United States Patent

Doughty

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[54] MULTICONDUCTOR BELT AND CONNECTOR

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[52] **U.S. Cl.** .....**339/17 F,** 174/117 F, 339/176 MF

[51] **Int. Cl.** **H05k 1/00**

[58] **Field of Search** .....339/17 R, 17 F, 17 L, 95, 97, 339/99, 176 MP, 176 MF, 196 M; 174/117 R, 117 F, 117 FF, 117 A

[56] **References Cited**

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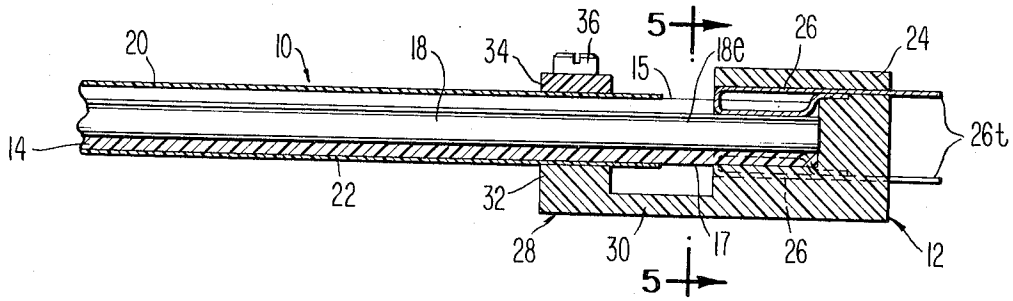
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Assistant Examiner—Terrell P. Lewis
Attorney—Paul W. Fish, Edward J. Feeney, Jr. and Charles S. Hall

[57] **ABSTRACT**

An electrical cable and a receptacle connector into which the cable is plugged. The cable is in the form of a belt, with the insulation on both sides readily removable for access to the conductor contact surfaces. The connector is provided with a releasable clamping means for securing the belt in the connector.

