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(71) Applicant: **MOLEX INCORPORATED**
Lisle Illinois 60532 (US)

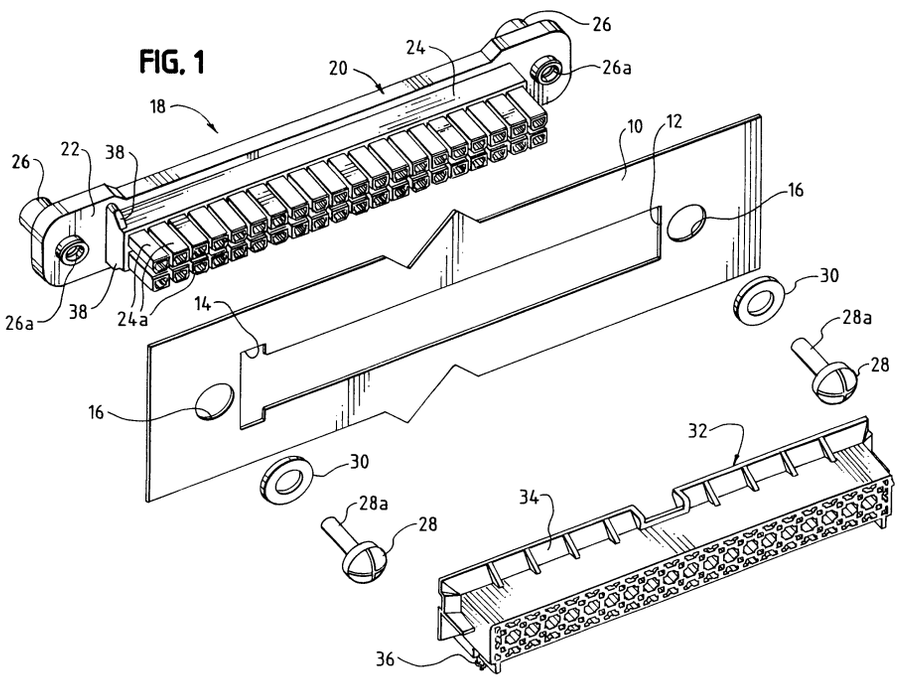
(72) Inventors:
- **Bandura, Michael A.**
  Lisle, Illinois 60532 (US)
- **Edgley, Richard R.**
  Elmhurst, Illinois 60126 (US)
- **Mueller, Scott**
  Carpentersville, Illinois 60110 (US)
- **Pearson, Nels**
  Deerfield, Illinois 60015 (US)

(74) Representative: **Herden, Andreas F.**
Blumbach, Kramer & Partner GbR
Patentanwälte
Alexandrastrasse 5
65187 Wiesbaden (DE)

(54) Polarized panel mounted electrical connector

(57) A polarizing system is provided for a panel mount electrical connector assembly. A panel (10) includes an elongated opening (12) with an enlarged area (14) at one end thereof. A connector (18) includes an elongated mating portion (24) insertable into the elongated opening in the panel. The mating portion is defined by opposite longitudinal sides and opposite ends. A pair of polarizing projections (38) are located at one end of the mating portion (24) and are insertable into the enlarged area (14) at the one end of the panel opening (12). One of the projections (38) is located at each opposite side of the mating portion (24).

FIG. 1



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Description

Field of the Invention

[0001] This invention generally relates to the art of electrical connectors and, particularly, to a panel mounted connector having a polarization system between the connector and the panel.

Background of the Invention

[0002] Panel mounted electrical connectors typically comprise a non-conductive or dielectric housing having at least one electrically conductive terminal mounted therein. The housing also includes means for mounting the housing to a panel. The panel mounted connector is mateable with other circuitry, such as another connector, which, in turn, may be terminated to a cable or discrete wires or, itself, be mounted to a second panel.

[0003] The mating of a panel mounted electrical connector to another circuit component, such as another connector, often is carried out under blind mating conditions such that precise alignment of the panel mounted connector with the other circuit component cannot be assured. Blind mating of panel mounted connectors often occur with components of computers or computer equipment, copiers, telecommunications equipment and a variety of other electronic apparatus. An attempt to forcibly blind mate improperly aligned electrical connectors can damage the housing of the connector, the fragile terminals in the housing or the panels to which the connectors are mounted. Improper alignment may also prevent complete mating, thereby negatively affecting the quality of the electrical connection.

