

[54] **BUNDLING STRAP WITH
SELF-CONTAINED SEVERING MEANS**

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[52] U.S. Cl. **24/16 PB; 30/165**

[51] Int. Cl.² **B65D 63/00; B26B 27/00**

[58] Field of Search **30/165, 127, 278, 301;
24/90 PR, 90 W, 73 PB, 30.5 P, 17 AP, 206
A, 16 PB; 248/68, 71, 73, 74 PB**

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[57]

ABSTRACT

The head portion of a bundling strap is provided with severing means encompassing a strap body receiving aperture extending transversely through the head portion, said severing means having a sharpened blade partially restricting the head portion aperture opening to enable the excess portion of the strap body extending beyond the head portion to be severed from the remainder thereof by urging the strap body against the sharpened blade. The sharpened blade may comprise either a continuous edge or selected elements of predetermined length extending inwardly from the periphery of the strap head portion and located preferably generally adjacent or coincident with one face of the head portion to permit the strap body portion to be severed at a position generally flush with the adjacent face of the head portion. An obliquely angled, inwardly protruding leg portion extending from the inner surface of the severing means may be provided to lockingly engage the strap body portion within the apertured head portion of the bundling strap.

6 Claims, 11 Drawing Figures

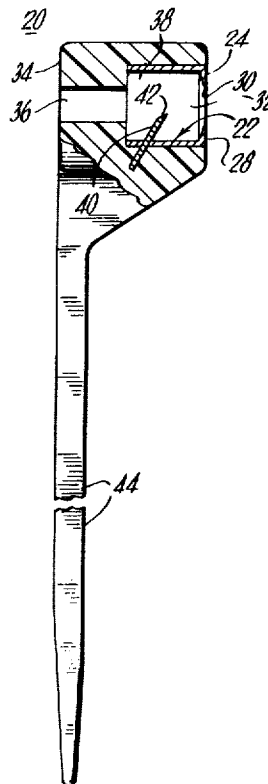


Fig. 1.

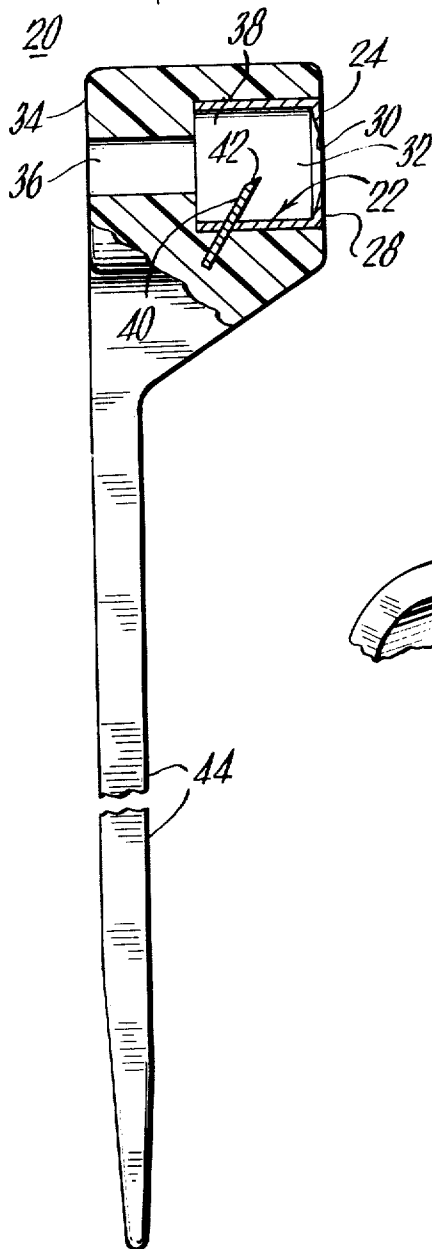


Fig. 2.

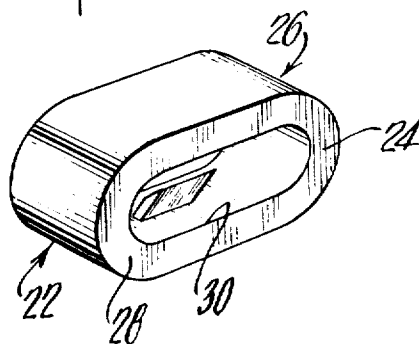


Fig. 3.

