

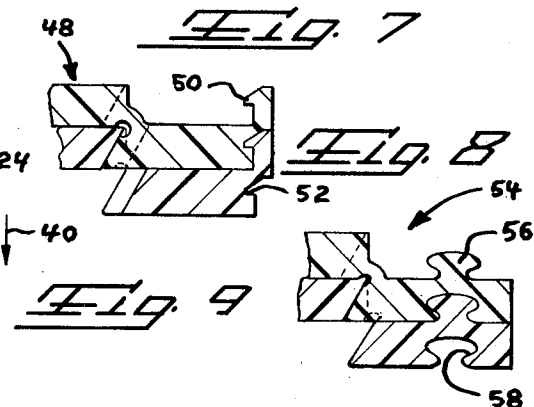
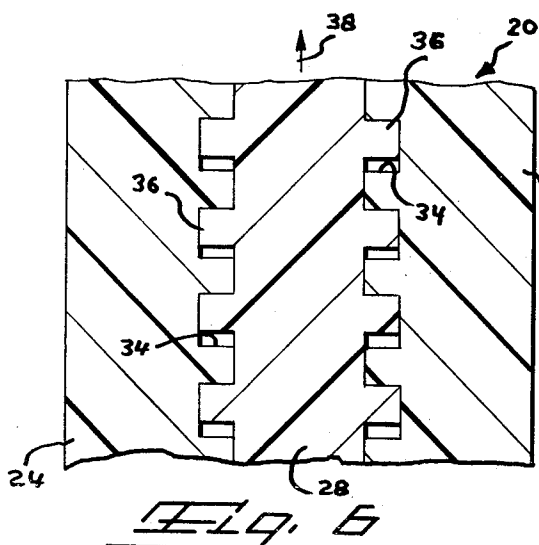
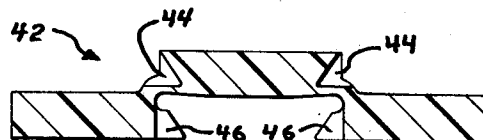
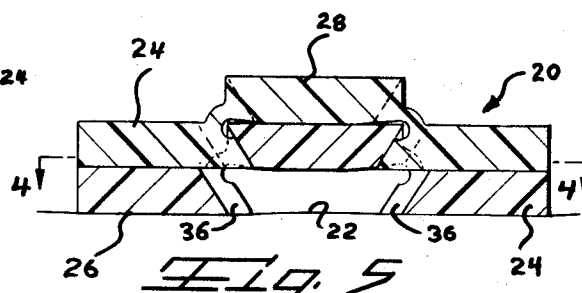
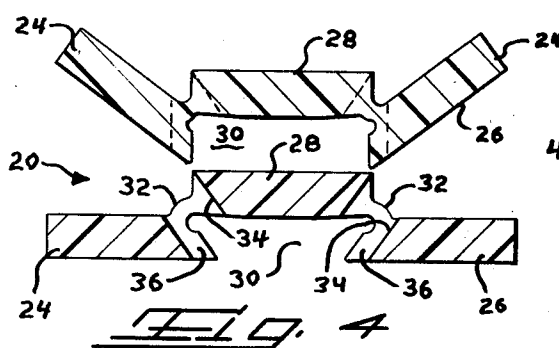
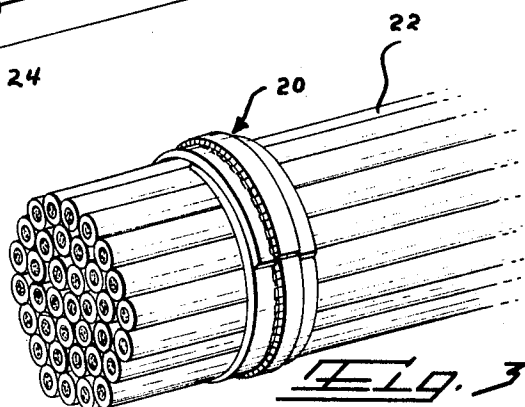
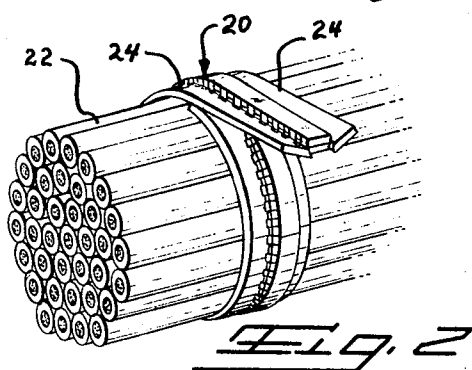
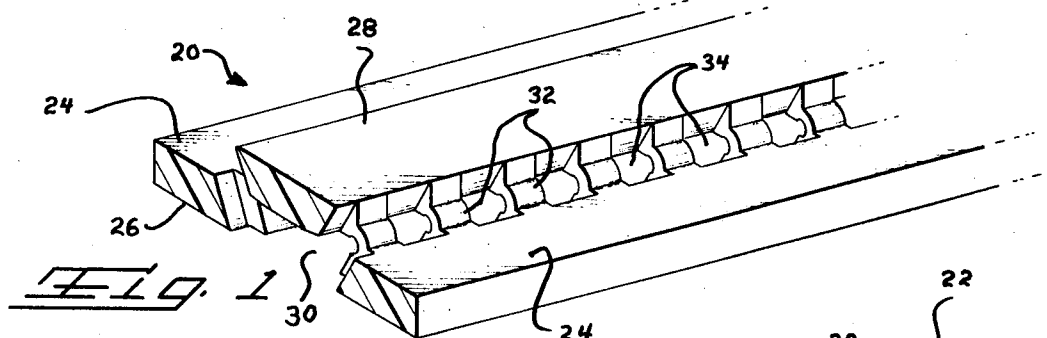
June 2, 1970

