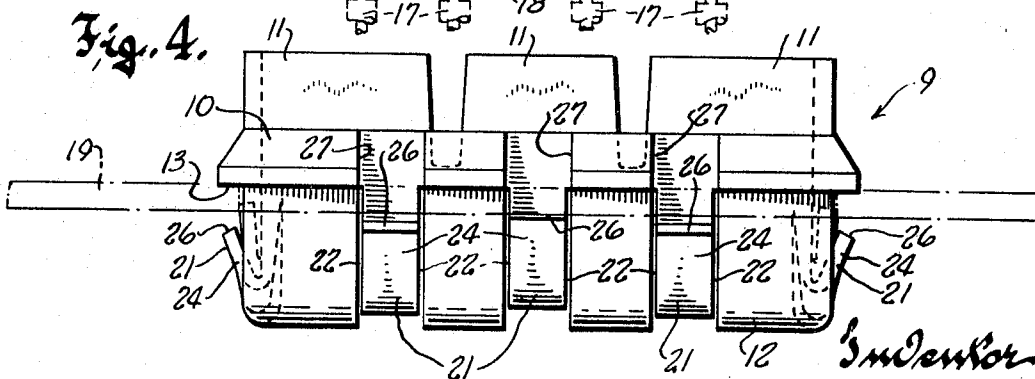


Fig. 4.



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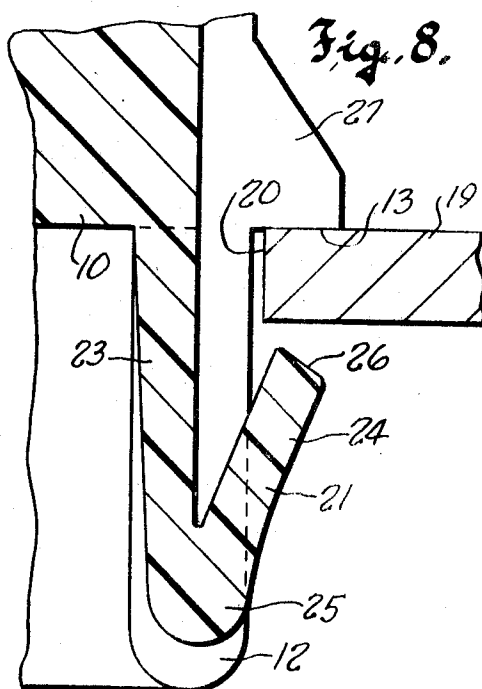
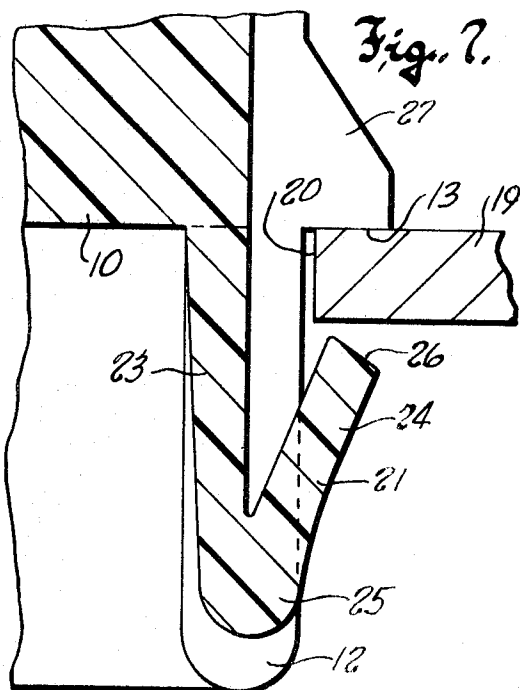
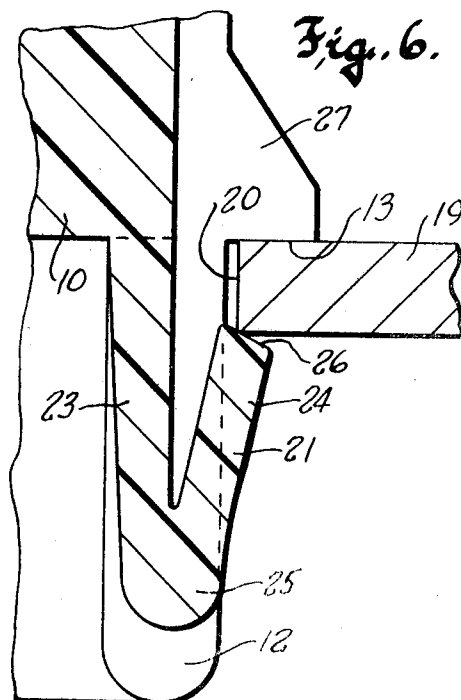
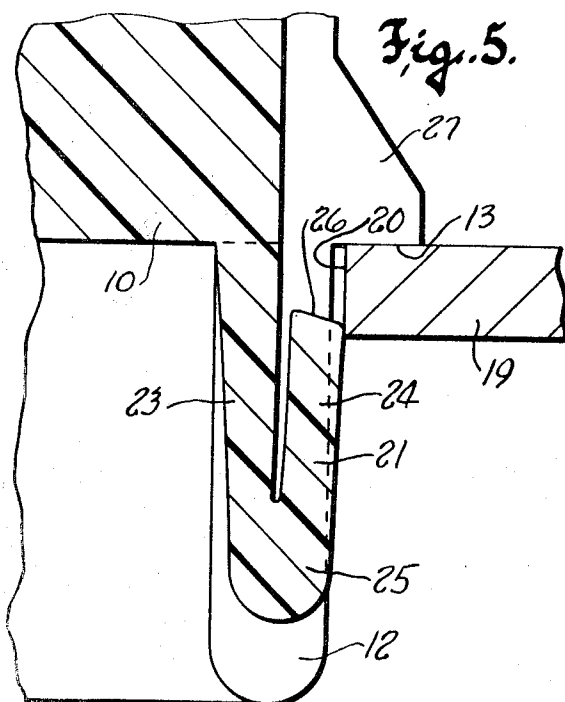
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SOCKET FOR PLUG-IN ELECTRICAL COMPONENTS WITH SNAP-IN ATTACHMENT TO MOUNTING PANEL

