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54 Connector.

57 A connector comprises a plurality of contacts (1, 1', 1'') each having at least two connecting ends (1A, 1A', 1A''), a housing (2, 2', 2'') having a storage hole (2A, 2A', 2A'') for storing a flat cable having a plurality of conductors surrounded by an insulating material, said housing (2, 2', 2'') being provided with storage cavities (2B, 2B', 2B'') for respectively storing said plurality of contacts (1, 1', 1''), the contacts (1, 1', 1'') being slidable in said storage cavities (2B, 2B', 2B'') such that said connecting ends (1A, 1A', 1A'') extend through said storage hole (2A, 2A', 2A'') and said cable inserted in said storage hole, and said two connecting ends (1A, 1A', 1A'') extend through corresponding ones of said cable conductors, respectively.

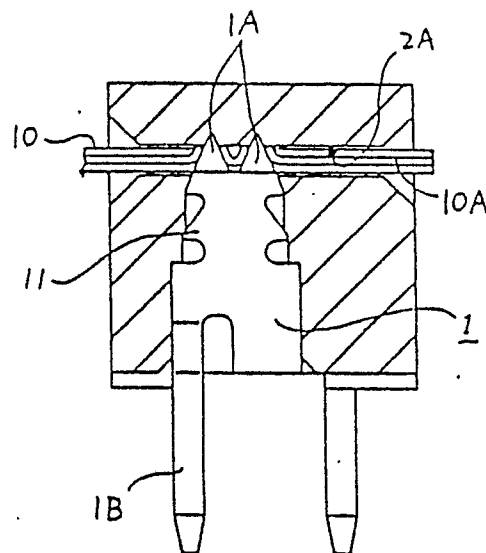


Fig. 1B

CONNECTOR

The present device relates to a connector for connecting a flat cable and, more particularly, to a connector for connecting a multicore cable having small pitch of conductors.

Known is a conventional connector of this type wherein the distal end of each contact must pierce a cable coating, and at the same time is urged against a cable conductor. In order to clamp the cable conductor with the distal end of each contact, the distal end of the contact must have a V-shaped groove. For this reason, reduction in contact pitch is limited.

In order to connect a compact flat cable obtained by reducing an interconductor pitch of a cable or a highly integrated flat cable obtained by increasing the number of cores, if a conventional connector is used, the intercontact pitch must be reduced. It is, however, difficult to reduce the pitch due to structural limitations. Even if the pitch is reduced, incomplete connections between the cable and the contacts tend to occur. Strong demand has arisen for developing a connector having another structure.

The present device has been made in consideration of the above situation, and has as its object to provide a connector having a novel structure which allows reduction in a pitch of the contacts which are brought into contact with core wires of a flat cable when a pitch of the core wires is reduced.

According to the invention, there is provided a connector comprising:

a plurality of contacts each having at least two connecting ends, a housing having a storage hole for storing a flat cable having a plurality of conductors surrounded by an insulating material, said housing being provided with storage cavities for respectively storing said plurality of contacts, the contacts being slidable in said storage cavities such that said connecting ends extend through said storage hole and said cable inserted in said storage hole, and said two connecting ends extend through corresponding ones of said cable conductors, respectively.

By way of example, three embodiments of a connector according to the invention will now be described with reference to the accompanying drawings, in which:-

Figure 1A is a longitudinal sectional view showing an application state of a first embodiment of the present device;

Figure 1B is a sectional view taken along the line A-A of Figure 1A;

Figure 1C is a bottom view of the first embodiment;

Figure 2A is a longitudinal sectional view showing an application state of a second embodiment of the present device;

Figure 2B is a sectional view taken along the line A-A of Figure 2A;

Figure 2C is a bottom view showing the second embodiment;

Figure 3A is a sectional view showing an application state of a third embodiment of the present device; and

Figure 3B is a sectional view showing a state wherein each contact is stored in the corresponding storage cavity in the third embodiment.

Figures 1A to 1C show a first embodiment of the present device.

A connector body comprises a plurality of contacts 1 and a housing 2.

