April 15, 1969 W. R. EVANS 3,438,095

BUNDLE TIE

Filed Aug. 25, 1967

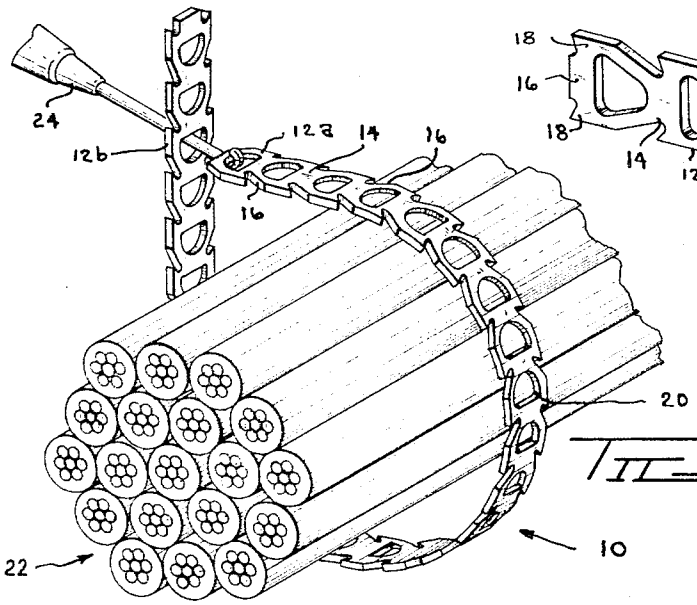


FIG. 3

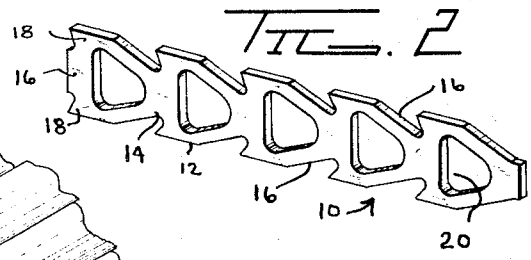


FIG. 2

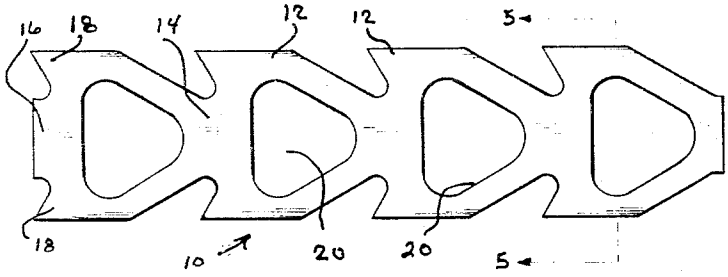


FIG. 1

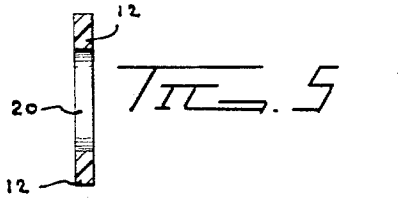


FIG. 5

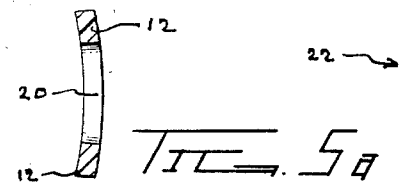


FIG. 5a

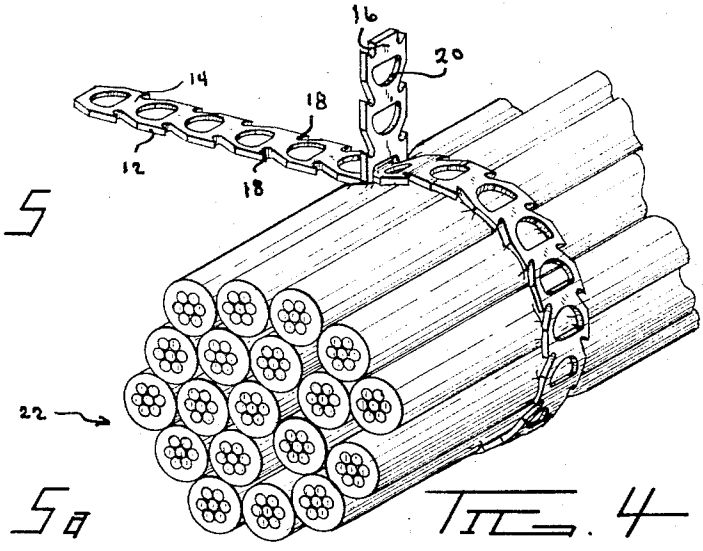


FIG. 4

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3,438,095

BUNDLE TIE

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Int. Cl. B65d 63/02
U.S. Cl. 24—16 3 Claims

ABSTRACT OF THE DISCLOSURE

A device for securing together a plurality of rod-like objects comprising an elongated strip of material having recurrent unit shapes, each unit comprising a male locking portion and a female receiving portion.

BACKGROUND OF THE INVENTION

Field of the invention

The instant device has particular application to the bundling of insulated wire or similar articles.

Description of the prior art

U.S. Patent No. 3,224,054 is representative of the prior art. The main drawback of the prior art devices lies in their inability to effect a taut wrapping around every bundle within a given diameter range.

SUMMARY OF THE INVENTION

The invention provides a strip of unit sections, each unit having a central aperture and external locking edges, the configuration being such that any one unit may be inserted into the aperture in another unit and retained therein by the locking edges on the one unit. The strip is stretchable an amount corresponding to at least the axial length of each unit sufficiently to provide infinite adjustability in the strip plus a resilient force remaining on the bundled objects, whereby a bundle of any diameter within a given range can be secured.