4 Claims, 5 Drawing Figures



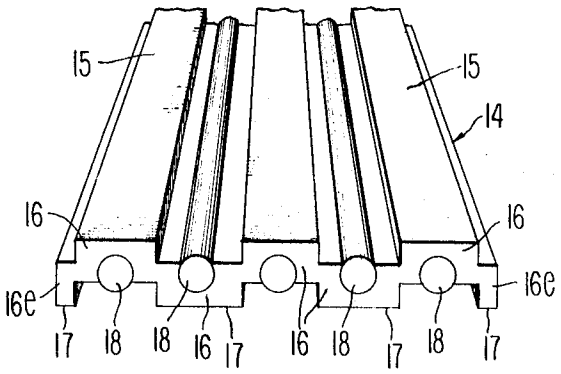


Fig. 2

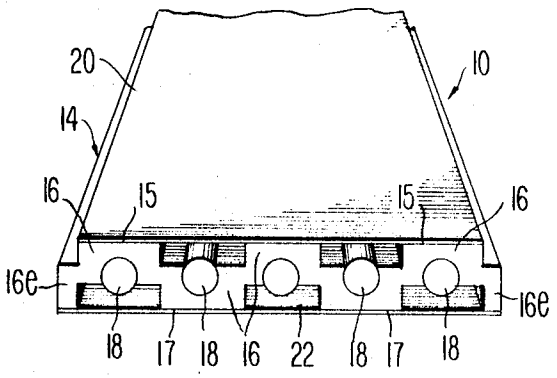


Fig. 1

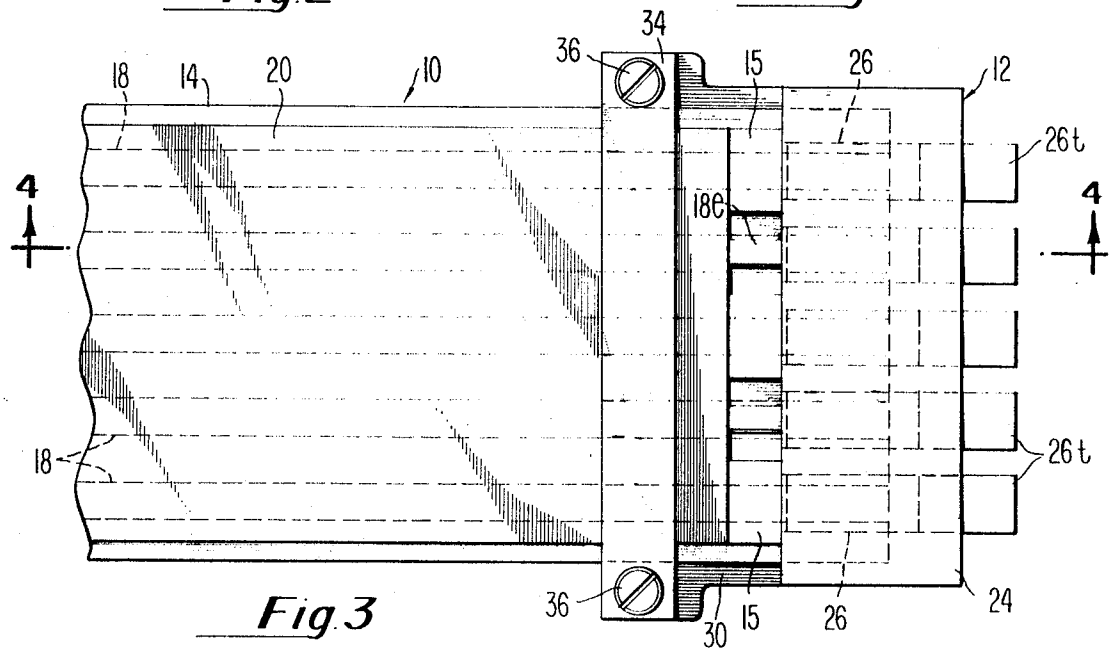


Fig. 3

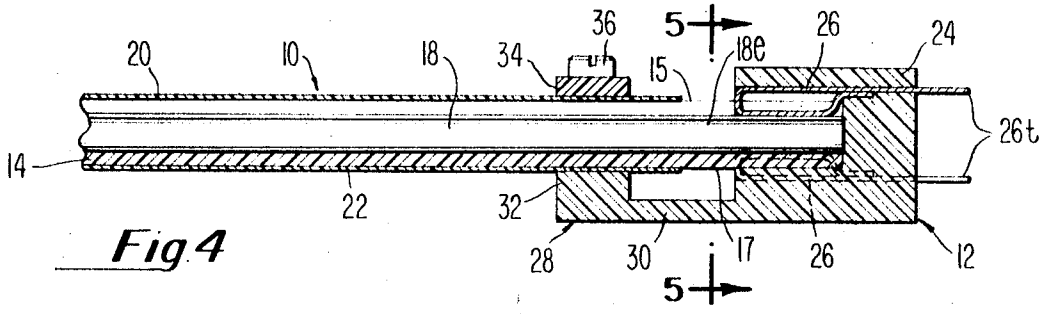


Fig. 4

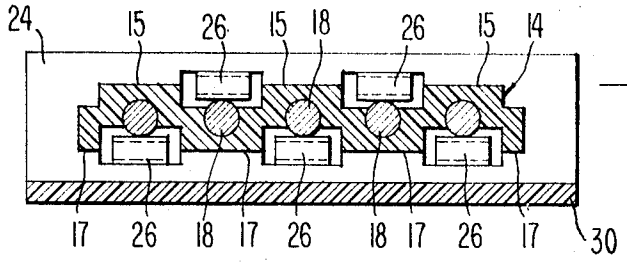


Fig. 5

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MULTICONDUCTOR BELT AND CONNECTOR

BACKGROUND OF THE INVENTION

This invention relates generally to electrical conductors and connectors and particularly to a multiconductor cable or belt and receptacle connector. While not limited thereto, the invention finds special application for making electrical connections in the cabinets and between the cabinets of computing systems.

Multiconductor cables for computing systems, for example, generally contain a large number of densely packed, miniature diameter wire conductors which are both difficult to separate at their end regions and difficult to route to their connecting points. Moreover, an inexpensive method of separating the conductors in a desired order and terminating them to some form of connector is not presently known.

SUMMARY OF THE INVENTION

An object of the invention is to provide a multiconductor belt and connector which avoid the above-mentioned disadvantages.

Another object of the invention is to provide a multiconductor belt whose conductors can readily be exposed for connection purposes.

A further object of the invention is to provide such a multiconductor belt in which exposed conductors are protected against undesired contacts.

Another object of the invention is to provide a multiconductor belt whose conductors do not have to be separated from the belt, either for connection or for any other purpose.

A further object of the invention is to provide a receptacle connector for a multiconductor belt, with means for securing the belt against withdrawal.

Still a further object of the invention is to provide a multiconductor belt construction in which the belt will readily lie substantially flat for ease in handling, and with minimum tension in the belt.

A further object of the invention is to provide a multiconductor belt and connector which are simple to use and inexpensive to manufacture.

