

Sept. 9, 1969

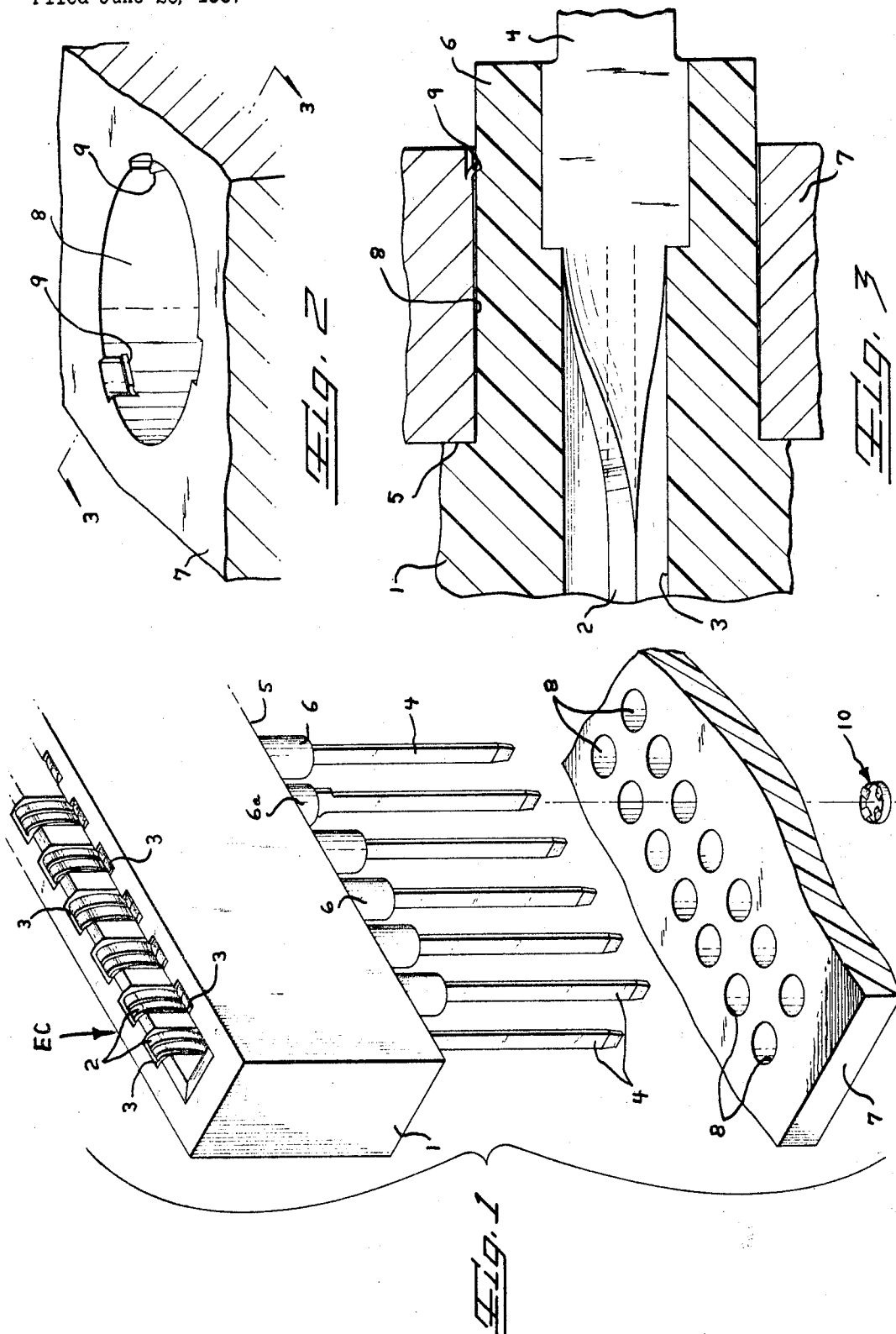
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MOUNTING MEANS FOR AN ELECTRICAL CONNECTOR