BRIEF DESCRIPTION OF THE DRAWING

FIGURE 1 is a top plan view of a strip in accordance with the teachings of the present invention;

FIGURE 2 is a perspective view of the strip shown in FIGURE 1;

FIGURE 3 is a perspective view of the strip being applied to a bundle of rod-like members;

FIGURE 4 is a perspective view similar to FIGURE 3 and showing the strip in its secured position around the bundle;

FIGURE 5 is a view partly in section taken along the line 5—5 of FIGURE 1; and

FIGURE 5A is a view partly in section similar to FIGURE 5 and showing an alternative cross-sectional configuration of the strip of FIGURE 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

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 is shown and described an illustrative embodiment of the invention; it is to be understood, however, that this embodiment is not intended to be exhaustive nor limiting of the invention but is 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.

In FIGURE 1 there is shown a strip **10** used for securely tying a bundle of rod-like members. The strip comprises a series of individual units **12**, regularly spaced along the entire length of the strip **10**. The strip is relatively thin (see FIGURE 2), and is preferably formed of a resilient material such as nylon, although other suitable materials may be used.

Each unit **12** comprises a narrow neck portion **14**, secured to the relatively wide trailing portion **16** of an adjacent unit. The trailing portion **16** has a pair of laterally extending edges **18**, which serve as a locking means in a manner to be described.

A central aperture **20** is disposed in each unit, and is shaped so as to produce maximum size of opening, while leaving sufficient material around the aperture to provide the necessary strength to the units.

In FIGURE 3 there is shown a bundle of rod-like members **22** which are to be secured together. The members **22** may be insulated conductors or may be non-yielding bar stock. It is to be understood that other objects could be secured by the present invention and that rod-like members are given only by way of an example. The strip **10** is shown in position surrounding the bundle of members **22**. In order to secure the strip around the bundle it is necessary that the strip be pulled through an aperture **20** in one of the units of the strip. A simple tool **24** is shown in FIGURE 3, and comprises a hook-like means for engaging the aperture of the lead unit **12***a*, and pulling such unit through the aperture of a trailing unit **12***b*. As can be seen, the unit **12***a* is pulled through the aperture with its narrow neck portion leading, to aid in the entrance of the unit within the aperture. It is apparent from FIGURE 1 that the aperture **20** is not large enough in its normal position to receive a unit of the strip. However, the strip is made of a resilient material so that the aperture **12** is permitted to elongate laterally to accommodate the wide trailing portion **16** of the other units.

The strip is pulled through the aperture in unit **12***b* until the strip is relatively tight around the bundle. At this point it is possible to apply additional force to the strip, to thereby pull the next succeeding unit of the strip through the aperture in unit **12***b* causing the locking ears **18** of such succeeding unit to engage aperture **20** of unit **12***b*, to thereby produce considerable tensile forces in the strip. These tensile forces maintain the strip in a taut condition around the bundle.

The axial extent of each unit **12** is dependent upon the size bundle upon which the strip will be used. For example, a strip intended for use on relatively large bundles of a given diametral range will have a relatively large unit size, whereas a strip intended for use on bundles of small size within a given diametral range will have a correspondingly small unit size. The relation of unit size to bundle diameter is for the purpose of achieving a strip having the proper degree of axial stretchability, in order to yield proper tensile forces when applied to a bundle. Each unit of a strip must be capable of elongating in an axial direction an amount which is some fraction of the axial unit length. This fraction, as a minimum, is the reciprocal of the number of units necessary to surround a bundle of a given diameter. For example, if a strip having 20 units is required to surround a particular bundle, then each unit of the strip must be capable of stretching an amount equal to one-twentieth of the unit axial length. In this way the twenty units can be stretched to extend a distance equivalent to twenty-one units, thereby providing the ability to exert proper tensile force on the bundle.

The shape of aperture **20** is largely responsible for the stretching capability of the strip. A thin axially extending aperture would not permit any stretching of the strip, and therefore, would not be acceptable. Applicant's aperture is of sufficient lateral extent to permit each unit to become deformed during stretching to achieve the desired result as set forth above.

The strip **10** is normally of flat configuration as can be seen in FIGURE 5. However, an alternative embodiment of the strip could have an arcuate cross-sectional configuration as seen in FIGURE 5*a*. The arcuate configuration has the advantage of requiring less force to draw the strip through a particular unit aperture. Obviously, the lateral dimension of the strip is reduced when in an arcuate form, and therefore, less lateral yielding of the aperture **20** is required.

I claim:

1. A flexible, resiliently stretchable strip for tying a bundle or the like comprising a series of integrally connected like units disposed in end-to-end fashion along the strip, each said unit comprising a forward tapered neck portion and a trailing lock portion of substantial uniform lateral width having locking ears, said lock portion being of greater lateral extent than said neck portion, each said unit further comprising a centrally located aperture of generally equilateral triangular configuration having rounded corners, each said aperture having a maximum dimension which is less than the lateral extent of said lock portion, each said unit being capable of axial elongation, due to applying forces, an amount which is a fraction of its axial length, said apertures being adapted to elongate laterally to accommodate the trailing lock portion of a unit inserted therein to permit the strip to be tightly secured around the bundle.

2. A strip as set forth in claim **1** wherein said fraction is equal to at least the reciprocal of the number of units in the strip.

3. A strip as set forth in claim **1** wherein said strip is capable of axial elongation due to applying forces an amount equal to at least the axial length of one unit.

References Cited

UNITED STATES PATENTS

2,361,506	10/1944	Smith.
3,114,184	12/1963	Bigaovette.
3,224,054	12/1965	Lige.

FOREIGN PATENTS

692,631	8/1964	Canada.
1,281,537	12/1961	France.
455,178	10/1936	Great Britain.

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