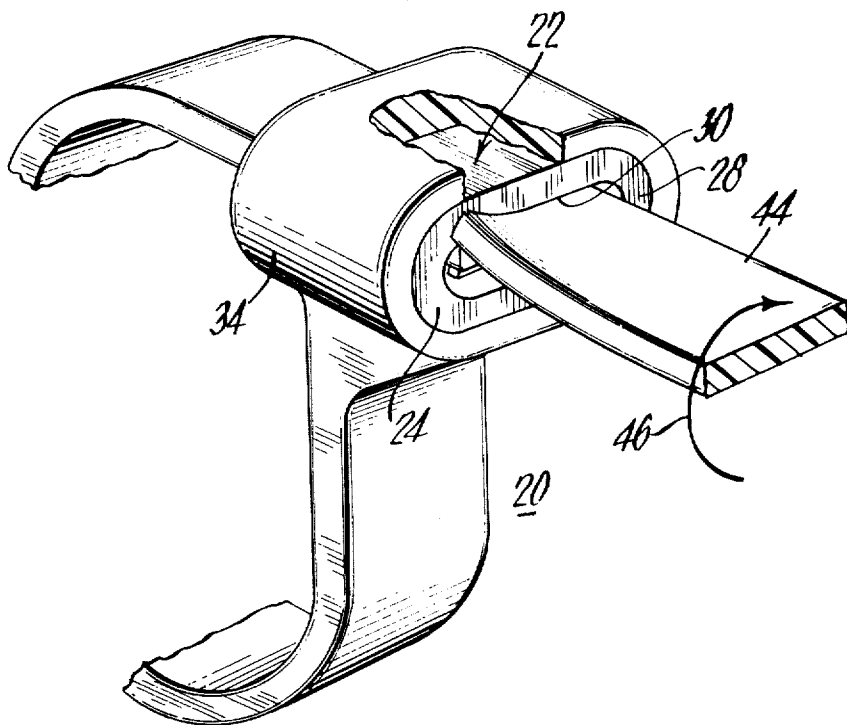


Fig. 4.

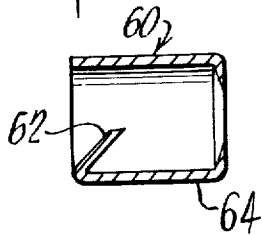


Fig. 5.

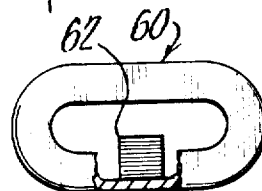


FIG. 6.

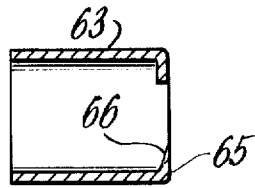


FIG. 7.

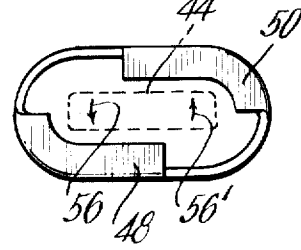


FIG. 8.

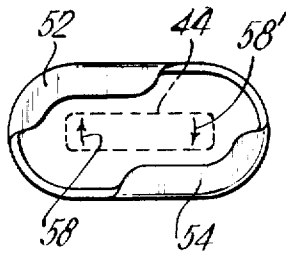


FIG. 9.

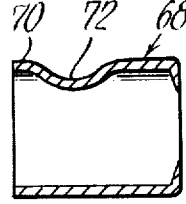


FIG. 11.

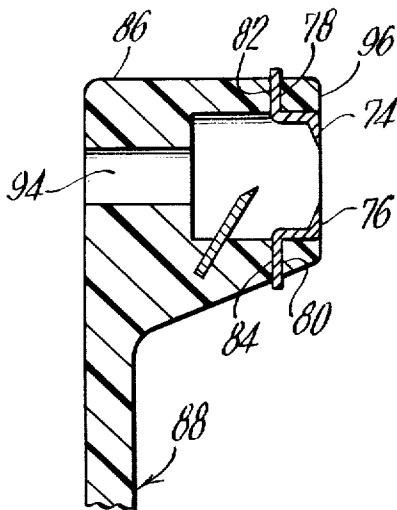
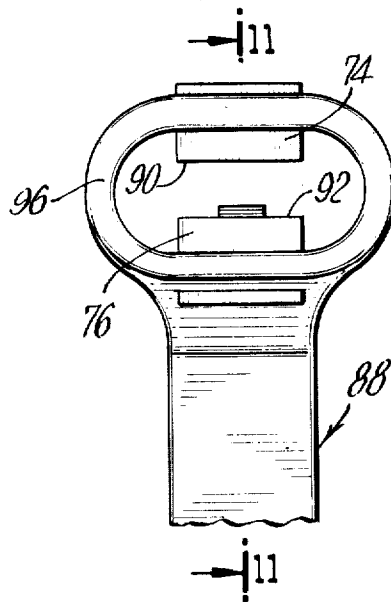


FIG. 10.