Filed June 26, 1967

2 Sheets-Sheet 1



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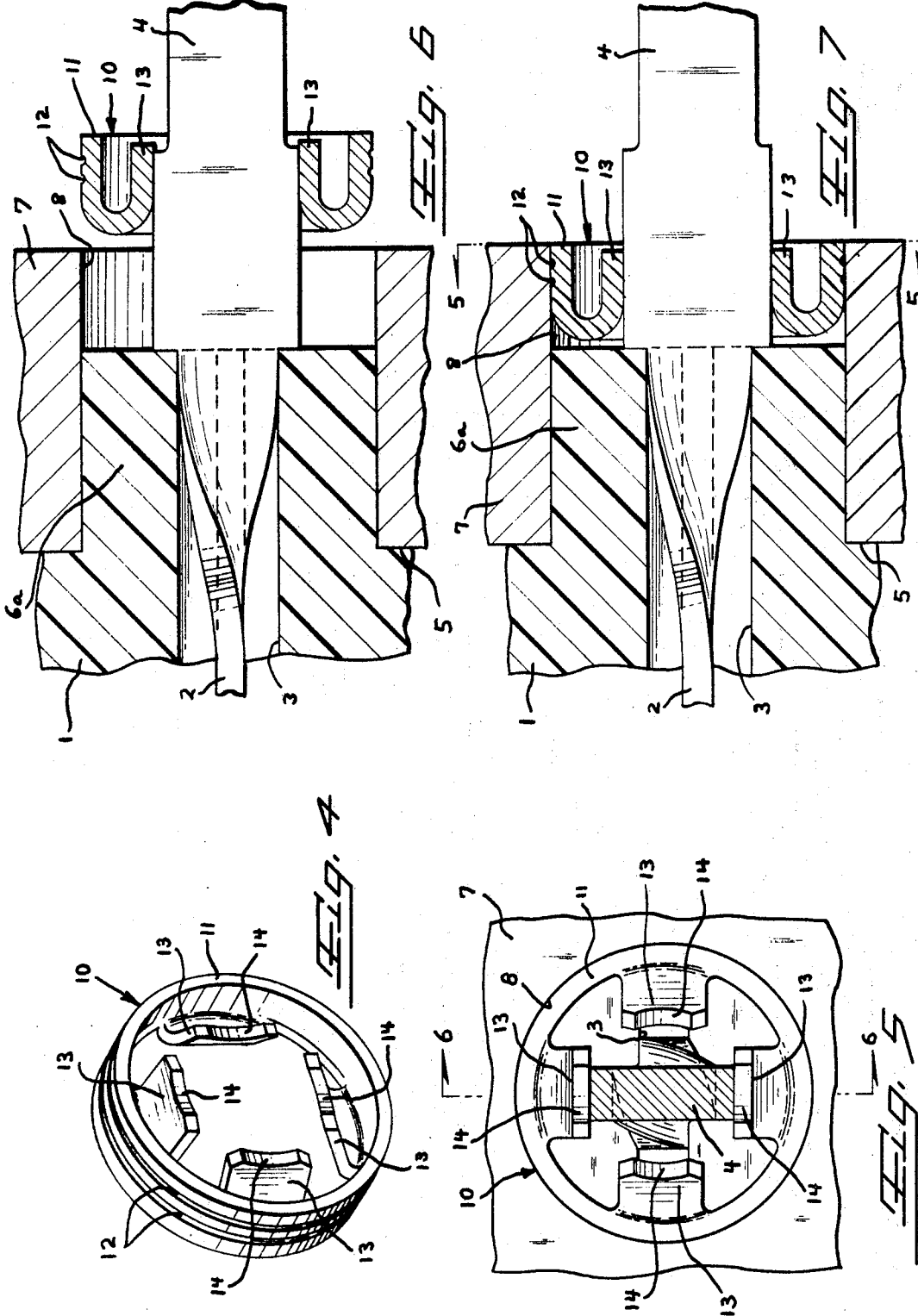
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MOUNTING MEANS FOR AN ELECTRICAL CONNECTOR

