

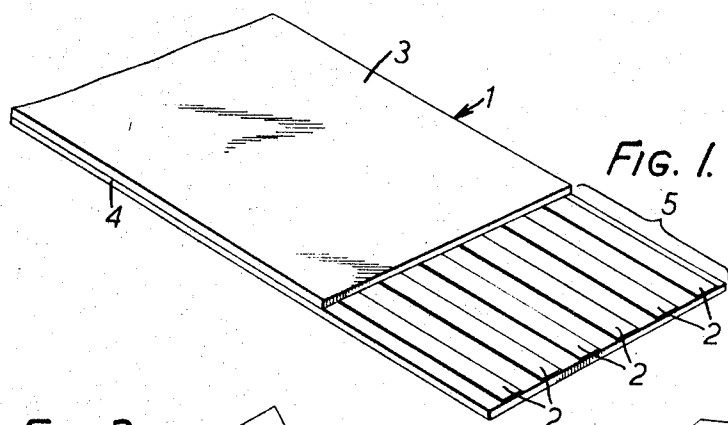
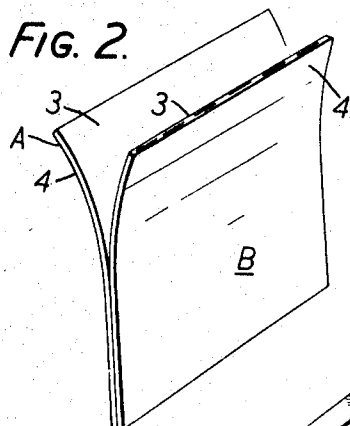
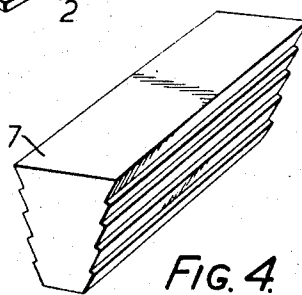
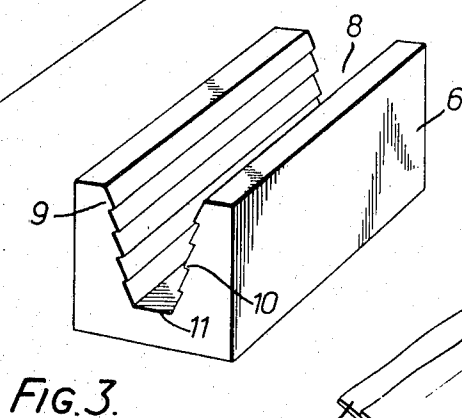
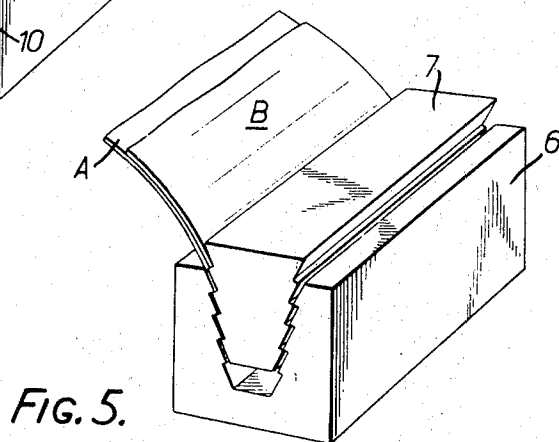
Oct. 6, 1970

