(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 090 539**
A2

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **83301401.2**

(22) Date of filing: **15.03.83**

(51) Int. Cl.³: **H 01 R 13/658**

(30) Priority: **31.03.82 US 364122**

(43) Date of publication of application: **05.10.83**
Bulletin 83/40

(84) Designated Contracting States: **AT BE DE FR GB IT NL SE**

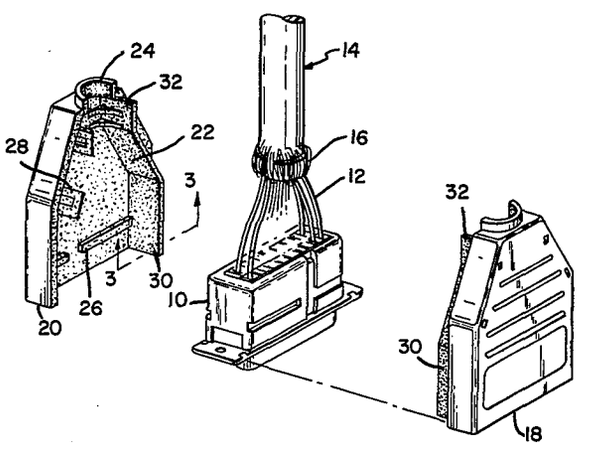
(71) Applicant: **AMP INCORPORATED, Eisenhower Boulevard, Harrisburg Pennsylvania (US)**

(72) Inventor: **Clark, Richard Paul, 124 Allendale Way, Camp Hill Pennsylvania 17011 (US)**
Inventor: **Hawk, Gary Wilbert, R.D. No. 1 Box 699, Halifax Pennsylvania 17032 (US)**
Inventor: **Hnatuck, Robert James, 507 E. Marble Street, Mechanicsburg Pennsylvania 17055 (US)**

(74) Representative: **Wayte, Dennis Travers et al, 20 Queensmere, Slough, Berkshire SL1 1YZ (GB)**

(54) Shielded connector.

(57) A shielded connector is formed by cover members (18, 20) normally molded of insulative material selectively plated with conductive material (32) to form a shield. The members (18, 20) include interfitting peripherial flanges (30), which are plated, so that no gaps, which would act as slot antennae, are formed. The plating (32) will also serve as a direct contact with the shielding (16) of shielded cable (14). Selectively plating the members (18, 20) allows for an unplated exterior thereby avoiding the possibility of an operator being shocked by stray ground currents.



EP 0 090 539 A2

SHIELDED CONNECTOR

The present invention relates to a shielded electrical connector, and in particular, to a connector in which the shielding is provided by selectively plating parts that are normally formed of molded insulative material.

The Federal Communications Commission, in the early 1980's, began to issue a series of regulations concerning limiting the conducted and radiated EMI that computers and other digital equipment can emit thereby reducing the possibility of interfering with other equipment. These regulations pertain to any electronic device that generates RF energy in excess of 10,000 cycles (pulses) per second and uses digital techniques. These rules apply to the complete device and not just to a microprocessor or other subassembly or component of the device. They include all commercial, industrial, or business computing devices (Class A) as well as residential computing devices (Class B).

There are two forms of interference which must be controlled. Conducted interference occurs when interconnecting cables and power cables carry interference from place to place. Radiated interference is energy emitted by one device and picked up by another. Thus, every electronic device is both a potential transmitter as well as a potential receiver.

A material's intrinsic shielding effectiveness is often of less concern than is the leakage caused by shield discontinuities, such as seams and holes. Holes can behave as slot antennae and radiate energy directly. The amount of radiation is a function of the radiating frequency. In general, holes or seams attenuate radiation significantly if they are smaller than 1/100 wavelength of the RF emission.

There have been a plurality of proposals for preventing electromagnetic interference including the use of filters and metal shielding

in various configurations. The use of filters has frequently caused a great deal of expense in initially designing the filters into a system, but has been successful as a retrofit to correct existing systems. The other primary method of preventing electromagnetic interference has been the use of metallic housings enclosing conventional electrical connectors terminating shielded cable. This, to a certain degree, is successful but generally has two drawbacks, namely, a substantial increase in the cost due to the additional parts and the labor of assembling them, plus creating a generally larger and somewhat unwieldy connector. This is often an unacceptable solution in high density situations where EMI can be the most difficult.

