

[54] MOLDED PLASTIC BUNDLE TIE
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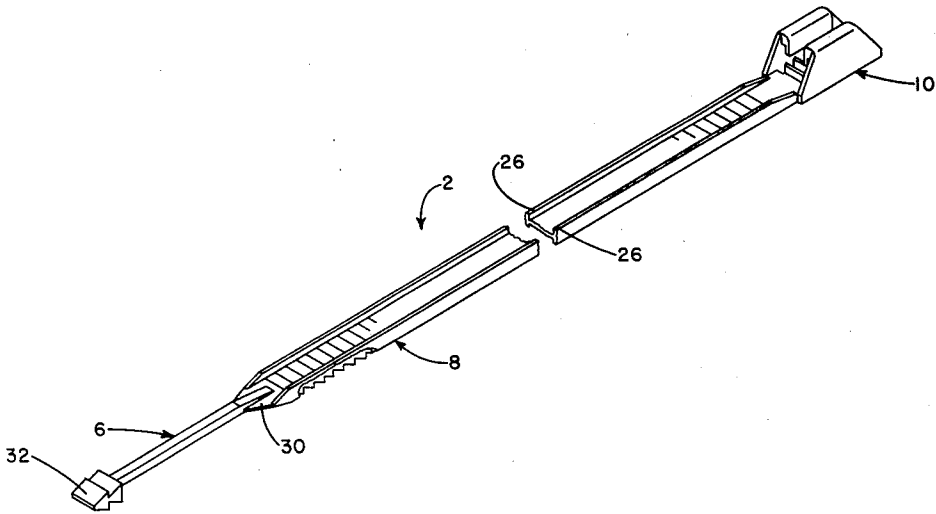
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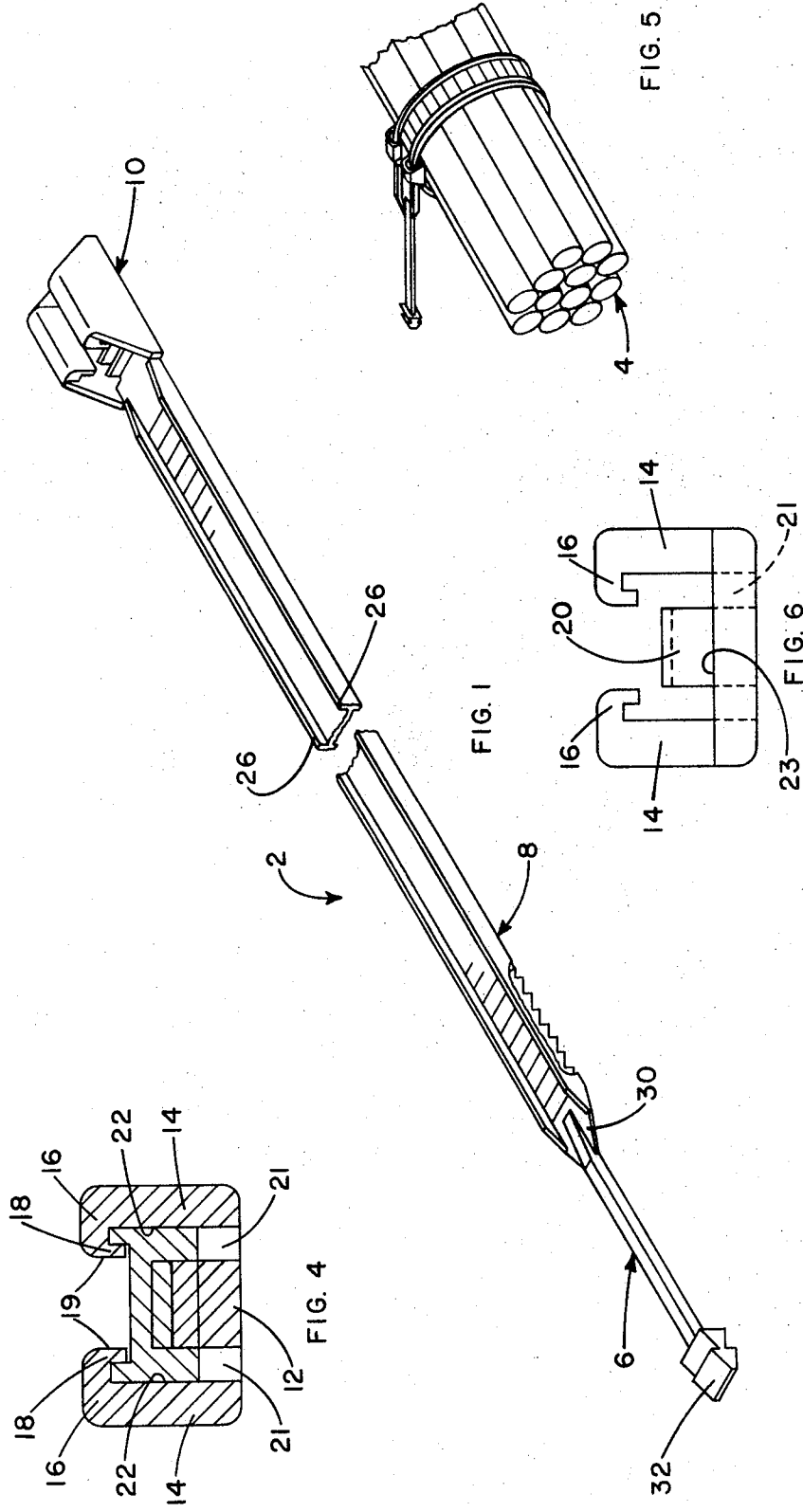
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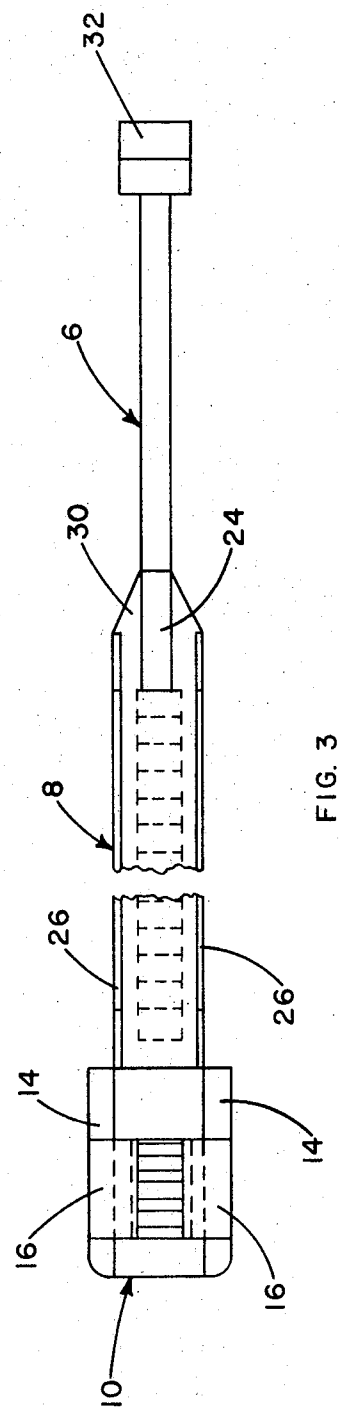
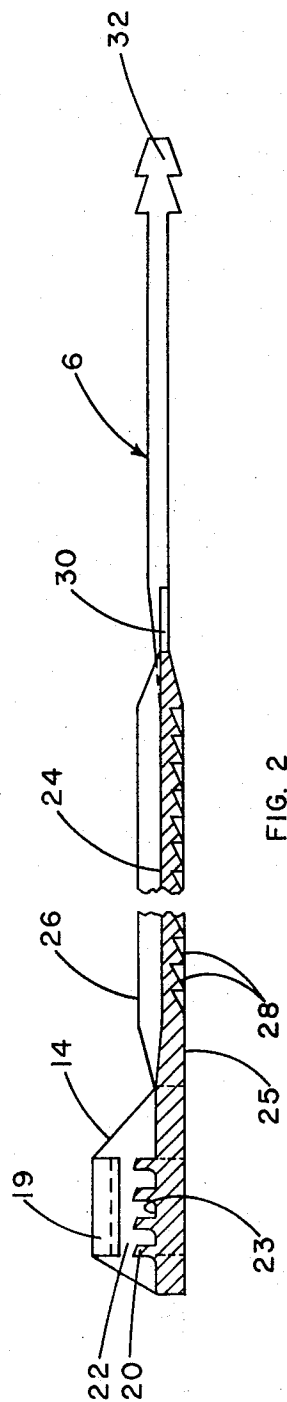
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[57] ABSTRACT
Molded plastic bundle tie device which can be produced in a straight action mold comprises a strap section and a U-shaped buckle on one end of a strap section. The sidewalls of the buckle have inwardly directed free ends which extend over the web and flanges extend from the free ends towards the web. The flanges have spaced apart opposed sides and teeth are molded on the portion of the web which lies beneath the gap formed by the depending flanges. These teeth and other features permit the tie to be produced in a straight action mold.