Each contact 1 has at least two extending connecting ends 1A arranged inside a given plane. A terminal 1B of each contact 1 is arranged on a side opposite to the connecting ends outside the given plane. The housing 2 includes a storage hole 2A for storing a flat cable (including a flexible board having a conductive pattern thereon) 10 having a plurality of conductors surrounded by an insulating material. The housing 2 also includes storage cavities 2B which communicate with the storage hole to respectively store the contacts.

The contacts are slidable within the storage cavities such that the connecting ends extend through the storage hole and the cable inserted in the storage hole, and that the two connecting ends of each contact extend through the corresponding cable conductors.

The flat cable 10 has a plurality of conductors 10A insulated and extending parallel to each other.

In Fig. 1B, reference numeral 11 denotes a means for preventing return of each contact when the distal end of each contact 1 is slid in the corresponding storage cavity so as to pierce the cable. The means 11 is obtained by notching the body of the contact in an arrowhead-like shape.

In the illustrated embodiment, the connector is formed as a so-called header mounted on a surface of a printed circuit board. However, the present device is not limited to this structure.

Figs. 2A to 2C show a second embodiment of the present device.

A connector body comprises a plurality of contacts 1' and a housing 2' as in the first embodiment.

Each contact 1' has at least two extending connecting ends 1A' arranged inside a given plane. A terminal 1B' of each contact is arranged on a side opposite to the connecting ends outside the

given plane.

The housing 2' has a storage hole 2A' for storing a flat cable having a plurality of conductors surrounded by an insulating material. The housing 2' also includes storage cavities 2B' for respectively receiving the contacts.

Each storage cavity extends in the storage hole. A storage cavity portion 2C' immediately under the storage hole is wider than a storage cavity portion 2D' immediate above the storage hole.

The contacts are slidable within the storage cavities such that the connecting ends extend through the storage hole and the cable inserted in the storage hole, and that the two connecting ends of each contact extend through the corresponding cable conductors.

As shown in Fig. 2B, reference numeral 12 denotes a projection for holding a body of each contact which is slidable in the corresponding storage cavity.

Figs. 3A and 3B show a third embodiment of the present device.

A contact body comprises a plurality of contacts 1" and a housing 2" as in the first and second embodiments.

Each contact 1" has at least two extending connecting ends 1A".

The housing 2" has a storage hole 2A" for storing a flat cable having a plurality of conductors surrounded by an insulating material. The housing 2" also includes storage cavities 2B" for respectively storing the contacts and a plurality of through holes 2C" for respectively storing the connecting ends. The through holes communicate with the storage cavities and extend through the storage hole.

The plurality of through holes are formed in a direction perpendicular to an insertion direction of the cable. The contacts are slidable within the storage cavities such that the connecting ends extend through the storage hole and pierce the cable inserted into the storage hole, and that the two connecting ends of each contact extend through the corresponding cable conductors and are respectively located within the through holes.

As shown in Fig. 3A, reference numeral 2D" denotes a projection for stopping movement of each contact within the corresponding storage cavity.

In this embodiment, the connecting ends are located inside a given plane, each contact has a terminal 1B", and this terminal is located outside the given plane.

Effect of the Device

The structures of the connectors according to

the present device have been described in detail, and the following effects can be obtained by these structures.

That is, according to the present device, the contact connecting ends pierce the coating of the cable inserted in the storage hole of the housing. At the same time, the contact connecting ends directly extend through the cable conductors to perform electrical connections. As compared with the conventional urging type connecting, the pitch of the contacts can be easily reduced. In addition, at least two connecting terminals of each contact are prepared, and these connecting ends extend through the conductors to guarantee perfect electrical connections.

Claims

1. A connector comprising:
a plurality of contacts (1, 1', 1'') each having at least two connecting ends (1A, 1A', 1A''), a housing (2, 2', 2'') having a storage hole (2A, 2A', 2A'') for storing a flat cable having a plurality of conductors surrounded by an insulating material, said housing (2, 2', 2'') being provided with storage cavities (2B, 2B', 2B'') for respectively storing said plurality of contacts (1, 1', 1''), the contacts (1, 1', 1'') being slidable in said storage cavities (2B, 2B', 2B'') such that said connecting ends (1A, 1A', 1A'') extend through said storage hole (2A, 2A', 2A'') and said cable inserted in said storage hole, and said two connecting ends (1A, 1A', 1A'') extend through corresponding ones of said cable conductors, respectively.

