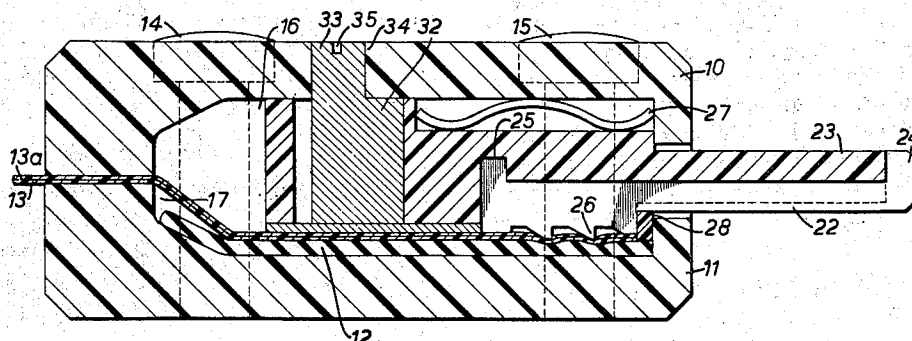


Bridle

[45] Sept. 18, 1973

1,145,297 3/1969 Great Britain 339/99 R

11 Claims, 2 Drawing Figures



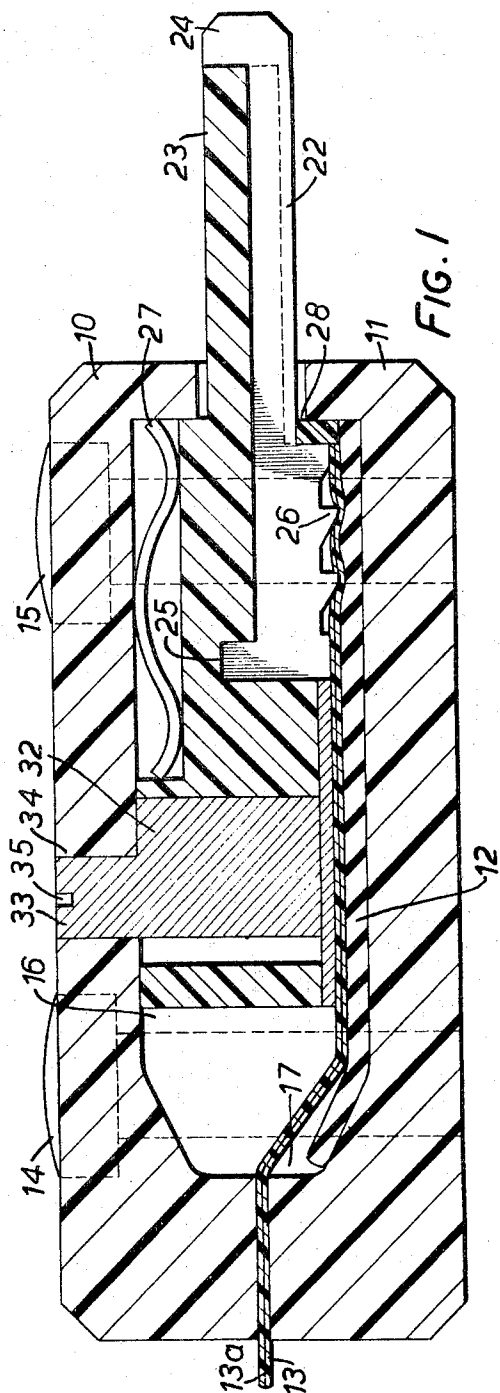


FIG. 1

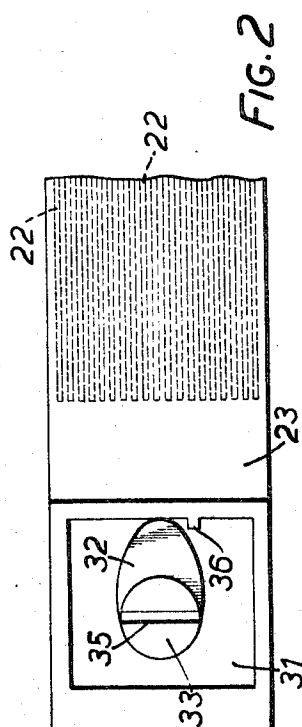


FIG. 2

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1 CONNECTORS

This invention relates to connectors for making electrical connections to a tape cable comprising a metallic tape or side-by-side tapes embedded in an insulating medium. For some uses, such tape cables have advantages over the more usual cables having generally circular cores formed into an approximately circular cable. However, difficulties are encountered in making connections to such cables. Connectors have been devised for this purpose and such connectors may take various forms. For example they may be employed to provide terminal connections which may be of plug and socket form so that two cables can be connected end to end or which may provide terminals for connection to various other systems. However, such connectors as have been devised have suffered from certain disadvantages.