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7 Claims

ABSTRACT OF THE DISCLOSURE

An electrical connector mounting arrangement which constitutes a mounting panel having openings extending therethrough, at least some of the openings provided with inwardly-directed protrusions, an electrical connector including a dielectric housing and electrical terminals disposed in passageways in the housing corresponding to the number of panel openings, section of the terminals extending outwardly from one end of the housing, projections extending outwardly from the one end of the housing and surrounding portions of the sections of the terminals, the housing being positioned on the mounting panel with the one end disposed thereagainst, the projections being disposed within the panel openings and the openings having the protrusions bitingly engaging the projections therein thereby maintaining the connector in position on the panel.

This invention relates to an electrical connector mounting arrangement for mounting an electrical connector onto a mounting panel and more particularly to a mounting arrangement for mounting a printed circuit connector to a pre-drilled panel without the use of mounting hardware.

It is known, as disclosed in U.S. Patents 2,911,460, 2,919,300 and 2,995,617, to place a hollow dielectric insert into an opening of a mounting member and to introduce an electrical terminal having an enlarged area into the insert thereby expanding the insert into frictional engagement with the opening to form an interference-fit and securing the terminal in position.

This concept is satisfactory when placing and securing individual terminals in position in a mounting member, but it is not a desirable approach when electrical terminals secured in a dielectric housing are to be disposed in corresponding openings in a mounting panel and secured in at least some of them. Infinite problems would result among which are the following: individual inserts provided for the openings and special configurations provided on the terminals in the areas that are to form the interference-fit of the inserts in the openings.

Another approach to mounting electrical connectors on a mounting panel is that of providing openings to receive the electrical connectors and the electrical connectors are secured to the mounting panel via bolts, rivets, screws and the like as disclosed by U.S. Patents 2,994,056 and 3,084,302. Such an approach requires extra hardware and alignment is generally not proper if point-to-point wiring is to be automatically applied to the electrical terminals of the electrical connectors.

An object of the present invention is to provide an electrical connector mounting arrangement which obviates the drawbacks of existing mounting arrangements.

Another object of the invention is the provision of a mounting panel having openings therethrough in which sections of terminals in a connector housing are disposed and means being provided in at least some of the openings and on the housing securing the connector housing in position on the mounting panel.

A further object is to provide projections of a con-

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necting housing surrounding sections of electrical terminals extending outwardly from the connector housing, these projections mating with corresponding openings in a mounting panel with some of the openings having protrusions to bitingly engage the projections thereby forming an interference-fit therebetween.

An additional object of the invention is the provision of grounding means to ground some of the terminals in the housing with the metallic mounting plate.

Other objects and attainments of the present invention will become apparent to those skilled in the art upon a reading of the following detailed description when taken in conjunction with the drawings in which there is shown and described an illustrative embodiment of the invention; it is to be understood, however, that this embodiment is not intended to be exhaustive nor limiting of the invention but is given for purposes of illustration in order that others skilled in the art may fully understand the invention and the principles thereof and the manner of applying it in practical use so that they may modify it in various forms, each as may be best suited to the conditions of a particular use.

In the drawings:

FIGURE 1 is an exploded perspective view of an electrical connector, mounting member and grounding means;

FIGURE 2 is a partial perspective view of one opening in the mounting member;

FIGURE 3 is a view taken along lines 3—3 of FIGURE 2 with the part of the electrical connector secured in position therein;

FIGURE 4 is a perspective view of the grounding means;

FIGURE 5 is a view taken along lines 5—5 of FIGURE 7;

FIGURE 6 is a view taken along lines 6—6 of FIGURE 5 with the grounding means partially in position; and

FIGURE 7 is a view similar to FIGURE 6 with the grounding means in position.