2. A connector comprising:
a plurality of contacts (1) each having at least two extending connecting ends (1A) arranged inside a given plane and each having a terminal (1B) at a side opposite to said two extending connecting ends outside said given plane; and
a housing (2) having a storage hole (2A) for storing a flat cable having a plurality of conductors surrounded by an insulating material, said housing (2) being provided with storage cavities (2B), communicating with said storage hole, for respectively storing said plurality of contacts, wherein said contacts are slidable in said storage cavities such that said connecting ends extend through said storage hole and said cable inserted in said storage hole, and said two connecting ends of each contact extend through corresponding ones of said cable conductors, respectively.

3. A connector comprising:
a plurality of contacts (1') each having at least two extending connecting ends (1A') arranged inside a given plane and each having a terminal (1B') at a side opposite to said two extending connecting

ends outside said given plane; and
a housing (2') having a storage hole (2A') for
storing a flat cable having a plurality of conductors
surrounded by an insulating material, said housing
(2') being provided with storage cavities (2B') for
respectively storing said plurality of contacts,
wherein
each of said storage cavity extends through said
storage hole such that a storage cavity portion
(2C') immediately below said storage hole is wider
than a storage cavity portion (2D') immediately
above said storage hole, and
said contacts are slidable in said storage cavities
such that said connecting ends extend through said
storage hole and said cable inserted in said stor-
age hole, and said two connecting ends of each
contact extend through corresponding ones of said
cable conductors, respectively.

4. A connector comprising:

a plurality of contacts (1'') each having at least two
extending connecting ends (1A''); and
a housing (2'') having a storage hole (2A'') for
storing a flat cable having a plurality of conductors
surrounded by an insulating material, said housing
(2'') being provided with storage cavities (2B'') for
respectively storing said plurality of contacts (1'')
and a plurality of through holes (2C'') for storing
said connecting ends, said through holes being
formed to communicate with said storage cavities
and extend through said storage hole,
wherein said plurality of through holes are formed
in a direction perpendicular to an insertion direction
of said cable, and said contacts are slidably ar-
ranged in said storage cavities such that said con-
necting ends extend through said storage hole and
said cable inserted in said storage hole, and that
said two connecting ends of each contact extend
through corresponding ones of said cable conduc-
tors and are located within said through holes,
respectively.

5. A connector according to Claim 4, charac-
terised in that said housing further comprises ex-
tending portions (2D'') for stopping movement of
said contacts within said storage cavities.

6. A connector according to Claim 5, charac-
terised in that said connecting ends are located
inside a given plane, each of said contacts has a
terminal (1B''), and said terminal is located outside
the given plane.