It is known to plate insulative materials with metal. This is most often done for appearance only and serves no electrical function. Ground planes have also been formed by plating aluminum on a dielectric block as explained in U.S. Patent No. 3,539,954. However, a ground plane, such as described in this reference, would not achieve EMI shielding.

The present invention overcomes the difficulties of the prior art by providing selective plating of metal on portions of a connector housing which are normally molded from insulative materials. The molded members are profiled for an overall positive intermating and are plated so that there is no gap between the mating members.

The present invention will be described by way of illustrative example with reference to the accompanying drawings in which:

FIGURE 1 is an exploded perspective view of an electrical connector incorporating the subject invention;

FIGURE 2 is an assembled view of the connector of Figure 1; and

FIGURE 3 is a fragmentary section through a housing according to the present invention.

The subject connector 10 is of known design and is used to terminate a plurality of conductors 12 of a shielded cable 14 in known fashion. The shielding 16 of the cable is peeled back so as to engage the shielding of the connector and expose the conductors 12. The connector 10 is enclosed in a pair of mating strain relief and cover members 18, 20. The cover members 18, 20 are preferably hermaphroditic and together define a connector

receiving cavity 22, a strain relief cable exit 24, connector gripping means 26, latching means 28, and a stepped peripherial flange 30. The cover members 18, 20 are preferably molded from insulative material and then plated with conductive material 32 on only the inner surfaces, plus the peripherial flange 30 as best seen in Figure 3.

The thus described present invention has numerous features which are not to be found in the prior art. Amongst these features are the invention provides a lower profile while still providing a requisite amount of shielding. This is something that is generally not available with the prior art metal enclosures. Further, the present invention still maintains an insulative outer housing so that there is no danger of an operator getting shocked by stray ground currents when either engaging or disengaging the subject connector. Third, the connector housing is so arranged that shielding is provided about the entire periphery of the connector thereby obviating any slots or openings which could serve as a slot antenna and radiate electromagnetic interference.

CLAIMS:

1. In combination with a known electrical connector (10) terminating conductors (12) of a shielded cable (14) in known fashion, an RF/EMI shielding system comprising a pair of mating housing members (18, 20) of molded insulative materials defining therebetween a connector receiving cavity (22) with a both cable entry (24) and mating face opening and having interfitting peripherial flanges (30) which allow no gaps or slots to be formed between said members (18, 20) in a mated condition, said members (18, 20) and flanges (30) being plated on their entire inner surfaces with a conductive material (32) so that an entire conductive enclosure is formed about the connector (10).

2. The combination according to claim 1 characterized by said housing members (18, 20) being hermaphroditic.

3. The combination according to claim 1 characterized by said housing members (18, 20) further having cable strain relief means (24).

4. The combination according to claim 1 characterized by said housing members (18, 20) further having connector gripping means (26).

5. The combination according to claim 1 characterized by said housing members (18, 20) further having interacting latching means (28).

6. A method for providing RF/EMI shielding on an electrical connector of known design terminating conductors of a shielded cable in known fashion characterized by forming a pair of connector enclosing housing members (18, 20) from insulative material, said members (18, 20) having interfitting peripherial flanges (30) which allow no gaps or slots to be created therebetween in a mated condition; and selectively plating at least the interior surfaces of said housing members (18, 20) and flanges (30) with conductive material (32).