BUNDLING STRAP WITH SELF-CONTAINED SEVERING MEANS

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention is directed to the field of severing devices for use with bundling straps and the like.

2. Description of the Prior Art

Bundling straps, according to the prior art, generally comprise an elongate resilient member having a body portion extending from an enlarged head portion suitably apertured to receive the body portion therethrough so that the body portion may be looped about an article such as a bundle of wires, or the like, and drawn through the aperture in the head portion to provide a restraining loop about such article. The excess length of the body portion extending beyond the face of the head portion is generally severed from the remainder of the body portion so as to provide a neat, unencumbered appearance, and to prevent interference with adjacent elements or members situated within the locality of the wire bundle. To accomplish the severing operation, the operator is required to have available separate cutting devices of one form or another which may comprise plier-like tools, or shearing blades incorporated within a relatively expensive strap tightening and cutting device which may not be readily available to the operator. In cases where a knife is employed to sever the strap, extreme caution must be exercised to prevent serious injury to the operator and to prevent damage to the article being bundled, which, in the case of a wire harness, may include damage to the wire insulation and associated components attached thereto.

SUMMARY OF THE INVENTION

The invention overcomes the limitations and difficulties noted above with respect to prior art devices by providing severing means selectively incorporated within the head portion of a bundling strap to provide an arrangement more versatile, convenient, efficient, and safer than such prior art devices. In a preferred embodiment, a sharpened blade extends inwardly from the periphery of a metallic sleeve which is fitted within the transverse aperture of the head portion of a bundling strap so that upon insertion of the strap body portion through the head portion of the strap the excess portion of the strap extending beyond the face of the head portion may be removed from the remainder of the strap simply by twisting or otherwise urging the extending portion of the strap against the blade edge sufficiently to cause the severance thereof. The sharpened blade may be located coincident with the adjacent face of the head portion so that the exposed severed strap end is flush with the head portion face and free of bothersome or dangerous protuberances extending therebeyond. The severing blade may comprise an unbroken continuous inner edge or may be formed as discrete blade segments selectively disposed about the periphery of the metallic sleeve so as to provide a predetermined direction of twist for severing the excess portion of the strap body from the remainder thereof. There may also be provided a leg portion extending obliquely from the wall portion of the metallic sleeve towards the interior thereof to provide locking means for engaging the strap body portion contained within the head portion of the strap. It is therefore an object of this invention to provide an improved bundling strap.

It is another object of this invention to provide means incorporated within a bundling strap for conveniently removing the excess portion of the strap body from the remainder thereof.

It is a further object of this invention to provide a metallic sleeve engageable with the head portion of a bundling strap to permit selective severance thereof.

Other objects and features will be pointed out in the following description and claims and illustrated in the accompanying drawings, which disclose, by way of example, the principle of the invention and the best mode contemplated for carrying it out.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. 1 is a fragmentary side elevational view, partly cut away and partly in section, showing a bundling strap incorporating therein severing means constructed in accordance with the concepts of the invention.

FIG. 2 is a perspective view of the severing means employed in the device of FIG. 1.

FIG. 3 is a fragmentary perspective view, partly cut away and partly in section, showing use of the severing means employed in the device of FIG. 1.

FIG. 4 is a side elevational view, in section, of another embodiment of severing means constructed in accordance with the concepts of the invention.

FIG. 5 is a front elevational view partly cut away, and partly in section, of the device shown in FIG. 4.

FIG. 6 is a side elevational view, in section, of yet another embodiment of severing means constructed in accordance with the concepts of the invention.

FIG. 7 is a front elevational view of still a further embodiment of severing means constructed in accordance with the concepts of the invention.

FIG. 8 is a front elevational view of still another embodiment of severing means constructed in accordance with the concepts of the invention.

FIG. 9 is a side elevational view, in section, of yet a further embodiment of severing means constructed in accordance with the concepts of the invention.