[0004] A problem with such panel mounted connectors, including blind mated connectors, is that many applications require that a panel mounted electrical connector be polarized relative to the panel in which it is mounted. In other words, it may be required that the connector have a particular orientation relative to the panel. Therefore, additional structure is required to provide for such polarization.

[0005] Heretofore, polarization of panel mounted connectors often has been accomplished by providing ribs, tabs, bosses, flanges or the like which project outwardly of the connector housing in an asymmetrical manner, with the opening in the panel being similarly configured. Therefore, the connector housing, such as the mating portion of the connector housing, can be inserted into the panel aperture only in a particularly orientation. For instance, the polarizing projection may be at one end but not the other end of the mating portion of the connector housing. One or more polarizing projections may be provided on one side of the mating portion but not on the other side. One of the problems with such polarization systems is that the projections have a tendency to become broken, particularly when the housings typically are molded of plastic material. Another problem is that the projections often are located with little assurance that an operator can see the projections from all sides of the connector. In other words, if an operator is looking at one side of the connector, and the polarizing projections are on the opposite side of the connector, the operator may not even see the projections and have difficulty ascertaining why the connector cannot be inserted into the blind panel aperture. The present invention is directed to solving these problems in a very simple polarization system wherein the polarizing projections provide redundancy against breakage problems and are visible from all sides of the mating portion of the connector.

Summary of the Invention

[0006] An object, therefore, of the invention is to provide a new and improved polarization system in a panel mount electrical connector assembly.

[0007] In the exemplary embodiment of the invention, a panel has an elongated opening with an enlarged area at one end thereof. A connector has an elongated mating portion insertable into the elongated opening in the panel. The mating portion is defined by opposite longitudinal sides and opposite ends. A pair of polarizing projections at one end of the mating portion are insertable into the enlarged area at the one end of the panel opening. One of the polarizing projections is located at each opposite side of the mating portion. Therefore, the polarizing projections can be visualized when looking at any side of the mating portion. In addition, the pair of polarizing projections on opposite sides of the mating portion provide for redundancy in the event that one of the projections becomes broken.

[0008] As disclosed herein, the connector includes a dielectric housing molded of plastic material and including the elongated mating portion, with the polarizing projections being molded integrally with the mating portion. The housing includes a mounting flange for interfacing with the panel. The mating portion projects from the mounting flange. The polarizing projections comprise integrally molded gussets between the mounting flange and the mating portion. The panel opening is generally T-shaped to define a leg portion for receiving the elongated mating portion of the connector and a cross portion defining the enlarged area for receiving the polarizing projections of the connector.

[0009] Other objects, features and advantages of the invention will be apparent from the following detailed description taken in connection with the accompanying drawings.

Brief Description of the Drawings

[0010] The features of this invention which are believed to be novel are set forth with particularity in the appended claims. The invention, together with its objects and the advantages thereof, may be best under-

stood by reference to the following description taken in conjunction with the accompanying drawings, in which like reference numerals identify like elements in the figures and in which:

FIGURE 1 is an exploded perspective view of a panel mount electrical connector assembly embodying the polarization system of the invention, in conjunction with a mating connector;
FIGURE 2 is a perspective view of the panel mount electrical connector assembly in assembled condition and oriented 180° from the view in Figure 1, again in conjunction with the mating connector;
FIGURE 3 is a plan view of the panel mount connector; and
FIGURE 4 is a side elevational view of the panel mount connector.

Detailed Description of the Preferred Embodiment

[0011] Referring to the drawings in greater detail, and first to Figure 1, the polarization system of the invention is incorporated in a panel mount electrical connector assembly which includes a panel 10 having an elongated opening 12 provided with an enlarged area 14 at one end of the opening. A mounting hole 16 is provided through the panel at each opposite end of the elongated opening. Therefore, it can be seen that the opening is generally T-shaped defining a leg portion 12a for receiving an elongated mating portion of the connector, as described hereinafter, and a cross portion defining enlarged area 14.

[0012] The assembly includes an electrical connector, generally designated 18, which includes a one-piece housing, generally designated 20, unitarily molded of dielectric material such as plastic or the like. The molded plastic housing includes a mounting flange 22 for interfacing with a back side 10a of panel 10. An elongated mating portion 24 projects forwardly of mounting flange 22 for insertion through leg portion 12a of panel opening 12. The mating portion includes a plurality of "silos" 24a within which are mounted a plurality of conductive terminals (not shown). A mounting post 26 is integrally molded with connector housing 20 at each opposite end of mounting flange 22. The posts have forward portions 26a which are inserted into mounting holes 16 in panel 10.