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Filed Sept. 23, 1968, Ser. No. 761,628

Int. Cl. H02b 1/02

U.S. Cl. 339—128

6 Claims

ABSTRACT OF THE DISCLOSURE

A socket for a multiple terminal plug-in type electrical component molded of insulating material has a plurality of retaining tongues depending from its underside, each of which consists of integrally joined upwardly divergent inner and outer legs, the latter coacting with a downwardly facing shoulder at the marginal edge of the socket to secure the socket in a hole in a panel; and the outer legs of some of the tongues being of different lengths so that the free ends thereof are spaced different distances from the downwardly facing shoulder to compensate for differences in thickness of the panel.

This invention relates to sockets for multiple terminal plug-in type electrical components and has as its purpose and object to provide an improved socket for this purpose.

SUMMARY

The socket of this invention is of the snap-in type. It comprises an integral molding of insulating material having a body wall with spaced apart terminal receiving cavities opening to the top and bottom of the body wall so that terminals seated in the cavities are accessible at the top and bottom of the body wall. A skirt depends from the bottom of the body wall for insertion into a correspondingly shaped and sized hole in a mounting panel, and provides an insulating barrier between the panel and terminals exposed at the bottom of the socket. The skirt has paired slits therein at spaced apart locations extending from its edge substantially to the body wall to define a plurality of tongues spaced around the skirt. A particularly significant feature of the invention resides in the formation of these tongues. Thus, each tongue comprises integrally joined upwardly divergent inner and outer legs, the inner one of which is joined at its distal end with the body wall. The junction of the divergent legs is near the edge of the skirt, and the inherent resiliency of the legs yieldingly resists flexure of the outer leg out of an upwardly and outwardly slanting position protruding beyond the outer face of the skirt with its free end spaced downwardly from a locating shoulder on the marginal portion of the body wall, to coact therewith in securing the socket to the panel.

By virtue of the resilience of the integrally joined legs, the outer leg can be deflected inwardly by contact with the edge of the hole in the mounting panel during attachment of the socket to the panel, and springs back toward its free position upon insertion of the socket far enough for the free end of the outer leg to clear the bottom edge of the hole in the panel. The outer legs of some of the tongues are of different lengths so that their free ends are spaced different distances from the downwardly facing locating shoulder to accommodate different panel thicknesses and assure that, despite such different panel thicknesses, the outer legs of some of the tongues have their free ends wedged against the bottom edge of the hole in the panel to secure the socket to the panel.

Although numerous snap-in sockets have been devised

heretofore, and quite a few patents have been issued on such sockets, the present socket is greatly improved over its predecessors. Of the prior patented sockets, the closest approach appears to be in the Klump, Jr. Pat. No. 3,079,581, and the Krol Pat. No. 3,273,104, but even these lack the advantages of this invention.