FIG. 10 is a fragmentary front elevational view of the head portion of a bundling strap incorporating still another embodiment of severing means constructed in accordance with the concepts of the invention.

FIG. 11 is a fragmentary side elevational view, in section, taken along the line 11—11 of FIG. 10.

Similar elements are given similar reference characters in each of the respective drawings.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Turning now to FIGS. 1, 2, and 3 there is shown a bundling strap 20 incorporating a severing means 22 constructed in accordance with the concepts of the invention. The severing means 22 comprises a sharpened blade portion 24 extending inwardly from the periphery of a wall portion 26 of the severing means 22 adjacent one end thereof. The blade portion 24 may comprise an inwardly turned flanged portion 28 suitably formed so as to provide a sharpened edge 30, as shown more clearly in FIG. 1. The wall portion 26 is suitably dimensioned so as to seat tightly within an aperture 32 extending through a head portion 34 of the bundling strap 20. The aperture 32 comprises a first portion 36 preferably slightly larger than the strap body 44 and a second portion 38 dimensionally larger than the first

portion 36. The sharpened edge 30 of the severing means 22 is arranged to extend inwardly from the wall portion 26 of the severing means 22 so as to provide an opening thereat generally equivalent to the opening provided by the first portion 36 of the aperture 32, thereby at least partially simulating a uniform opening at each end of the head portion 34 of the bundling strap 20. A blade-like member 40 is inserted within the head portion 34 of the bundling strap 20 and comprises a free end 42 adapted to engage the strap body portion upon its insertion through the aperture 32, after being looped about an article such as a bundle of wires or the like, to prevent disengagement of the strap body portion from the head portion 34 of the bundling strap 20. The member 40 thus provides locking means for the strap body portion 44 of the bundling strap 20 in a manner well known to those skilled in the art. In use, as illustrated in detail in FIG. 3, the severing means 22 provides a simple, rapid, and economical means for removing the excess portion of the strap body 44 extending beyond the head portion 34 of the bundling strap 20 by the simple expedient of looping the strap body about an article to be bundled, advancing the strap body 44 through the head portion aperture 32 to the desired tightness, and then twisting or otherwise urging the excess portion of the body portion 44 which extends beyond the head portion 34 in the direction shown, for example, by the arrow 46 so as to cause the body portion to be urged against the edge 30 sufficiently to effect complete severance of the excess body portion 44 from the remainder thereof. In this manner, selective severance of the strap body portion 44 is achieved in one safe, rapid, and simple operation without the need for external blades, tools, or other cutting implements. Although the embodiment illustrated in FIG. 2 permits rotation of the strap body portion 44 in either direction to accomplish the aforescribed severing action, the blade portion of the severing means may be modified as shown, for example, in FIGS. 7 and 8 where the sharpened blade portion 24 shown in FIG. 2 is modified to provide discrete segments, such as, 48 and 50 in FIG. 7, and 52 and 54 in FIG. 8. In the arrangement illustrated in FIG. 7, severing is accomplished by rotating or twisting the strap body portion counterclockwise approximately 180° as viewed in FIG. 7, in a direction indicated by the arrows 56, 56', so as to urge the lower left edge of the strap body portion 44 against the corresponding edge of the sharpened blade segment 48 while at the same time urging the upper right hand portion of the strap body portion 44 against the sharpened edge of the blade segment 50. As will be noted, each of the segments 48 and 50 extend transversely across the opening of the head portion aperture 32 to an extent slightly greater than half the length thereof to insure complete severance of the body portion 44 at the desired area. The reverse of this embodiment is illustrated in FIG. 8 wherein the body portion 44 is rotated clockwise, as viewed in FIG. 8, in a direction indicated by the arrows 58, 58', again through an arc of approximately 180 degrees, so that the upper left hand portion of the strap body portion 44 is caused to engage the adjacent edge of the blade segment 52 while the lower right hand portion of the body portion 44 is brought into engagement with the blade segment 54. It will of course be clear that the rotation of the strap body portion in a direction contrary to that shown by the arrows in each of the specific embodi-

ments illustrated in FIGS. 7 and 8 will cause only a partial severing of the strap body portion as heretofore described, since the arc through which the strap body portion is rotated is generally devoid of any sharpened edge for the severing thereof. In this manner there is thus provided a unidirectional rotational feature which may be coordinated with a particular strap design so that, according to the cross-sectional configuration of the strap, a preferred direction of severance may be indicated. For example, the strap body portion of the bundling strap 20 may have provided therewith a series of transverse notches (not shown) along one edge adapted to be engaged by the severing means at selected predetermined locations, while in the embodiment illustrated in FIG. 2, severing of the strap body portion may be accomplished at any desired location therealong. It should, of course, be clear that a notched configuration as heretofore described is not necessary to accomplish the severing operation, but may be provided to assist the operator in more readily separating selective segments of the strap body portion from the remainder thereof.

