

Feb. 9, 1965

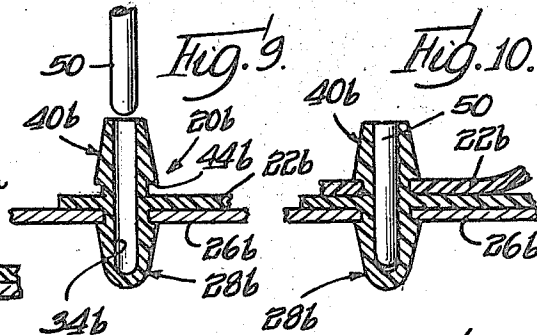
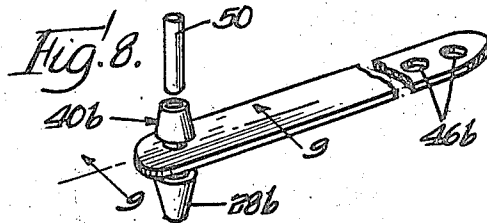
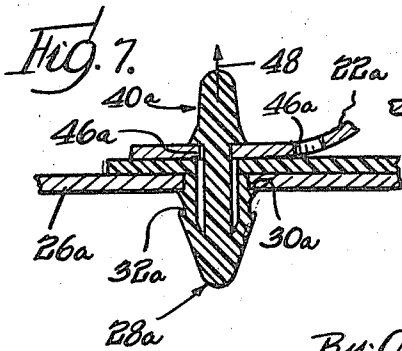
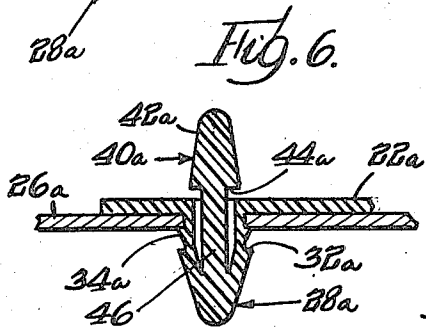
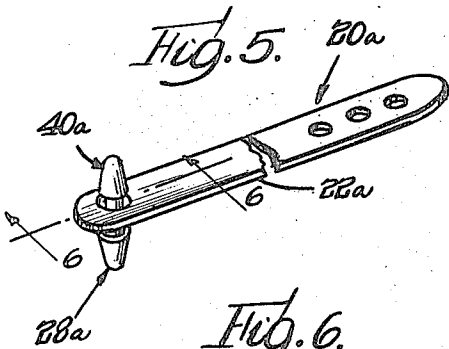
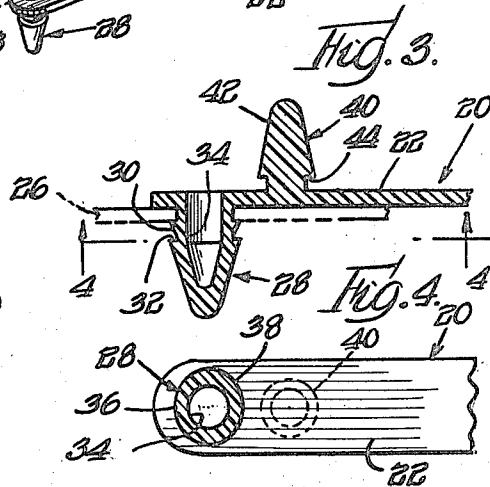
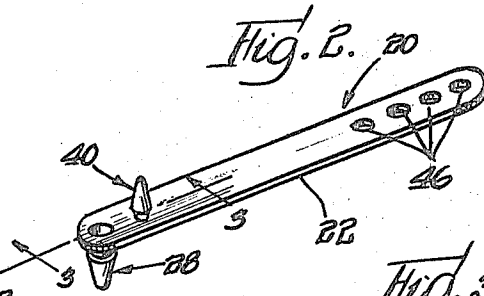
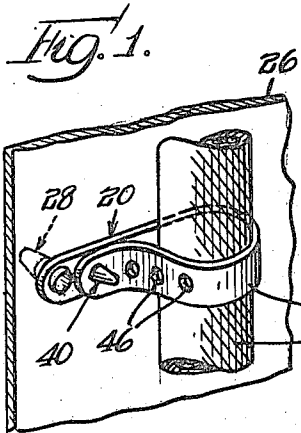
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3,169,004