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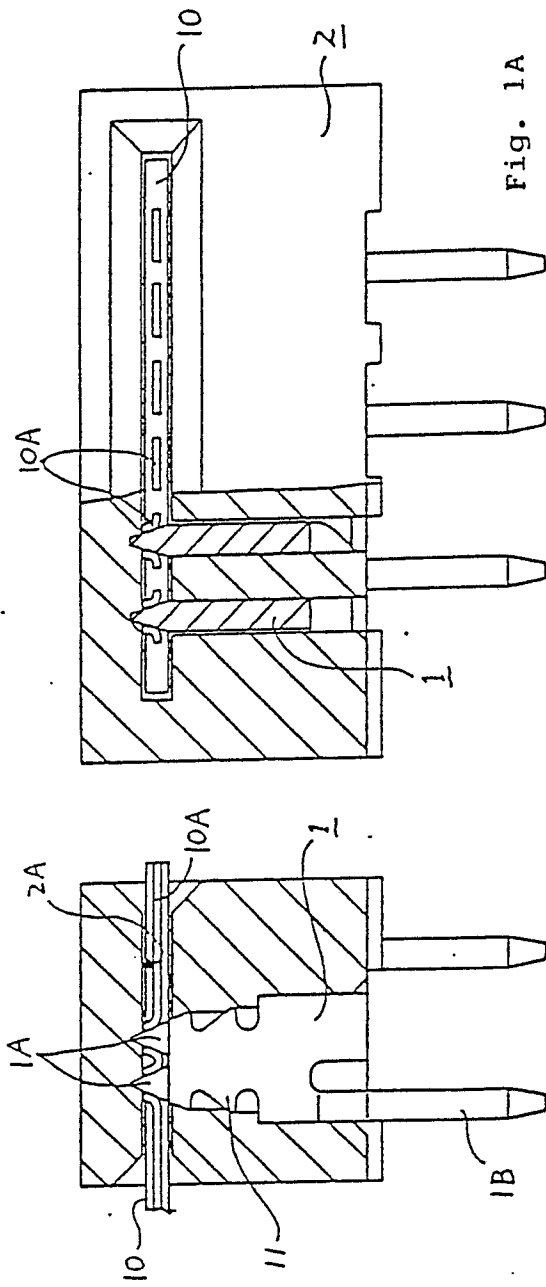