W. R. EVANS

3,514,815

BUNDLE TIE

Filed April 10, 1968



INVENTOR
WILLIAM ROBERT EVANS

BY *John H. Hutchins*

1

3,514,815

BUNDLE TIE

William Robert Evans, Hershey, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Apr. 10, 1968, Ser. No. 720,101

Int. Cl. B65d 63/00

U.S. Cl. 24—16

5 Claims

ABSTRACT OF THE DISCLOSURE

A bundle tie is disclosed and comprises an elongated flexible strap for tying a bundle of cables or the like, the strap having a pair of laterally extending wing members having bearing surfaces for engaging the strap, and cooperable interlocking means disposed between the wing members, the interlocking means being capable of self-engagement when the strap is disposed around a bundle and caused to overlap itself. Alternative forms of interlocking means are disclosed together with alternative forms of wing members.

In the electronic industry there are various applications involving the use of a great number of electrical conductors disposed in close proximity to each other. It is normally desirable to separate the conductors into discrete bundles and to secure the bundles together with some form of a tie.

Various bundle ties are known in the prior art for securing a bundle of conductors, cables, or the like. The most frequent form of tie involves a belt-like strap having a slotted portion at one end and a series of teeth extending along the strap. The strap is passed around a bundle and the teeth are ratcheted through the slot until the strap is securely in position. There are several drawbacks to this type of strap. First, it involves a considerable waste of material in that there is always excess strap which serves no purpose and must be discarded. Additionally, many various lengths of straps must be stocked in order to cover a range of bundle sizes. Another drawback is that the tie appreciably increases the overall bundle size since the locking arrangement on the strap produces a build up of material around the bundle. These and other drawbacks of the prior art provide the background for the instant invention in which a continuous length of strap is employed which strap may be selectively severed after being applied to a bundle. The strap employs a continuous self-locking feature which fits snugly around a bundle thus avoiding any appreciable size build up.

It is therefore an object of this invention to provide a bundle tie which avoids the various drawbacks of the prior art devices.

Another object is to provide a bundle tie which is supplied in indeterminate length to avoid the necessity of storing multiple size ties.

Another object is to provide a bundle tie of continuous hermaphroditic design.