J. F. THOMPSON
STRIP CABLE CONNECTOR

3,533,049

Filed Oct. 30, 1967

3 Sheets-Sheet 1



Oct. 6, 1970

J. F. THOMPSON
STRIP CABLE CONNECTOR

3,533,049

Filed Oct. 30, 1967

3 Sheets-Sheet 2

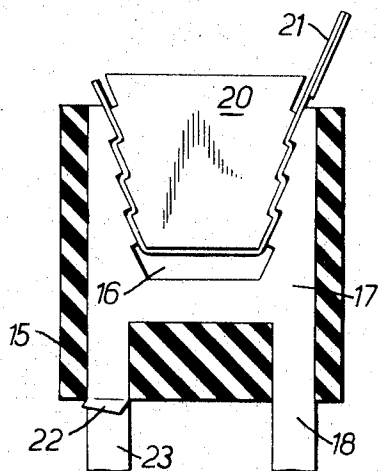


FIG 6

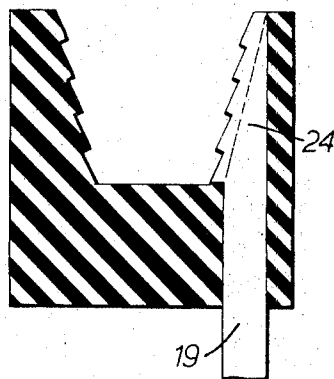


FIG. 7

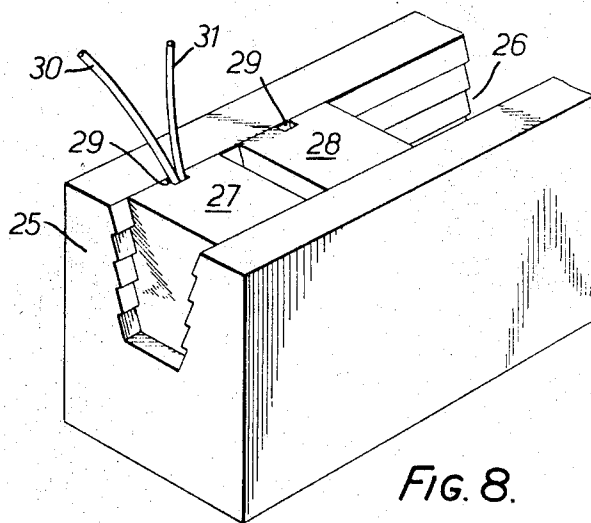


FIG. 8.

Oct. 6, 1970

J. F. THOMPSON
STRIP CABLE CONNECTOR

3,533,049

Filed Oct. 30, 1967

3 Sheets-Sheet 3

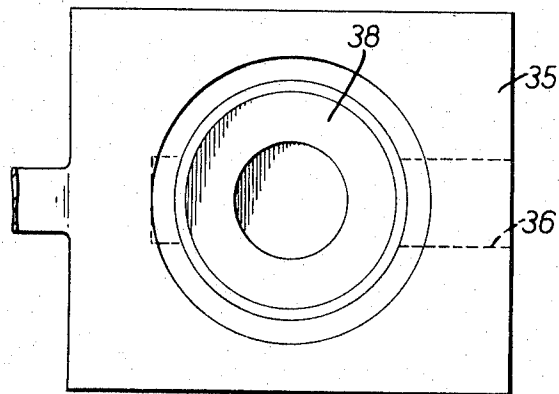


FIG. 9

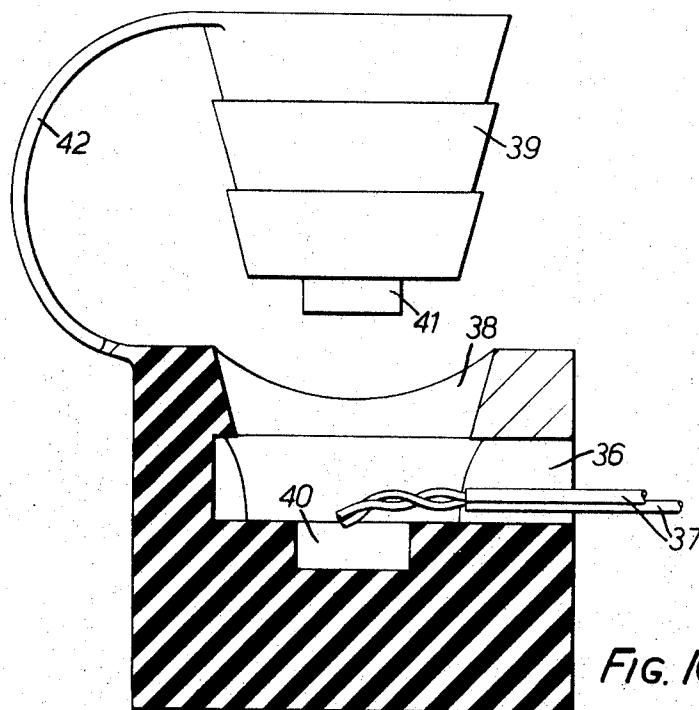


FIG. 10.