FLEXIBLE RETAINER WITH INTEGRAL FASTENING MEANS

Filed July 3, 1961

2 Sheets-Sheet 1



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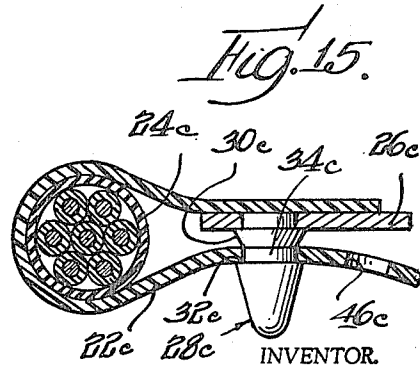
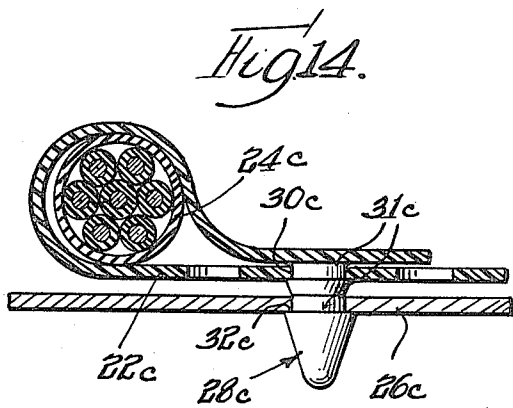
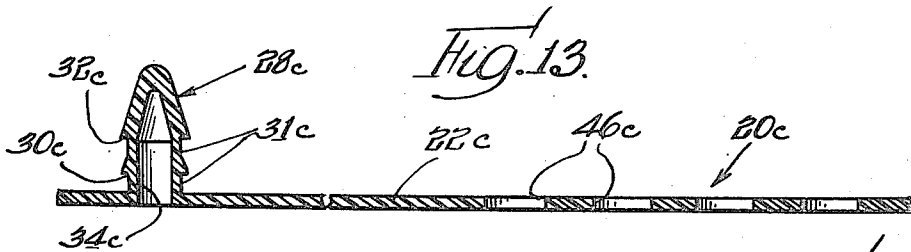
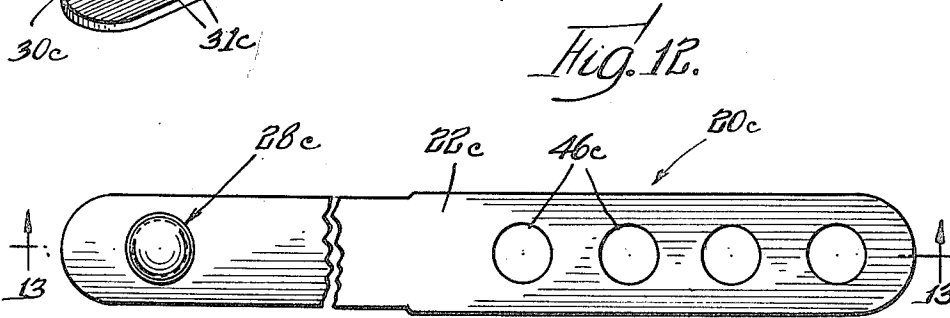
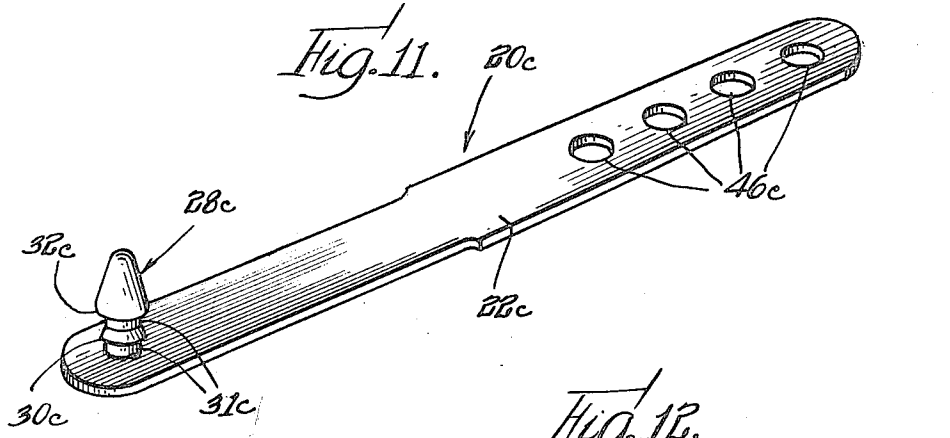
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FLEXIBLE RETAINER WITH INTEGRAL FASTENING MEANS