In one form of connector, see example French Patent Specification No. 1,433,525 granted Feb. 21, 1966 to Inovac S.A., pins are pressed into the cable in a direction generally perpendicular to the plane of the tape cable; it has been found that the electrical connection between the pins and the metallic tapes is not completely reliable over extended periods of time. In another form of connector the tape is drawn over chisel-shaped teeth. An example of this form is to be found in my U.S. Pat. No. 3,621,449. This specification describes an electrical connector for a tape cable which has a number of teeth for engagement with the metallic tapes, the teeth being fixed in a housing and the housing having means for clamping the tape cable with respect to the housing. The housing carries a rotatable member having a portion of its diameter of greater radius and a portion of lesser radius arranged so that when the rotatable member is rotated the portion of greater radius comes into contact with the tape cable and the cable is drawn longitudinally across the teeth so that the teeth plough through the insulating medium and establish electrical contact with the metallic tape. This arrangement works satisfactorily in some circumstances, but it has been found that for certain requirements the tension on the cable which is exerted by rotation of the rotatable member and which is necessary to draw the cable across the face of the teeth is very high; this high tension can result in stretching of the cable between the rotatable member and the teeth so that the relative movement between the cable and the teeth is not as great as it would be if stretching had not occurred and may be insufficient to produce satisfactory contacts between the teeth and the metallic tapes. Moreover, damage to the cable can occur. It is believed that this is caused by the high degree of friction between the cable and the surfaces with which it comes into contact, it being borne in mind that the teeth must be spring-loaded against the cable in order to effect penetration.

Accordingly, it is an object of the present invention to overcome the disadvantages of our previous construction and to provide a tape cable connector in which excessive stretching of the tape cable will not occur.

This object is achieved by providing means for moving the or each tooth relative to the housing and along the tape cable whereby the or each tooth ploughs through the insulating medium to establish electrical contact with a metallic tape. Thus, by contrast with the previous construction in which the tape is moved rela-

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tive to the housing and to the contact which is stationary relative to the housing, with the present invention the tape cable remains stationary relative to the housing and the contact is moved. With this arrangement friction between the cable and the surfaces with which it comes in contact assists in maintaining the cable in the position required instead of acting against the imposed movement of the cable as in the previous construction. The distance moved by the contact can be accurately determined and this will be the length of the relative movement between the contact and the cable.

Normally the tape cable will have a plurality of metallic tapes and in this case the contacts are preferably carried in a common contact carrier and the moving means is arranged to move the contact carrier. The moving means may comprise an eccentric rotatably mounted in the housing and arranged to move the contact carrier.

The invention may be carried into practice in various ways and one connector embodying the invention will now be described by way of example with reference to the accompanying drawings, of which:

FIG. 1 is a longitudinal section of the connector, and

FIG. 2 is a plan view of the contact carrier and eccentric.

The connector includes a housing having an upper portion 10 in the form of an open-bottomed box and a lower portion 11 in the form of an open-topped box. The cavity 17 in the lower portion is faced with rubber 12 and forms a channel to accommodate a tape cable 13 which consists of a number of strips 13a, for example 19, of copper embedded side-by-side in a plastics insulator. The two portions may be clamped together with two pairs of screws 14 and 15, one pair at the front and one pair at the rear of the connector.

The chamber formed by the cavity 16 in the upper portion 10 and the cavity 17 in the lower portion 11 contains metal electrical contacts 22 and a contact carrier 23 of insulating material. The contacts 22 are held loosely in the contact carrier and are prevented from moving longitudinally with respect to the carrier by shoulders 24 and 25 at each end of each contact. The contact carrier contains a contact for each metallic tape in the tape cable. The edge of each contact facing the lower portion 11 of the housing is provided with chisel-shaped teeth 26 and above the contact carrier is a rectangular corrugated spring 27 which extends across the whole width of the tape cable and the contact carrier.