5 Claims, 6 Drawing Figures







MOLDED PLASTIC BUNDLE TIE

BACKGROUND OF THE INVENTION

Plastic bundle ties are widely used in the electrical industry for securing groups of wires in a harness or the like in a neat and compact bundle. Most of the ties currently being used are manufactured by injection molding processes which, in general, permit the production of ties at low cost. Many of these ties, however, require a compound mold for their manufacture, that is, a mold having core pins extending in the direction of opening and closing of the mold and having additional core pins which may extend transversely of the mold opening and closing direction. These relatively expensive and complicated molds are required because of the complexity of many currently used types of bundle ties.

Other currently used bundle ties are such that they can be produced in a simple straight action mold but require that a separate part or parts, particularly metallic detent teeth, be assembled to the tie after molding. The requirement of an additional part also increases the production cost of the tie and therefore, its price in the market place.

The instant invention is directed to the achievement of a bundle tie which can be easily produced at very low cost in a straight action mold. The invention further contemplates a bundle tie which can be produced by a molding process in relatively small sizes and which, after application to a bundle will remain securely in place and cannot be removed excepting by deliberate cutting thereof.

It is accordingly an object of the invention to provide an improved bundle tie. A further object is to provide a bundle tie which can be manufactured with a straight action mold. A further object is to provide a bundle tie which is capable of being economically produced in small sizes. A still further object is to provide a bundle tie which will remain securely and firmly on a bundle to which it has been applied and which cannot be removed without destruction thereof.

These and other objects of the invention are achieved in a preferred embodiment thereof which is briefly described in the foregoing abstract, which is described in detail below and which is shown in the accompanying drawings in which:

FIG. 1 is a perspective view of a preferred form of bundle tie in accordance with the invention.

FIG. 2 is a sectional sideview of the bundle tie of FIG. 1.

FIG. 3 is a top plan view.

FIG. 4 is a sectional view taken through the buckle portion of the tie after it has been applied to a bundle.

FIG. 5 is a perspective view of a bundle of wires having a bundle tie in accordance with the invention applied thereto.

FIG. 6 is an end view taken along the lines 6—6 of FIG. 3.

A bundle tie 2 in accordance with the invention comprises an elongated molded strip of suitable plastic having a leading end 6, in intermediate strap portion 8, and a trailing end 10 which constitutes a buckle adapted to receive the leading end in the intermediate portion.

The trailing end is generally channel-shaped or U-shaped in cross-section and has a flat web 12 and parallel sidewalls 14. The free ends of the sidewalls are inwardly directed over the web as shown at 16 and

flanges 18 extend from these free ends partially towards the surface of the web 12. The opposed sides 19 of the flanges 18 are spaced apart so that a gap is provided which exposes central surface portions 23 of the upper surface of the web. Upwardly projecting flexible teeth 20 are provided on this central exposed portion and generally rectangular openings 21 are provided in the web on each side of the teeth 20 and in alignment with the inwardly directed free ends in the flanges 18 of the sidewalls. These openings 21 and the configuration of the sidewalls 14 permit the tie to be manufactured in a straight action mold as will be described below.

The intermediate strap portion 8 has a flat upper surface 24 and has teeth 28 extending along its underside 25. Locking flanges 26 extend from the side portions of the intermediate strap portion 25, these flanges 26 having a thickness which is substantially equal to the distance between the inner surfaces of the flanges 19 and the surfaces 22 of the sidewalls. The overall width of the intermediate portion is substantially equal to, and slightly less than, the distance between the opposed inner surfaces 22 of the sidewalls so that this intermediate strap portion can be pulled between the sidewalls.

The leading end 6 is connected to the intermediate strap portion by a transition section 30 having side edges which taper divergently from the relatively narrow leading end. The width of the leading end is slightly less than the distance between the opposed sides 19 of the flanges 18 and a saw tooth enlargement is provided at the tip of the leading end to facilitate manual application of the tie to a bundle.

In use, the tie is simply wrapped around the bundle with the underside 25 against the bundle. This can be done by grasping the enlarged tip 32 while locating the buckle 10 against the bundle. The narrow leading end 6 is then moved laterally between the surfaces 19 and against the teeth 20 which will be flexed downwardly. The leading end is then pulled away from the buckle while the buckle is held and the intermediate portion 8 is guided through the buckle by the transition section 30. The locking flanges 26 move between the upper portions of the sidewall surfaces 22 and the inwardly facing surfaces of the flanges 18 and as the intermediate portion 8 is pulled through the buckle, the teeth 20 are flexed in the direction of movement of the strap portion through the buckle. When the tie has been drawn snugly around the bundle, the teeth 20 will be locked into the teeth 28 thereby preventing retrograde movement of the intermediate portion and loosening of the tie.