1

3,533,049

STRIP CABLE CONNECTOR

John Frank Thompson, Rottingdean, Sussex, England,
assignor to M.B. Metals Limited

Filed Oct. 30, 1967, Ser. No. 678,900

Claims priority, application Great Britain, Nov. 9, 1966,
50,199/66

Int. Cl. H01r 13/38

U.S. Cl. 339—99

8 Claims

ABSTRACT OF THE DISCLOSURE

An electrical connector for a strip cable comprises a first body member having a recess formed by mutually inclined walls. A contact member has a serrated portion projecting beyond a wall of the recess. A conductor of the cable is held in engagement with the contact member by a second body member with external serrated surface formed for interlocking resilient engagement with the serrated contact member portion.

This invention relates to a device for retaining electrical conductors in mutual contact and to electrical connectors which are particularly though not exclusively suitable for use with multiple laminar conductors, that is to say, conductors in the form of flexible metal strips applied to or enclosed between strips of flexible insulating material. Connectors according to the invention may be used to make connections between two multiple conductors of this type, or to make connection between such a multiple conductor and a like plurality of conductors of another form.

Thus it is an object of one aspect of the present invention to provide an improved device for retaining electrical conductors in mutual contact.

It is a further object of the invention to provide a device for retaining conductors of multiple laminar conductors in mutual contact.

It is an additional object of the invention to provide a device for retaining in mutual contact between the conductors in each of a plurality of sets of conductors.

It is an object of the invention in another aspect to provide an electrical connector device capable of making electrical contact to individual conductors in a laminar array of conductors.

It is a further object of this aspect of the invention to provide an electrical connector device having desirable properties of ease of and economy in manufacture.

In one aspect, the invention provides a device for retaining electrical conductors in mutual contact. This device comprises a first member having an inwardly tapering recess of which the sides are serrated. The device also comprises a further member having an external form tapering in like manner to said recess and having serrations mating with those of said recess when said further member is inserted in said recess. The mated serrations resist the withdrawal of the further member from the recess. One at least of the members is formed of an elastically resilient material.

In another aspect, the invention provides an electrical connector device comprising a first member of insulating material having opposed internal surfaces defining a recess and mutually inclined at a predetermined angle. The device also comprises a further member of insulating material having opposed external surfaces mutually inclined at said predetermined angle. One of said insulation members carries one or more contact members each having a serrated edge protruding from an inclined surface of that insulating member. The surfaces of the other of such insulating member is provided with serrations en-

2

gageable with those of said contact member to resist disengagement of the members.

Features and advantages of devices in accordance with the invention will be best understood from the following description taken in conjunction with the drawings, comprising FIGS. 1 to 10, of which:

FIG. 1 is a perspective view of a portion of a multiple laminar conductor prepared for connection;

FIG. 2 represents two conductors, prepared as in FIG. 1, positioned for joining together;

FIG. 3 represents a body portion of a device according to the invention for retaining electrical conductors in mutual contact;

FIG. 4 represents an insert portion of the device of FIG. 3;

FIG. 5 shows two multiple laminar conductors joined by the device of which the components are shown in FIGS. 3 and 4;

FIG. 6 shows a cross-section through one embodiment of electrical connector in accordance with the invention;

FIG. 7 shows a cross-section through another embodiment of electrical connector in accordance with the invention;

FIG. 8 is an isometric view of another device in accordance with the invention for retaining electrical conductors in mutual contact;

FIG. 9 is a plan view of another device (as FIG. 8); and

FIG. 10 is a sectional view of the device of FIG. 9.

FIG. 1 of the drawings shows a multiple laminar conductor 1 shown in this case by way of example only as consisting of six conductors 2 of strip form enclosed between bands 3, 4 of insulating material which are adhesively or otherwise secured together. To prepare such a laminar conductor for connection by means of a connector according to the invention a portion of the upper insulating strip 3 is removed at the end of the conductor as denoted by reference 5, leaving the conductors exposed as shown. Preparatory to making the connection, the ends of two multiple conductors A and B are thus prepared and disposed face-to-face with the metal strips in alignment as shown by FIG. 2. The metal strips of the two multiple conductors are thus in contact.