Turning now to the drawings and more particularly FIGURES 1 through 3, there is illustrated an electrical connector EC which comprises a dielectric housing 1 having electrical terminals 2 positioned in passageways 3 of housing 1. Electrical terminals 2 are preferably secured in passageways 3 in accordance with the teaching set forth in U.S. patent application, Ser. No. 613,966, filed Feb. 3, 1967, but, of course, the terminals can be secured in position in the passageways in any desirable manner. Electrical terminals 2 include posts 4 that extend outwardly from rear surface 5 of housing 1. Projections 6 extend outwardly from rear surface 5 of housing 1 as part of the housing. The projections surround sections of most of posts 4 adjacent rear surface 5. Dielectric housing 1 is made from any suitable dielectric material which contains good memory characteristics. Projections may be provided for every post, depending upon the application.

Mounting member 7 is a metallic mounting member and it has openings 8 corresponding to the number of posts 4 of electrical terminals 2. Openings 8 have a configuration corresponding to the configuration of projections 6 and a clearance fit is provided therebetween, projections 6 having a length equal to or greater than the thickness of member 7. Selected openings 8 have protrusions 9 formed therein at the inner ends thereof opposite the ends into which projections 6 are inserted into the openings.

When electrical connector EC is mounted on mounting member 7, projections 6 mate with corresponding openings 8 in mounting member 7 and the openings having protrusions 9 bite into projection 6 as the electrical connector is pushed into position until rear surface 5 engages mounting members 7 thereby securing the electrical con-

necter in position on the mounting member. It has been found that if a fraction of the number of openings 8 are provided with protrusions 9, such an arrangement is sufficient to adequately secure the electrical connector in position on the mounting member; however, other arrangements may, of course, be utilized. Placing protrusions 9 on the inner ends of openings 8 facilitates the insertion of projection 6 within the openings containing these protrusions and obviates channeling the projections along substantially the full lengths thereof if protrusions 9 were located at the insertion entrances to openings 8. The memory characteristics of the material of the dielectric housing causes projections 6 in the areas of protrusions 9 to flow therearound, as illustrated in FIGURE 3, thereby tightly securing projections 6 in position in the openings containing these protrusions. If desired, protrusions may be disposed at the insertion entrances to openings 8 instead of at the inner ends and protrusions may be disposed at both ends of the openings but offset from each other.

Protrusions 9 are readily formed in selected openings 8 by means of a special punch that fits the openings and is provided with projections to disrupt the area surrounding the openings thereby forming protrusions 9. The protrusions formed in the selected openings are formed in accordance with a balanced arrangement in order to preclude misalignment of posts 4 when protrusions 9 dig into projections 6.

In view of the fact that mounting member 7 is a metallic member, it is desirable in some cases to make mounting member 7 a ground plane and thereby connect some of terminals 2 thereto in order to ground same. If this is the case, a grounding collar 10 is utilized for this purpose and is inserted within an opening 8 which contains no protrusions 9 and a shorter projection 6a. Grounding collar 10 comprises an annular member 11 conforming to the configuration of opening 8 and is of such diameter so as to frictionally engage same. Grooves 12 are formed in an exterior surface of annular member 11 to increase metal to metal intimacy with opening 8. Opposed pairs of spring fingers 13 are disposed internally of annular member 11 and they are directed toward the axis of grounding collar 10. One pair of spring fingers 13 makes spring contact with the narrow edges of a post whether the post is truly centered or off-center due to tolerance build-up. The other pair of spring fingers aids automated assembly of the grounding collars in position in the mounting member as well as to prevent the post from being moved too far out of alignment when lateral forces are applied thereto. Arcuate depressions 14 are disposed in the free ends of spring fingers 13 and may or may not assist in the electrical engagement with the edges of post 4. Grooves 12 provide sharp edges so as to scrub the surfaces of openings 8 in order to make a good electrical connection therewith, especially if the openings have a chemical conversion coating or if the mounting member is made of aluminum to scrape through the aluminum oxide coating.