1/1

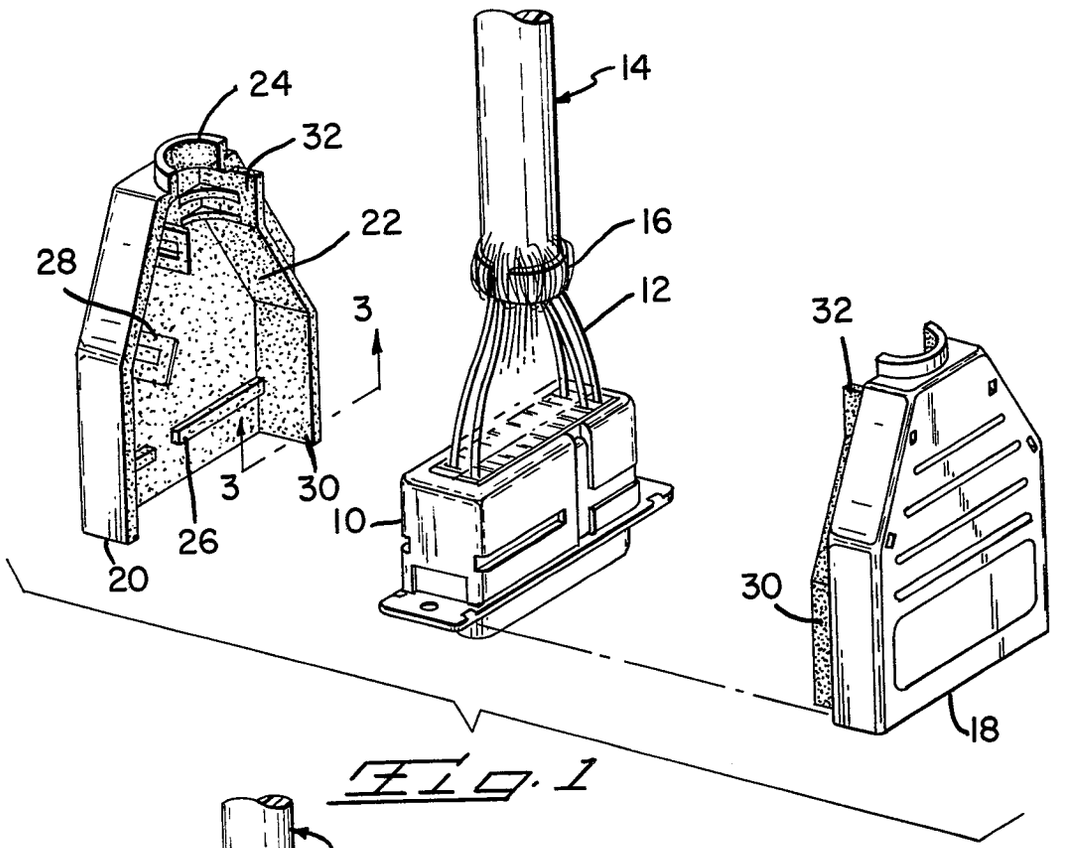


Fig. 1

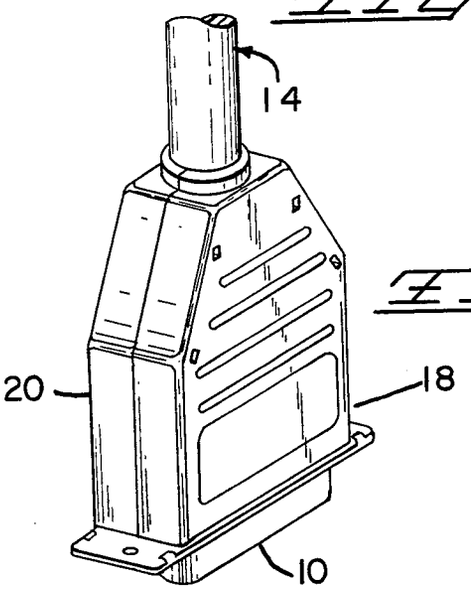


Fig. 2

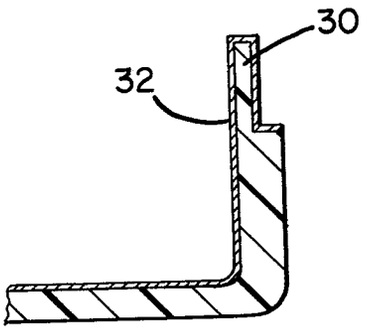


Fig. 3