[0013] As seen in Figure 2 which shows the invention oriented 180° from the view in Figure 1, the elongated mating portion 24, including silos 24a, of connector 18 is inserted through leg portion 12a of panel opening 12. A pair of fasteners 28 and washers 30 are used to fix connector 18 to panel 10. For instance, mounting posts 26 (Fig. 1) may be internally threaded, and fasteners 30 may have externally threaded shank portions 28 for threadingly engaging the mounting posts to secure the connector to the panel, with mating portion 24 and silos 24a projecting through panel opening 12.

[0014] A mating connector, generally designated 32, is mateable with mating portion 24 in the direction of arrow "A" (Fig. 2). This interconnection may be in a blind mate application, and mating connector 32 includes an angled flange 34 about the periphery thereof to facilitate mating of the connectors. Mating connector 32 also mounts a plurality of conductive terminals (not shown) for electrical connection to the terminals within silos 24a of panel mounted connector 18. The mating connector, itself, may be mounted on a second panel, a circuit board or the like by means of a pair of bifurcated mounted posts 36 (Fig. 2).

[0015] Referring to Figures 3 and 4 in conjunction with Figures 1 and 2, the polarization system of the invention contemplates the provision of a pair of polarizing projections 38 located only at one end of mating portion 24 and insertable into enlarged area 14 of panel opening 12. It can be seen that one of the pair of polarizing projections 38 is located at each opposite side of mating portion 24 at the one end thereof. With the connector housing being a one-piece molded plastic structure, polarizing projections 38 are molded as integral gussets between mounting flange 22 and mating portion 24 of the connector housing.

[0016] From the foregoing, it can be understood by looking at the various depictions in the drawings, that polarizing projections 38 can be seen when an operator looks at any particular side of mating portion 24 of the connector. Therefore, the operator readily will ascertain that the projections must be inserted into a particular aperture configuration in the panel, namely enlarged area 14 of panel opening 12. In addition, by providing one of the polarizing projections on each opposite side of the mating portion, redundancy is provided in the event that localized forces on one side of the connector breaks one of the polarizing projections. Even if only one projection still remains, the mating portion of the connector can be inserted through panel opening 12 only when the remaining polarizing projection is aligned with enlarged area 14 of panel opening 12.

[0017] It will be understood that the invention may be embodied in other specific forms without departing from the spirit or central characteristics thereof. The present examples and embodiments, therefore, are to be considered in all respects as illustrative and not restrictive, and the invention is not to be limited to the details given herein.

Claims

1. A polarization system in a panel mount electrical connector assembly, comprising:

a panel (10) having an elongated opening (12) with an enlarged area (14) at one end thereof; and
a connector (18) having an elongated mating

portion (24) insertable into the elongated opening in the panel, the mating portion being defined by opposite longitudinal sides and opposite ends, and including a pair of polarizing projections (38) at one end of the mating portion (24) insertable into the enlarged area (14) at said one end of the panel opening (12), one of the projections (38) being at each opposite side of the mating portion (24).

2. The polarization system of claim 1 wherein said panel opening (12) is generally T-shaped defining a leg portion (12a) for receiving the elongated mating portion (24) of the connector (18) and a cross portion (14) defining said enlarged area for receiving the polarizing projections (38) of the connector.

3. The polarization system of claim 1 wherein said connector (18) includes a dielectric housing (20) molded of plastic material and including said elongated mating portion (24), with said polarizing projections (38) being molded integrally with the mating portion.

4. The polarization system of claim 1 wherein said connector (18) includes a mounting flange (22) for interfacing with the panel (10), said mating portion (24) projecting from the mounting flange.

5. The polarization system of claim 4 wherein said polarizing projections comprise gussets (38) between the mounting flange (22) and the mating portion (24).

6. A polarization system in a panel mount electrical connector assembly, comprising:

a panel (10) having a generally T-shaped opening (12) defining an elongated leg portion (12a) and an enlarged cross portion (14) at one end of the leg portion; and
a connector (18) including a dielectric housing (20) molded of plastic material and including a mounting flange (22) for interfacing with the panel (10), an elongated mating portion (24) integral with and projecting from the mounting flange (22) and insertable into the elongated leg portion (12a) of the panel opening (12), the mating portion (24) being defined by opposite longitudinal sides and opposite ends, and including a pair of polarizing gussets (38) integrally molded between the mounting flange (22) and the mating portion (24) at one end of the mating portion for insertion into the enlarged cross portion (14) of the panel opening (12), one of the polarizing gussets (38) being at each opposite side of the mating portion (24).