Turning now to FIGS. 4 and 5 there is shown a further embodiment of a severing means 60 constructed in accordance with the concepts of the invention. The severing means 60 may be formed essentially as illustrated and described heretofore with respect to the embodiments illustrated in FIGS. 2, 7, and 8, but further incorporates a leg portion 62 extending inwardly from a wall portion 64 at an oblique angle to the longitudinal axis of the severing means 60 to provide locking means essentially similar to that described heretofore with respect to the element 40 illustrated in FIG. 1. Thus, by utilizing the embodiment illustrated in FIGS. 4 and 5, the member 40 may be eliminated and the leg portion 62 substituted therefor.

Turning now to FIG. 6, there is shown a severing means 63 having only the lower portion of an inturned flange 65 sharpened as at 66 to further control the manner in which the excess portion of the strap body portion 44 is severed from the remainder thereof.

Referring now to FIG. 9, a severing means 68 is provided with a wall portion 70 having an indented portion 72 arranged to be positioned along a transverse axis generally coincident with the locking means comprising either the member 40 illustrated in FIG. 1 or the leg portion 62 illustrated in FIGS. 4 and 5, to further restrict the opening provided by the interior surface of the wall portion 70 so that upon rotation of the body portion of the bundling strap against the sharpened blades of the severing means 68, lateral movement of the portion of the strap body portion engaged by the locking means 40 or 62 is sufficiently restricted to prevent it from being disengaged therefrom during this manipulation.

Turning now to FIGS. 10 and 11, the severing means may comprise elemental sharpened blade members 74 and 76 each having an extension 78 and 80, respectively, seated within respective slotted portions 82 and 84 extending transversely through a head portion 86 of a bundling strap 88 so that the blade member edges 90, 92 communicate with the head portion aperture 94 generally adjacent the face 96 thereof. Each of the blade edges 90, 92 are of sufficient length to insure complete severance of the strap body portion during the twisting operation and, although shown as encompassing only selected portions of the upper and lower

areas of the head portion aperture 94, may be suitably extended so that each blade edge encompasses substantially one half of the total periphery of the opening defined by the aperture 94. It will be evident that the arrangement illustrated in FIGS. 10 and 11 may be modified whereby each of the blade members 74 and 76, rather than being provided with offset extensions such as 78 and 80, may each be provided with a shoulder portion (not shown) generally coplanar with its respective blade member and the shoulder portion fastened directly to the face 96 of the head portion 86.

It will also be apparent to those skilled in the art that the embodiments heretofore described which have been illustrated as being formed essentially as eyelet-like integral members may, of course, comprise one or more separate blade members suitably attached to the wall portion of the severing means by, for example, bonding, brazing, riveting, press fitting, or other suitable joining methods.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. An improved bundling strap comprising: a head portion, a tail portion, and an elongate body portion therebetween; said head portion having an aperture extending therethrough for receiving said body portion; locking means for restricting removal of said body por-

tion from said head portion; and severing means coupled to said head portion and having a sharpened blade cooperative with said head portion aperture for severing said strap body portion thereat, said severing means comprising a metallic sleeve having a wall portion seated within said head portion aperture.

2. An improved bundling strap as defined in claim 1 wherein said sharpened blade is disposed generally normal to the plane of said wall portion.

3. An improved bundling strap as defined in claim 2 wherein said sharpened blade extends inwardly from the periphery of said wall portion.

4. An improved bundling strap as defined in claim 3 wherein said sharpened blade comprises a continuous inner edge disposed adjacent one end of said head portion aperture.

5. An improved bundling strap as defined in claim 3 wherein said sharpened blade comprises at least two discrete inner edges disposed adjacent one end of said head portion aperture.

6. An improved bundling strap as defined in claim 3 wherein said locking means comprises a leg portion extending from said wall portion inwardly towards the interior of said severing means for engaging said strap body portion upon the insertion of said strap body portion through said head portion aperture.

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