BRIEF DESCRIPTION OF THE DRAWING

In the drawings in which like reference numerals refer to like parts:

FIG. 1 is a perspective view of a bundle tie made in accordance with the teachings of the present invention;

FIG. 2 is a perspective view of the tie of FIG. 1 being preliminarily placed around a bundle;

FIG. 3 is a perspective view similar to FIG. 2 showing the tie in its tightened position;

FIG. 4 is a cross-sectional view showing the bundle tie in overlapped position prior to interlocking engagement;

2

FIG. 5 is a cross-sectional view similar to FIG. 4 and showing the tie subsequent to interlocking engagement;

FIG. 6 is a cross-sectional view taken along the line 6—6 of FIG. 5;

FIG. 7 is a cross-sectional view of a tie showing an alternative form of locking serrations;

FIG. 8 is a fragmentary cross-sectional view showing a tie with an alternative locking configuration; and

FIG. 9 is a fragmentary cross-sectional view showing a still further alternative locking configuration on the tie.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The attainments of the present invention will become apparent to those skilled in the art upon a reading of the following detailed description when taken in conjunction with the drawings in which there are shown and described illustrative embodiments of the invention; it is to be understood, however, that these embodiments are not intended to be exhaustive nor limiting of the invention but are given for purpose of illustration in order that others skilled in the art may fully understand the invention and the principles thereof and the manner of applying it in practical use so that they may modify it in various forms, each as may be best suited to the conditions of a particular use.

Turning now to the drawings, there is shown a strap indicated generally at 20 for securing a bundle of cables or the like 22. The term "cable" as used throughout the specification and claims is intended to cover any generally elongated member and is not restricted to electric cables. The strap 20 is sufficiently flexible to permit its being wrapped around a bundle and is conveniently formed of a thermoplastic material such as nylon. The configuration of the strap permits it to be manufactured by an extruding process thus materially reducing the overall manufacturing cost.

The strap has a generally constant cross-sectional configuration and comprises a pair of wing members 24 disposed in generally opposite lateral directions and extending along the entire longitudinal axis of the strap. Each wing member has a lower surface 26 which constitutes a bearing surface for engaging the bundle and for providing lateral support to the strap.

The central portion of the strap between the wing members 24 is of hermaphroditic interlocking configuration to thus allow the strap to become locked to itself upon overlapping of the strap around the bundle. Thus the central portion of the strap is provided with a male portion 28 and a female portion 30. The male and female portions 28 and 30 respectively, are caused to interlock in a dove-tail manner when the strap is overlapped as shown in FIGS. 2 and 3. The outer layer of the overlapped portion of the strap may be manipulated by hand or by a suitable tool to cause the wing members 24 to be bent upwardly thus spreading the female portion of the outer strap layer to facilitate entry of such layer onto the inner layer of the strap. This position of the strap is best seen in FIGS. 2 and 4. Once initial entry of the interlocking parts is accomplished the remaining free end of the strap is then easily pressed radially inwardly as shown in FIG. 3 to secure the strap in position around the bundle.

The strap is maintained in its tightened position around the bundle by a plurality of locking serrations extending longitudinally along the strap, such serrations being indicated generally at 32. The serrations may be conveniently formed in the strap by a die stamping process or by a hot rolling process as the strap emerges from the extruder. The serrations 32 comprise a series of apertures 34 formed in the strap, the apertures being disposed in an angular fashion thus forming the dove-tail configuration on the

3

male and female members. It can be seen from the drawings that the angular openings 34 serve to produce locking tabs 36 along the lower portion of the strap intermediate the openings 34. These tabs 36 are caused to engage the openings 34 upon interlocking of the two strap layers around a bundle to thus prevent either opening or longitudinal slippage of the strap after being positioned as in FIG. 3.

In FIG. 6 there is shown a cross-section of the locking engagement caused by the various tabs 36 and apertures 34. A pair of arrows 38 and 40 are shown in the figure to indicate the direction of force exerted on the strap by the bundle to cause the interlocking tabs to remain in tight engagement.