The device shown by FIGS. 3 and 4 comprises a body member 6 of insulating material (FIG. 3) and an insert member 7 also preferably but not essentially of insulating material. The body member 6 has a longitudinal notch 8 of which the sides are serrated preferably so as to have alternately downwardly sloping longer flanks 9 and short flanks 10 which may be parallel to the bottom 11 of the notch or may slope slightly upwards. The directions upwards and downwards will be understood as applying only to the device as shown in the drawing and not as introducing any positional limitation. Insert member 7 (FIG. 4) has serrated outer faces of like form to the faces bounding notch 8 in body member 6.

To make a connection, conductors A and B, prepared and positioned as described in relation to FIG. 2, are placed in the notch 8 of body 6 and insert 7 is forced downwardly into the notch by appropriate pressure until a firm condition is attained. It will be obvious that the resilient deformation of one or both members 6, 7 of the connector is advantageous in ensuring a continuing firm engagement of the multiple conductors. To this end the two connector portions may conveniently be moulded in a suitable nylon.

The shape, size and number of the serrations in the sides of notch 8 and on the faces of insert 7 will be chosen to ensure a strong grip on conductors of varying thickness. Assembly of the two connector portions may be effected by pressure applied by means of a lever or screw-

3

action press of simple form, either portable or fixed as may be convenient.

The connector described above in relation to the drawing may be modified so as to provide for the connection of metallic strips in a multiple laminar conductor to metal contact members, possibly provided with serrated edges for engaging the laminar conductors, as shown in FIGS. 6 and 7. In FIG. 6 a connector body is longitudinally notched at 16, the sides of the notch tapering inwardly. A slot formed in body 15 accepts a contact member 17 having serrated limbs of which the serrated edges are exposed at the inner surfaces of the notch and protrude slightly above the notch surfaces. Contact member 17 is also provided with a terminal portion 18 protruding through a hole formed in the body member. This terminal portion is shown broken away but may in practice have any desired form for co-operation with known connecting means. Thus terminal portion 18 may be formed to provide a solder spill or bucket, or arranged for further deformation to make a crimped contact. Other forms of terminal portion may be used where a welded, wire wrapped or spring contact connection is to be made.

A further short limb 22 of contact member 17 passes through body member 15 and is deformed as shown to fix the contact member in position in its slot. Other means of securing the contact member in its slot may be used where desired. FIG. 7 differs from FIG. 6 only in that contact member 19, which here replaces contact member 17 has only one limb and may be secured in place in the body member by moulding it in place. As shown in FIG. 6, a tapered serrated wedge member 20 is used to urge a multiple laminar conductor 21, from the end portion of which one insulating layer may in some cases be removed, into contact with the teeth formed on a serrated contact member 17. Contact is thus made between a conductor member of conductor 21 and contact member 17. Similar contact members, of which another is indicated at 23, are conveniently spaced along the notch 16 in body member 15 so as to engage each of those conductor members of the laminar conductor to which electrical connection is to be made. In this case alternate contact members preferably have their terminal portions displaced as indicated. Where closely spaced contact members are retained in slots as described it may be found convenient to provide the notch in body member 15 with planar tapering sides and to rely upon the grip of the contact members to retain the wedge member 20 in position. Connectors of this type may have their terminal portions constructed to form members of a separable plug and socket coupling or otherwise as desired. Contact members could alternatively be arranged in grooves formed in the wedge member of the connector.

FIG. 8 shows a device in accordance with the invention by which solid or stranded equipment wires may be retained in mutual electrical contact. A body member 25 is provided with a serrated, tapered notch 26, into which may be inserted individual serrated, tapered wedge members 27, 28, conveniently provided with a notch 29 extending along one slant face. A set of wires of which the conductors are to be mutually connected in the case shown, are two wires 30, 31 with ends bared of insulation and twisted together. The twisted wire ends are then placed in the groove 29 of wedge 27 and the wedge is thrust into the groove of body 25, thus locking the connection. A generally similar method may be employed to connect wires to the conductors of a multi-conductor laminar array, the provision of grooves being in this case optional.