7. A polarized electrical connector (18) for mounting to a panel (10) having an elongated opening (12) with an enlarged area (14) at one end thereof, comprising:

an elongated mating portion (24) insertable into the elongated opening (12) in the panel (10), the mating portion being defined by opposite longitudinal sides and opposite ends; and
a pair of polarizing projections (38) at one end of the mating portion (24) insertable into the enlarged area (14) at said one end of the panel opening (12), one of the projections (38) being at each opposite side of the mating portion (24).

8. The polarized electrical connector of claim 7 wherein said elongated mating portion (24) and said polarizing projections (38) comprise integral components of a one-piece connector housing (20) molded of plastic material.

9. The polarized electrical connector of claim 8 wherein said housing (20) includes a mounting flange (22) for interfacing with the panel (10), and said mating portion (24) is integral with and projects from the mounting flange (22).

10. The polarized electrical connector of claim 9 wherein said polarizing projections comprise integral gussets (38) between the mounting flange (22) and the mating portion (24).

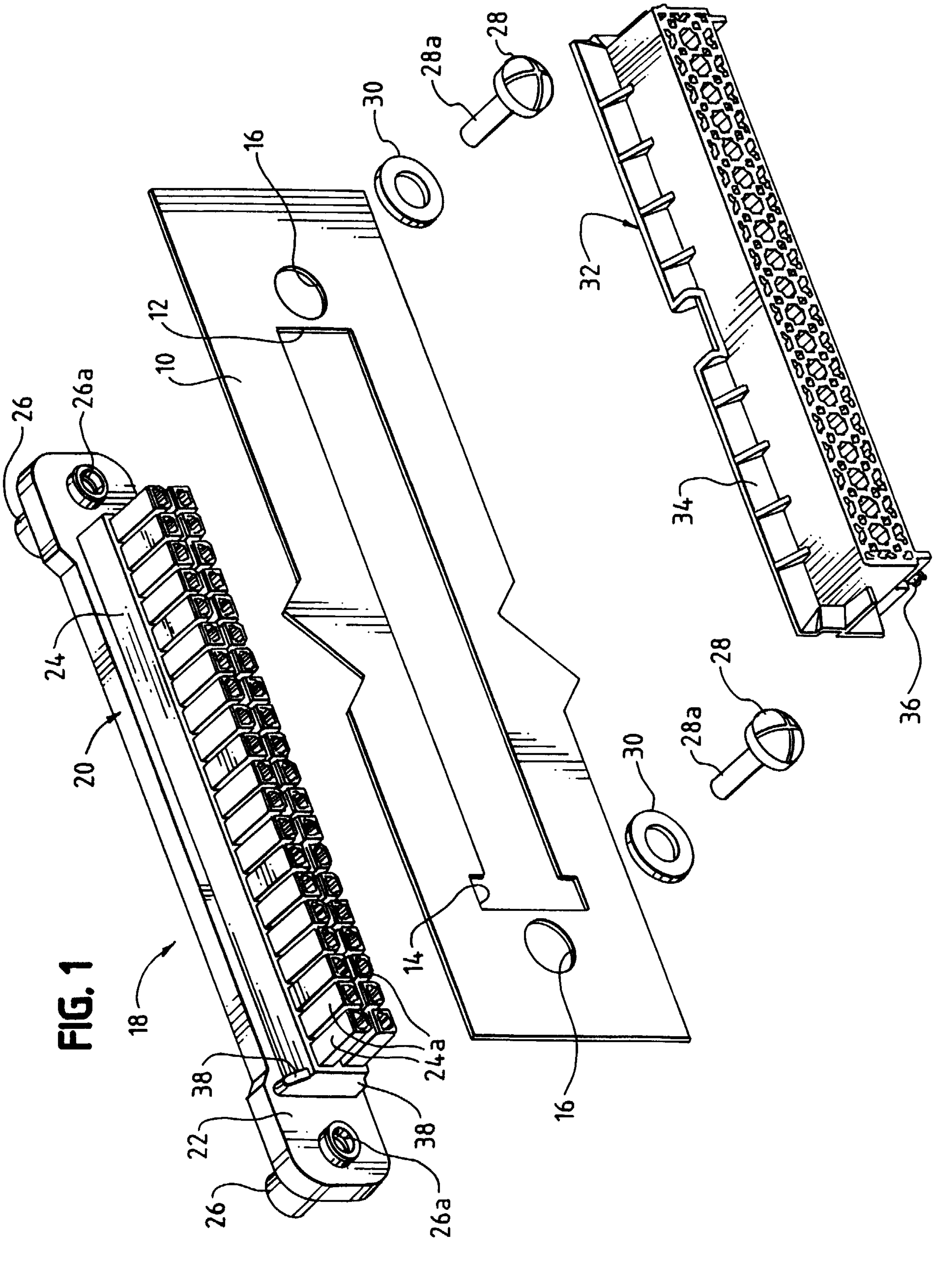
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FIG. 1