A rectangular slot 31 is formed in the left-hand end of the contact carrier 23 and contained in this slot is an eccentric 32 which carries an integral stub shaft 33 which extends through and is a sliding fit in a hole 34 in the upper portion of the housing. The stub shaft 33 has a screwdriver slot 35 in its upper end by which the eccentric can be rotated. Rotation of the eccentric will cause the contact carrier 23 to move longitudinally within the housing; in the position shown, the contact carrier is in its furthest position to the right with respect to the housing. Rotation of the eccentric through 180° from this position will cause the contact carrier to move to the left. The rotational movement of the eccentric is limited by a stop 36 formed on the contact carrier so that, as can be seen from FIG. 2, the eccentric cannot rotate any further in a clockwise direction. When the lobe of the eccentric engages the stop 36 it is slightly below the centre line of the housing as viewed

in FIG. 2 so that an inward force on the contacts 22 will press the lobe harder against the stop and inward movement of the contacts is prevented.

When the connector is to be assembled, the tape is guided within the longitudinal channel until it abuts a stop member 28 on the lower portion 11 of the housing. The wavy spring 27, the contact carrier 23 (with the contacts 22) and the eccentric 32 are placed on top of the tape with the eccentric positioned such that the contact carrier is in its position farthest to the left as seen in the drawings. The upper portion 10 is then placed over the lower portion and the pairs of screws 14 and 15 are tightened. The rear pair of screws 14 clamp the tape cable between the two portions 10 and 11 where the cable passes out of the housing and the front pair of screws 15 press the teeth 26 against or perhaps into the cable.

In order to make electrical contact with the metallic strips in the tape cable the eccentric 32 is rotated in a clockwise direction until it abuts the stop member 36. This rotational movement will move the contact carrier to the right which will cause the teeth 26 in the contact to plough through the tape until they are in good electrical contact with the metallic tapes.

In order to guide the contact carrier 23 in its reciprocating movement it may carry flanges which engage in grooves in the housing or the housing may carry flanges which engage in grooves in the carrier.

What we claim as our invention and desire to secure by Letters Patent is:

1. An electrical connector for a tape cable comprising a housing, a number of electrical contacts each having at least one tooth for contact with a metallic tape in the cable, a common contact carrier mounted in said housing and carrying said contacts, and drive means for moving said contact carrier longitudinally with respect to said housing and along the tape cable whereby each tooth ploughs along said tape cable.

2. A connector according to claim 1 wherein said drive means comprises an eccentric rotatably mounted on said housing and arranged, on rotation, to move said carrier lengthwise of said tape cable.

3. A connector according to claim 2 further comprising a stop to limit rotation of said eccentric just beyond its position of maximum throw, whereby reverse movement of said contacts is prevented.

4. A connector as claimed in claim 1 wherein said

housing contains a backing of resilient material located to support the tape cable opposite each said tooth on said contact carrier.

5. A connector as claimed in claim 4 further comprising a spring on the side of the contact opposite the backing and urging the teeth towards the backing.

6. An electrical connector for a tape cable comprising a housing, clamp means on the housing for gripping a metallic tape-containing tape cable entering the housing, a contact carrier slidably mounted in said housing, a plurality of contacts mounted in said carrier, each said contact having at least one chisel-shaped tooth, and an eccentric rotatably mounted in said housing and engaging said carrier, whereby rotation of said eccentric moves said carrier away from said clamp means and said teeth plough into said cable to establish electrical contact with the metallic tapes in said tape cable.

7. An electrical connector according to claim 6 wherein said carrier has a stop engageable by said eccentric.

8. An electrical connector according to claim 6 wherein said eccentric is mounted on a shaft one end of which extends to the outside of said housing and said end is formed with a screwdriver slot.

9. An electrical connector for a tape cable comprising a housing, clamp means on the housing for gripping a metallic tape-containing tape cable entering the housing and extending lengthwise thereof, a contact carrier mounted in said housing for rectilinear sliding movement parallel with the length of said housing, a number of contacts mounted in said carrier, each said contact having at least one chisel-shaped tooth projecting beneath the bottom surface of said carrier to penetrate said tape cable into contact with one of said tapes, and drive means carried by said housing for sliding said contact carrier longitudinally of said carrier and along said tape cable.

10. An electrical connector according to claim 9 wherein said housing is in two parts secured together by screws, facing surface of said two parts forming a clamp to grip said tape cable when said screws are tightened.

11. An electrical connector according to claim 9 wherein said housing is in two parts secured together by screws and tightening of said screws presses said teeth into said tape cable.

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