Fig. 1A

Fig. 1B

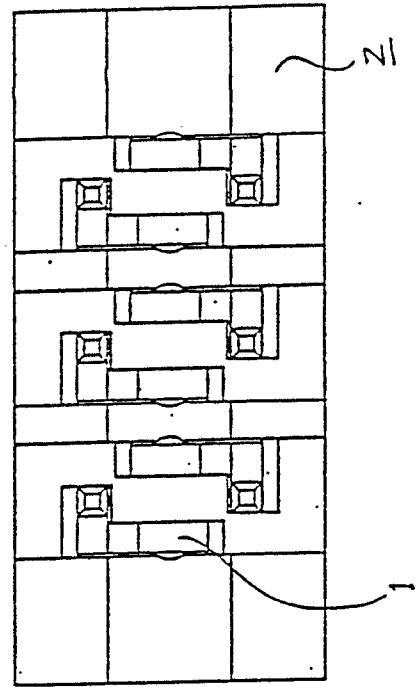


Fig. 1C

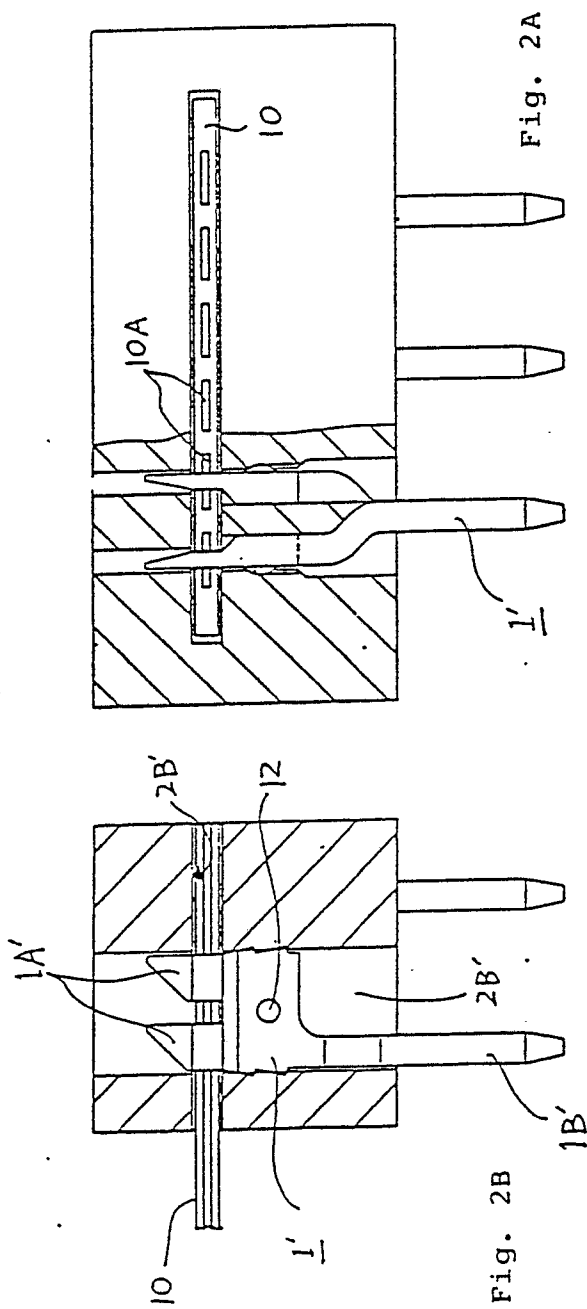


Fig. 2A

Fig. 2B

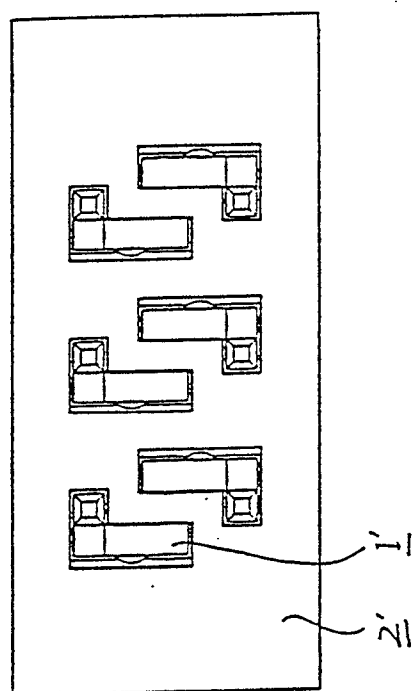


Fig. 2C

10"

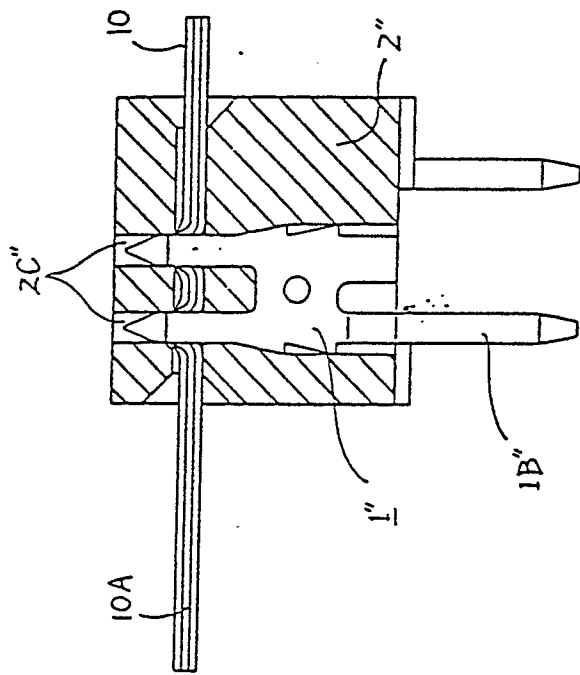


Fig. 3A

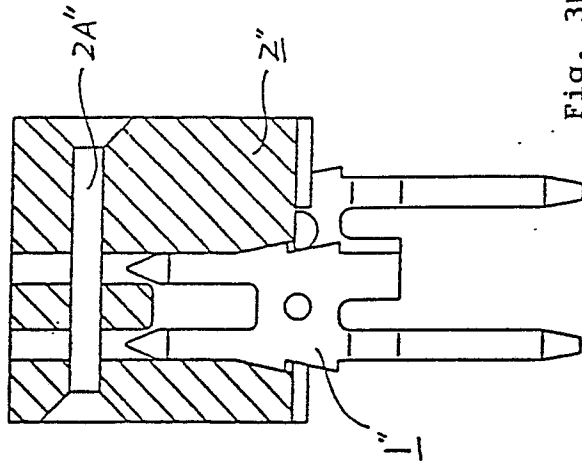


Fig. 3B