A salient advantage of the invention is that it can be produced by means of a straight action mold which is the most inexpensive molding process available. The features which permit the use of this production method will be apparent from a consideration of the physical structure of the tie. Specifically, most of the surfaces facing either upwardly or downwardly as viewed in FIG. 2 are such that they can be formed by the mold cavity or by core pins extending in the direction of movement of the mold parts when the mold is opened. This is particularly true of the intermediate portion 8 and the leading end 6. The buckle on the trailing end does have re-entrant surfaces, the surfaces of the free ends 16 and flanges 18, but these portions of the buckle can be formed by use of core pins which

extend through the openings 21. Furthermore, the upstanding teeth 20 are on the central portions of the web and have a width which is less than the distance between the surfaces 19 of the flanges 18. It follows that these teeth can be formed by mold surfaces or core pin surfaces which, upon opening of the mold would simply move upwardly relatively the molded tie.

Ties in accordance with the invention can be produced in any desired length but it can be particularly advantageous that ties having an overall length of only 4.5" have been successfully produced. The particular tie under consideration has a strap portion 8 having a length of 4" and has a buckle having an overall width of only 0.2'. Ties of this type can be used on bundles having a diameter of as much as 1" but the relatively small size of the tie is not disproportionate to the size of the bundle.

Ties in accordance with the invention have other advantages in addition to the ease with which they can be produced. For example, the tie is of one piece construction and does not require a separate metal part for its latching means. As will be apparent from the description given above of the manner of applying the tie to a bundle, ties in accordance with the invention can be easily and rapidly placed on the bundle. It is particularly advantageous where the tie is of a small size that the strap portion need not be fed or threaded through the buckle. Finally, the buckle lies flat against the surface of the bundle as shown in FIG. 5 so that the presence of the tie does not result in a disproportionately large radial projection on the bundle.

What is claimed is:

1. A molded plastic bundle tie device comprising:

an elongated strip of molded plastic, said strip having a leading end, an intermediate strap portion, and a trailing end,

said leading end comprising a generally channel-shaped buckle having a flat web and sidewalls, said sidewalls having inwardly directed free ends which extend over said web, said free ends having flanges on their ends which extend towards said web, said sidewalls having opposed sides which are a first predetermined distance apart, each of said depending flanges having an inner side which is opposed to its associated sidewall and is separated therefrom by a second predetermined distance,

said intermediate strap portion having a uniform width throughout its length which is equal to said first predetermined distance, said strap portion having a laterally extending locking flange on each of its side edges, said flange extending in the same direction as said sidewalls and having a thickness which is equal to said second predetermined distance,

said leading end being of reduced width, said reduced width being less than the distance between the opposed sides of said depending flanges, and interengaging means on said web and on said intermediate strap portion, said interengaging means

permitting movement of said intermediate portion through said buckle in one direction to tighten said tie on a bundle and preventing movement of said tie in the direction opposite to said one direction whereby,

said tie can be applied to a bundle by wrapping said tie around said bundle, moving said leading end laterally into said buckle and against said web and pulling said strap portion through said buckle until said tie tightly encircles said bundle.

2. A bundle tie device as set forth in claim 1, said interengaging means comprising teeth.

3. A bundle tie device as set forth in claim 2, said web having openings adjacent to each side thereof, said openings being in alignment with said inwardly directed free end portions of said sidewalls.

4. A plastic bundle tie device which is produced in a straight action mold, said device comprising:

an elongated strip of molded plastic having a buckle at one end thereof and having an elongated strap portion extending from said buckle,

said buckle being generally channel-shaped and comprising a flat web and sidewalls, said sidewalls having inwardly directed free ends and having flanges on said free ends extending towards said web, each of said flanges having an inner side which is spaced from its respective sidewall, said flanges having outer sides which are spaced apart to form a gap whereby central surface portions of said web which are in alignment with said gap are exposed on one side of said device,

said strap portion having a width equal to the distance between the opposed sides of said sidewalls, said strap portion having a laterally extending locking flange on each of its side edges, said flanges extending in the same direction as said sidewalls and having a thickness equal to the distance between each of said flanges and its associated sidewalls, said web having teeth on said one side, said teeth being on said central surface portions of said web, and said web having a core pin opening on each side of said central surface portions, and

locking teeth on said strap portion on the side thereof which is opposite to said one side whereby,

said bundle tie device can be applied to a bundle by wrapping said strap portion around said bundle, and pulling said strap portion through said buckle, said tie being capable of being produced in a straight action mold by virtue of the provision of said teeth on said central surface portions of said web and said core pin openings on each side of said central surface portions.

5. A bundle tie device as set forth in claim 4, said device having a leading end extending from said strap portion, said leading end having a width which is less than the width of said gap whereby said leading end can be moved laterally through said gap prior to pulling said strap through said buckle.

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