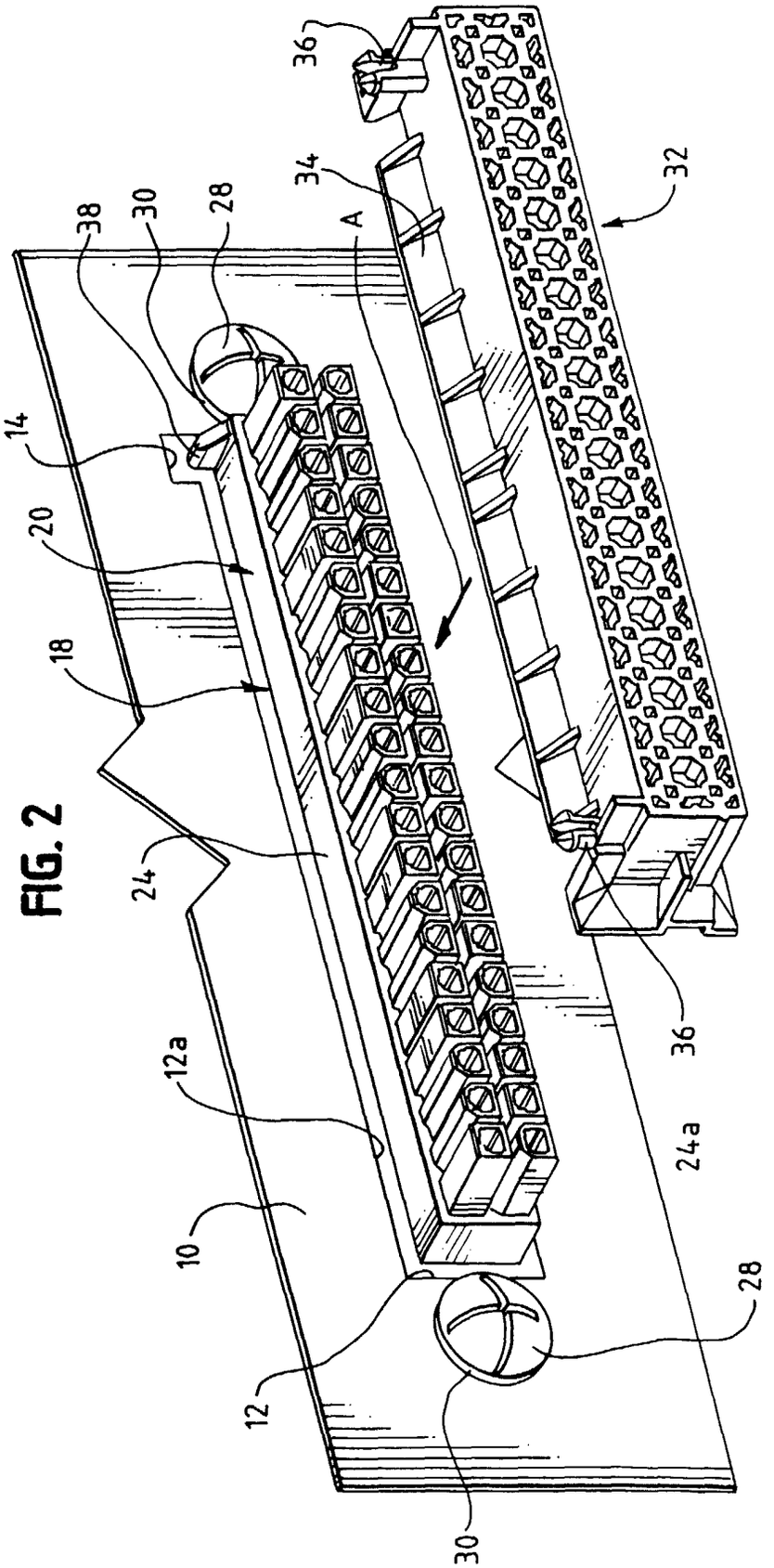

FIG. 2

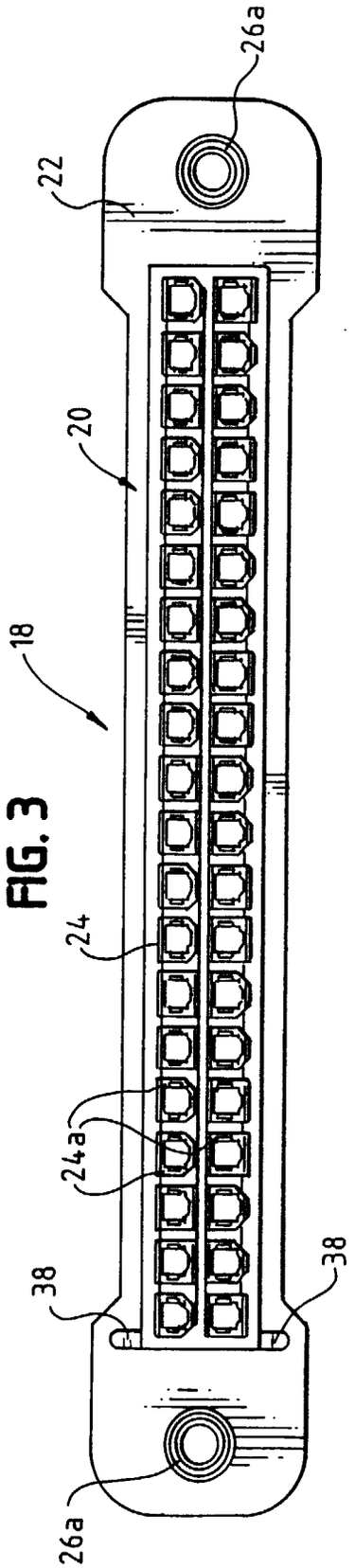