Grounding collar 10 therefore effects electrical grounding of selected wire posts to the mounting member without sacrificing a connection position on the posts in view of the grounding collar being disposed within the opening and thereby being flush with the surface of the mounting member adjacent thereto. Grounding collar 10 also may help to hold the post in position within the openings of the mounting member.

The present invention can be used in conjunction with mounting an electrical connector in openings in a mounting member wherein projections 6 of the dielectric housing surround sections of all of the electrical terminals and selected ones of the openings in the mounting member are provided with protrusions to bitingly engage corresponding projections of the dielectric housing to secure the electrical connector in position on the mounting member. The invention is also directed to the use of a ground-

ing collar to electrically ground selected posts to the mounting member.

It will, therefore, be appreciated that the aforementioned and other desirable objects have been achieved; however, it should be emphasized that the particular embodiment of the invention, which is shown and described herein, is intended as merely illustrative and not as restrictive of the invention.

The invention is claimed in accordance with the following:

1. An electrical connector mounting arrangement comprising a mounting panel having openings extending therethrough, at least some of the openings provided with inwardly-directed deformed protrusions formed of the material defining the openings, an electrical connector including a dielectric housing and electrical terminals disposed in at least some of passageways in the housing, sections of the terminals extending outwardly from one end of the housing, projections extending outwardly from the one end of the housing and surrounding portions of the sections of the terminals, the housing being positioned on the mounting panel with the one end disposed adjacent thereto, said projections being disposed within corresponding panel openings with said openings having said protrusions bitingly engaging the projections therein thereby maintaining the connector in position on the panel.

2. An electrical connector mounting arrangement according to claim 1 wherein said protrusions engage said projections in a balanced manner thereby preventing misaligning said sections of said terminals.

3. An electrical connector mounting arrangement according to claim 1 wherein grounding means is disposed in some of said openings in tight and electrical engagement therewith, said grounding means including spring finger means electrically engaging the sections.

4. In combination, a mounting member having openings disposed therein, some of said openings provided with deformed protrusions directed toward axes thereof and formed of the material defining the openings, an electrical connector including a dielectric housing and electrical terminals, said housing having passageways in at least some of which said terminals are disposed and projections extending outwardly from one surface thereof, said terminals having sections extending outwardly from the one surface of said housing with the projections extending partially therealong, said projections disposed in corresponding ones of said openings with said one surface being disposed adjacent one side of said mounting member, said protrusions of the openings bitingly engaging said projections without misaligning said sections of said terminals thereby securing said electrical connector in position on said mounting member and insulated therefrom by said projections and with said sections extending outwardly from the other side of said mounting member.

5. The combination of claim 4 wherein at least one of said projections has a length less than the width of said mounting member, grounding collar means disposed within the opening of this one projection and in electrical engagement with the mounting member, and spring finger means in electrical engagement with said section of the terminal.

6. The combination of claim 4 wherein said protrusions are located in the openings adjacent the other side of said mounting member.

7. The combination of a metallic mounting member and an electrical connector, said mounting member having openings therein, at least some of said openings having protrusions provided therein and directed toward the axes thereof, said electrical connector including a dielectric housing and electrical terminals secured therein, said electrical terminals having conductor-engaging means extending outwardly from one surface of said housing, projections extending outwardly from one surface, extending along sections of said conductor-engaging means and disposed in respective openings, all of the projections includ-

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ing the projections disposed in the openings having said protrusions except for at least one projection other than the projections in the openings having the protrusions having a length at least equal to the width of said mounting member, the protrusions bitingly engaging the projections therein thereby securing said electrical connector in position on said mounting member with the one surface being disposed adjacent one side of said mounting member, the one projection terminating within its respective opening inwardly from the other side of the mounting member, grounding collar means tightly disposed in this opening adjacent the one projection and in electrical engagement with the mounting member, and finger means in electrical engagement with the conductor-engaging means of this one projection.

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U.S. Cl. X.R.

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