An alternative form of strap is shown in FIG. 7, the strap being indicated generally at 42. Strap 42 is identical to strap 20 previously described with the exception that the straight through apertures 34 of strap 20 are replaced by a pair of partial apertures 44 and 46 disposed respectively on the upper and lower portions of the strap. The interlocking of the layers of the strap around a bundle is exactly as previously described and therefore is not separately shown.

In FIG. 8 there is shown an alternative form of strap 48 in which the wing members are provided with an upper locking ear 50 and a lower locking recess 52. When the two layers of strap are secured around a bundle the locking ears 50 of the inner strap layer will engage the locking recesses 52 of the outer strap layer to thus insure that the wing members of both strap layers remain together to thus provide additional insurance that the strap remains securely in position around the bundle.

In FIG. 9 there is shown a further alternative strap 54 wherein the wing members have locking tabs 56 and locking recesses 58 for cooperation in the same manner and for the same purpose as described in connection with the strap 48 of FIG. 8. It is apparent that various other locking tabs and recesses could be provided which would retain the strap layers together after application to a bundle.

When it is desired to secure a bundle 22 of cables or the like the operator will cut off a sufficient length of strap for the bundle. The strap 20 is normally supplied in continuous extruded form and therefore it is necessary to sever the strap to length for the individual use. Quite obviously this permits any bundle size to be tied by the strap and requires only a single indeterminate length of strap to be stored, with no scrap in use. The overlapped length of the strap can be varied as desired to thus vary the holding power of the interlock.

The hermaphroditic design of the strap permits the strap to take up a minimum amount of space around the bundle. Thus the double strap layer in reality takes up little more than a single strap layer since the two layers are caused to nestle inside of each other. It is also within the scope of this invention to produce the wing members 24 in other than a flat configuration. For example, the members may be placed in an angular relationship whereby when they are flattened during assembly around a bundle the wing members will have a memory of their original disposition, thus causing the members to remain adjacent

4

each other around the bundle. Looking at FIG. 4, if the wing members 24 are angularly disposed in a downward direction, it can be seen that the memory of this condition would cause the members to lie flat when in their overlapped position around a bundle.

Changes in construction will occur to those skilled in the art and various apparently different modifications and embodiments may be made without departing from the scope of the invention. The matter set forth in the foregoing description and accompanying drawings is offered by way of illustration only.

What is claimed is:

1. An elongated flexible strap for tying a bundle of cables or the like, comprising a pair of lateral wing members extending longitudinally along the entire length of said strap, each said wing member having a bearing surface for engaging the bundle, cooperable interlocking means disposed on opposite sides of said strap and extending longitudinally along said strap intermediate said bearing surfaces, said strap being capable of overlapping itself upon being placed around the bundle, said interlocking means being engageable upon said overlapping and comprising complementary male and female members engageable in dove-tail relation, said male member comprising a raised longitudinally extending rib and said female member comprising a longitudinally extending recess, and serrated means extending along said strap for locking said strap in overlapped position, said serrated means being disposed along lateral faces of said rib and recess whereby engagement of said rib and recess also causes engagement of said serrated means and whereby said serrated means is engageable substantially independently of the degree of tautness of said strap.

2. A strap as set forth in claim 1 wherein said strap is a thermoplastic extrusion.

3. A strap as set forth in claim 1 wherein said serrated means comprises a plurality of angularly disposed apertures extending through said strap on opposite sides of said rib.

4. A strap as set forth in claim 1 wherein said serrated means comprise a plurality of apertures disposed along the lateral faces of said rib and further comprise a plurality of apertures formed in the lateral faces of said recess.

5. A strap as set forth in claim 1 further comprising locking means disposed along said wing members, said locking means comprising cooperable surfaces for maintaining plural layers of said strap in juxtaposition upon overlapping of said strap.

References Cited

UNITED STATES PATENTS

3,066,366	12/1962	Wyckoff et al.
3,078,532	2/1963	Bywater.
3,206,813	9/1965	Schumm.

FOREIGN PATENTS

958,006	5/1964	Great Britain.
---------	--------	----------------

DONALD A. GRIFFIN, Primary Examiner