With these observations and objects in mind, the manner in which the invention achieves its purpose will be appreciated from the following description and the accompanying drawings. This disclosure is intended merely to exemplify the invention. The invention is not limited to the particular structure disclosed, and changes can be made therein which lie within the scope of the appended claims without departing from the invention.

The drawings illustrate one complete example of the physical embodiment of the invention constructed according to the best mode so far devised for the practical application of the principles thereof, and in which:

FIG. 1 is a perspective view of a socket embodying this invention, illustrating the same mounted on a panel;

FIG. 2 is a top plan view of the socket per se;

FIG. 3 is a vertical sectional view through FIG. 2 on the plane of the line 3—3, with a plug-in electrical component mounted therein;

FIG. 4 is a side view of the socket; and

FIGS. 5, 6, 7 and 8 are detail fragmentary sectional views on an enlarged scale, each taken through a different one of the retaining tongues by which the socket is held in place, as on the plane of line 5 of FIG. 2.

Referring now particularly to the accompanying drawings, the numeral 9 designates generally the socket of this invention. The socket is one integral molding of resilient insulating material, such as nylon, and has a body wall 10 generally square or rectangular in shape. A plurality of upwardly projecting bosses 11 rise from the top surface of the wall 10 and a skirt 12 depends from its underside inwardly of its marginal edge. Placement of the skirt inwardly of the marginal edge of the body wall results in the formation of a downwardly facing locating shoulder 13 circumscribing the entire body wall.

Each of the bosses 11 has one or more terminal receiving cavities 14 therein and opening to the top of the boss and the underside of the body wall. These terminal receiving cavities are adapted to receive and hold terminals 15 which, as indicated in FIG. 3, are accessible at the top and bottom of the body wall to receive the prongs of a plug-in type electrical component 16 and have conductors 17 connected thereto at the underside of the body wall.

Preferably, the space within the skirt 12 is compartmented by partition walls 18 depending from the underside of the body wall, one of these walls being shown in section in FIG. 3 and another appearing in elevation in that view. The arrangement of the partitions 18 generally follows that of the boundaries of the bosses 11.

Since the invention is in nowise concerned with the manner in which the terminals are secured in their respective cavities, these terminals as well as the conductors 17 connected thereto and the plug-in component 16 are merely indicated in broken lines in FIG. 3.

The primary concern of the invention is the manner in which the socket is solidly secured to a panel, indicated by the numeral 19, upon being snapped into a hole 20 in the panel. The hole 20 into which the socket is inserted is of a size and shape substantially corresponding to the exterior of the depending skirt 12. Hence, when the socket is in place on the panel, the downwardly facing locating shoulder 13 seats upon the top of the panel.

The socket is held to the panel by a plurality of resilient retaining tongues 21, which coact with the shoulder 13 to confine the panel therebetween. The tongues are

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defined by and lie between paired slits 22 formed in the skirt 12. All of the slits extend from the edge of the skirt to the underside of the locating shoulder. There are three pairs of these slits in each of the four sides of the skirt, so that at each of its four sides the socket has three retaining tongues arranged in a row.

Each retaining tongue comprises integrally joined upwardly divergent inner and outer legs 23 and 24, respectively, the inner legs being joined at their distal ends to the body wall and the junction 25 of the divergent legs being near the lower edge of the skirt.

When the tongues are in their free undeflected condition, their outer legs slant upwardly and outwardly to protrude beyond the outer face of the skirt with their free ends in juxtaposition to but spaced downwardly from the underside of the locating shoulder 13. Hence, when the socket is inserted into the hole in the panel, the edge of the hole deflects the outer legs inwardly. If the panel thickness is less than the distance between the extremity of the outer leg and the underside of the locating shoulder, the outer leg—due to the inherent resiliency of the tongues—springs back to its free position, as shown in FIGS. 7 and 8. On the other hand, if the panel thickness is greater than the distance between the extremity of the outer leg and the underside of the locating shoulder, the extremity of the outer leg cannot clear the lower edge of the hole. In this case, the outer leg remains in its deflected position shown in FIG. 5.

Obviously, in none of the situations depicted in FIGS. 5, 7 and 8 is the retaining tongue capable of coacting with the locating shoulder 13 to secure the socket to the panel.

However, if the panel thickness is such that the extremity of the deflected outer leg of a retaining tongue can swing out far enough to engage the lower edge of the hole in the panel, securement is achieved. This is the situation shown in FIG. 6.

From the foregoing comparison of FIGS. 5-8, it is evident that the outer legs of all of the retaining tongues are not of the same length. Instead, there are four different lengths.