FIG. 3

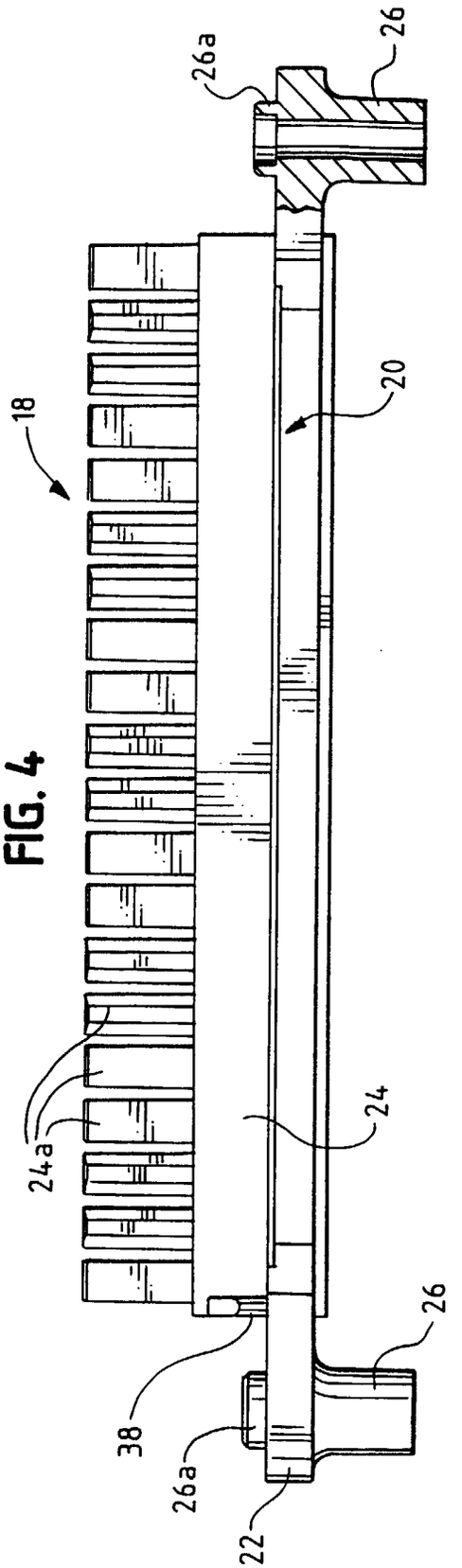

FIG. 4