In accordance with the above objects and considered first in one of its broader aspects, a multiconductor belt according to the invention may comprise a strip of electrical insulating material provided with spaced elongate ridges on both sides. Each of certain ridges on each side is opposite a space between adjacent ridges on the other side. A plurality of elongate conductors are provided, with each conductor partially embedded along its length in the strip near the medial portion of an associated one of the ridges and with its exposed portion along its length extending into the space opposite its associated ridge.

The invention will be more clearly understood when the following detailed description of the preferred embodiment thereof is read in conjunction with the accompanying drawing which is described below.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a fragmentary perspective view of a multiconductor belt constructed in accordance with the invention.

FIG. 2 is a view similar to FIG. 1 but with certain insulation omitted to more clearly reveal other parts.

FIG. 3 is an enlarged fragmentary plan view of an assembly of the multiconductor belt and a connector according to the invention.

FIG. 4 is a sectional view taken along line 4—4 of FIG. 3.

FIG. 5 is a sectional view taken along line 5—5 of FIG. 4.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Turning to the drawing, the invention comprises a multiconductor belt **10** and a receptacle connector **12** for receiving and releasably securing an end portion of the belt **10**.

The belt **10** comprises an elongate strip **14** (FIG. **2**) of electrical insulating material provided with spaced elongate ridges **16** on both sides and end ridges **16***e* on one side. The belt **10** is provided with a plurality of elongate conductors **18**, each partially embedded along its length in the strip **14** near the medial portion of one of the ridges **16**, and with its exposed portion along its length extending into the space opposite its associated ridge **16**. Both sides **15** and **17** of the strip **14** are covered with individual ones of electrical insulating adhesive tapes **20** and **22** (FIG. **1**) which are adhesively bonded to the sides **15** and **17** of the strip **14** so as to cover and protect the conductors **18** against undesirable contact. The conductors **18** are further protected against undesirable contact by having their elongate exposed portions below the adjacent outside surfaces **15** or **17** of the strip **14**.

The connector **12** (FIG. **4**) comprises a contact support portion **24**, a group of contacts **26** mounted in the contact support **24**, and a releasable clamping means **28** connected to the contact support **24** by means of a foot **30**. The releasable clamping means **28** is outboard of the contact support **24** and may take any desirable form. For purposes of illustration, the releasable clamping means **28** has been shown to comprise a base portion **32**, a clamping strap **34**, and clamping screws **36** which extend through openings, not shown, in the strap **34** and are tightened in threaded holes, not shown, in the base portion **32**. As shown in FIG. **5**, the contacts **26** are staggered and arranged in two horizontal rows, so that either horizontal row of contacts **26** makes contact with alternate conductors **18**. The contacts **26** are provided with terminals **26***t* (FIG. **4**) which, in one mode of connection, may receive the margin of a printed circuit board therebetween and be connected to conductors thereon.

The multiconductor belt **10** is initially plugged into the connector **12** by first having an end portion of its conductors **18** exposed, as by peeling back, or removing entirely, an appropriate length of the electrical insulating adhesive tapes **20** and **22**. In the illustrated embodiment of the invention, a portion of the tapes **20** and **22** is removed, as shown in FIGS. **3** and **4**, so as to expose an end portion **18***e* of the conductors **18**. When the end portion **18***e* of the conductors **18** is thus suitably exposed, the clamping screws **36** are loosened and the belt **10** is plugged into the connector **12** by sliding its end portion between the base **32** and clamping strap **34** until the conductor ends **18***e* make the desired degree of contact with the contacts **26** and extend into the connector **12** the required distance. The clamping screws **36** are then tightened against the clamping strap **34** to an extent suitable to prevent the multiconductor belt **10** from being withdrawn from the connector **12**.

I claim:

1. A multiconductor belt comprising a strip of electrical insulating material provided with spaced elongate ridges on both sides, each of certain ridges on each side opposite a space between adjacent ridges on the other side, and a plurality of elongate conductors each partially embedded along its length in the strip near the medial portion of an associated one of said ridges with its exposed portion along said length extending into the space opposite its associated ridge.

2. A multiconductor belt according to claim **1** wherein said exposed portion of each conductor is below the adjacent side of said strip.

3. A multiconductor belt according to claim **2** including electrical insulating tape removably adhesively bonded to each side of said strip and covering the exposed portions of said conductors.

4. The combination of a multiconductor belt according to claim **3** and a receptacle connector containing an end of said belt from which the tape has been removed, said connector comprising two rows of spaced contacts, each contact of each row opposite a space between adjacent contacts of the other row and in contact with one of said conductors, and means releasably clamping said belt to prevent its removal from said connector.