Since the body of the socket is substantially square in shape, or at least four sided, the skirt has four straight sides, and each of these four sides has three equispaced resilient retaining tongues. There are, therefore, twelve retaining tongues spaced around the skirt. Bearing in mind that there are four different lengths of outer legs, it follows that the total number of retaining tongues can be divided into four groups, each consisting of three tongues, the outer legs of which are of the same length. This has been done—but, more significantly, the arrangement of the four groups is such that the three tongues of each group are disposed tripod-wise transversely of the socket. This very desirable relationship stems from the fact that the endmost in the two of the three tongues at each side of the socket have outer legs 24 of the same length, while the middle tongue in each row has an outer leg of a length equal to that of the endmost tongues at the opposite side of the socket. It follows, therefore, that whatever the panel thickness may be, within the range for which the socket is designed, the socket will always be securely held thereto at three points, two of which are at one side of the socket and one at the transversely opposite side thereof. This assures utmost security in the attachment of the socket to the panel.

Attention is directed to the fact that the extremity 26 of each outer leg is bevelled to slope downwardly and outwardly with respect to the outer face of the leg. As a result, the restoring force due to the deflected condition of the outer legs which have their extremities bearing against the bottom edge of the hole in the panel—as shown in FIG. 6—wedges these legs tightly against the edge of the hole.

Those versed in the molding art will recognize that in forming the slits 22, gateways or notches 27 are left in the marginal edge portion of the socket which provides the

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locating shoulder 13, but the presence of these notches has no effect one way or another upon the utility of the socket or the security of its attachment to the panel.

What is claimed as my invention is:

1. A socket for a multiple terminal plug-in electrical component, adapted to be attached to a mounting panel by being snapped into a hole therein, comprising:

(A) an integral molding of insulating material having a body wall with a top and bottom;

(B) a plurality spaced apart terminal receiving cavities in the body wall, opening to the top and bottom thereof so that terminals seated in said cavities are accessible from above and below the wall;

(C) a skirt depending from the bottom of the body wall, for insertion into a hole of corresponding shape and size in a mounting panel,

said skirt providing an insulating barrier between the mounting panel and the lower ends of terminals seated in said cavities;

(D) means on the socket providing a downwardly facing locating shoulder projecting beyond the outer face of the skirt to seat upon the panel; and

(E) the skirt having paired slits therein at spaced apart locations extending upwardly from its lower edge to define a plurality of tongues spaced around the skirt, each of said tongues comprising

(1) integrally joined divergent inner and outer legs, the inner one of which is integrally joined at its distal end with the body wall,

the junction of the divergent legs being near the edge of the skirt and yieldingly resisting flexure of the outer leg out of an upwardly and outwardly slanting position protruding beyond the outer face of the skirt, while allowing it to be deflected inwardly by contact with the edge of the hole in the mounting panel during attachment of the socket to the panel and to cause said outer leg to spring back towards its free position upon insertion of the socket far enough for the free end of said outer leg to clear the bottom edge of the hole in the panel, and

(2) certain of the outer legs of said tongues being of different lengths so that their free ends are spaced different distances from said locating shoulder to accommodate a range of different panel thicknesses and assure that whatever that thickness may be the outer legs of some of the tongues will have their free ends bearing against the bottom edge of the hole in the panel to secure the socket to the panel.

2. The socket of claim 1, further characterized in that the arrangement of the tongues around the skirt, with respect to the different lengths of their outer legs, is such that for each length of outer leg there is at least one outer leg of the same length at the transversely opposite side of the skirt.

3. The socket of claim 2, wherein the tongues are arranged to have an outer leg of each length transversely and symmetrically opposite a pair of outer legs of the same length.

4. The socket of claim 3, wherein the skirt has pairs of opposite straight sides,

and wherein each of said straight sides of the skirt has three tongues in a row, the outer legs of which are of two different lengths with legs of the same length on the endmost tongues in the row,

so that the tongues of each straight side of the skirt are paired tripod-wise with the tongues of the transversely opposite straight side of the skirt.

5. The socket of claim 4, wherein the skirt has four straight sides,

and wherein there are four groups of tongues differing

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from one another only in the length of their outer legs.

6. The socket of claim 1, further characterized in that the extremity of each outer leg is bevelled to slope downwardly and outwardly with respect to the outer face of the leg,

whereby the restoring force due to the deflected condition of the outer legs which have their extremities bearing against the bottom edge of the hole in the

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panel, wedges said legs tightly against said edge of the hole.

References Cited**UNITED STATES PATENTS**

2,742,636	4/1956	Alden	339—128	X
3,079,581	2/1963	Klumpp	339—128	
3,273,104	9/1966	Krol	339—128	

RICHARD E. MOORE, Primary Examiner