FIGS. 9 and 10 show two views of a form of connector for retaining two electrical conductors in mutual contact. Here a body member 35, of resilient insulating material is shown as being of generally cylindrical external form, though this is irrelevant to the invention since the outward shape of the device does not affect its mode of operation. Body member 35 is provided with a bore 36

4

to receive conductors 37 which are to be retained in mutual contact. Bore 36 is intersected by an inwardly tapering and serrated circular recess 38 into which fits a tapered and serrated circuit plug 39. Recess 38 may be provided as shown with a central cylindrical depression 40 into which fits a cylindrical protrusion 41 found on the end of plug 39. Depression 40 and protrusion 41 may however be omitted. The conductors are inserted into bore 36 with their ends in contact and plug 39 is forced into tapering recess 38 to grip the conductors and return them in mutual contact. In a modification of this embodiment bore 36 may be replaced by a slot entering depression 38. Body member 35 and plug 39 are advantageously constructed as a unit, being connected by an integrally moulded strap 42.

I claim:

1. In an electrical connector for a strip cable comprising first and second insulating body members, said first body member including a recess defined by opposed surfaces mutually inclined at a predetermined angle, a contact member seated in said first body member adjacent said recess, said contact member having a plurality of surface portions for engagement with a conductor of said cable and said second body member being resilient and having external surfaces mutually inclined at said predetermined angle and spaced to urge said cable conductor against said contact member portions when said first insulating member and conductor are inserted in said recess, the improvement wherein:

said contact member portions form serrations having alternate longer edges sloping inwardly and downwardly of said recess and shorter edges sloping inwardly and upwardly of said recess, said alternate edges meeting in apices projecting inwardly of said recess beyond at least one of said inclined surfaces of said first body member; and

said external surfaces of said second body member have formed therein serrations matable in self-locking resilient inter-engagement with said serrations of said contact member whereby a conductor of a strip cable positioned between said body members is held in engagement with said serrated portion of said contact member by a matingly serrated portion of said second body member.

2. The improvement as set forth in claim 1 wherein portions of said contact member project beyond each of said opposed surfaces of said one body member.

3. The improvement as set forth in claim 1 wherein said contact member portions project beyond only one of said opposed surfaces of said one body member and said other inclined surface includes serrations formed for self-locking inter-engagement with said serrations on a mating surface of said second body member.

4. The improvement as set forth in claim 2 wherein said contact member has spaced parts each providing serrated contact member portions extending beyond a respective one of said opposed first body member surfaces.

5. The improvement as set forth in claim 1 wherein a plurality of said contact members are provided at spaced-apart positions in said recess for engagement with individual conductors of said cable.

6. The improvement as set forth in claim 5 wherein each said contact member has spaced parts each providing serrated contact member portions extending beyond a respective one of said opposed first body member surfaces.

7. The improvement as set forth in claim 2 wherein said contact member is generally of H form, said first body member having slots therein to receive adjacent limbs of said contact member, said contact member having a limb portion extending through a said slot beyond said body member, said contact member being retained in said body member by deformation of said limb portion.

8. The improvement as set forth in claim 6 wherein said contact member is generally of H form, said first

5

body member having slots therein to receive adjacent limbs of said contact member, said contact member having a limb portion extending through a said slot beyond said body member, said contact member being retained in said body member by deformation of said limb portion.

References Cited

UNITED STATES PATENTS

2,587,239	2/1952	Smith	339—98
2,858,351	10/1958	Taylor	339—244 XR 10
3,115,541	12/1963	Hanner et al.	174—92
3,189,863	6/1965	Leach	339—99

6

3,203,576	8/1965	Wout et al.	215—41 XR
3,355,699	11/1967	Oshva	339—99

FOREIGN PATENTS

202,156	2/1966	Sweden.
422,104	4/1967	Switzerland.

MARVIN A. CHAMPION, Primary Examiner

P. A. CLIFFORD, Assistant Examiner

U.S. Cl. X.R.

339—17, 59