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2 Sheets-Sheet 2



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3,169,004

FLEXIBLE RETAINER WITH INTEGRAL FASTENING MEANS

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 Filed July 3, 1961, Ser. No. 121,482
 2 Claims. (Cl. 248-71)

The present invention relates to a novel fastener, and more particularly to a fastener for securing wires, cables, conduits or other elongated work means to a workpiece or panel. This is a continuation-in-part of my copending application S.N. 747,699, filed July 10, 1958, now abandoned.

It will be appreciated that in automobiles, various appliances and many other installations, it is frequently necessary to secure one or more wires, cables or other work means against an apertured panel. Various fasteners or cable strap devices have heretofore been suggested for retaining wires and the like, but such devices have frequently been relatively difficult to apply or complicated and expensive to manufacture and handle.

It is an important object of the present invention to provide a novel fastener for securing elongated work means to an apertured workpiece or panel, which fastener is of simple and economical construction and may be easily looped around the work means and secured to the apertured workpiece.

A more specific object of the present invention is to provide a novel cable strap type fastener which may be easily applied to an apertured panel or workpiece and quickly and easily secured in a looped condition around one or more wires or other work means without the aid of separate fastening elements such as screws, rivets and the like.

Still another object of the present invention is to provide a novel cable strap type fastener of the above described type which may be readily applied to an apertured workpiece and one or more wires or the like to be retained without the use of any tools.

Another more specific object of the present invention is to provide a novel cable strap type fastener of the above described type which may be easily and economically molded essentially in one piece from plastic material.

Other objects and advantages of the present invention will become apparent from the following description and the accompanying drawings wherein:

FIG. 1 is a fragmentary perspective view showing a fastener incorporating the features of the present invention secured around an elongated workpiece and fully applied to an apertured panel for fastening the workpiece to the panel;

FIG. 2 is a perspective view showing the fastener of FIG. 1 prior to application to either the workpiece or the panel;

FIG. 3 is an enlarged fragmentary sectional view taken along line 3-3 in FIG. 2;

FIG. 4 is a fragmentary sectional view taken along line 4-4 in FIG. 3;

FIG. 5 is a fragmentary perspective view showing a fastener embodying a modified form of the present invention;

FIG. 6 is a fragmentary enlarged sectional view taken along line 6-6 in FIG. 5 and further showing the device applied to an apertured panel;

FIG. 7 is a fragmentary sectional view similar to FIG. 6 but shows further the condition of the device or fastener when it has been fully applied to both the elongated workpiece and the apertured panel;

FIG. 8 is a perspective view showing another modified form of the present invention;

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FIG. 9 is an enlarged fragmentary sectional view taken generally along line 9-9 in FIG. 8 and further shows the device applied to an apertured panel;

FIG. 10 is a sectional view similar to FIG. 9 and further shows the device in its completely assembled condition;

FIG. 11 is a perspective view showing a further modified form of the present invention;

FIG. 12 is a plan view of the embodiment shown in FIG. 11;

FIG. 13 is a sectional view taken along line 13-13 in FIG. 12; and

FIGS. 14 and 15 respectively show variations in the manner in which the device may be assembled with a work structure and articles to be retained.

Referring now more specifically to the drawings, wherein like parts are designated by the same numerals throughout the various figures, a fastener 20 incorporating features of the present invention is shown in FIGS. 1-3. The fastener 20 as well as the embodiments described below may be economically molded from plastic material. While various materials may be used for the fastener 20, a tough resilient plastic material such, for example, as nylon or polyethylene is preferred.

The fastener 20 is provided with an elongated flexible body portion 22 which is adapted to be looped around any work means 24 which is to be secured to an apertured panel 26. It will be appreciated that the work means 24 may be in the form of one or more wires, cables conduits or other similar elements. Preferably, the body portion 22 is provided with a relatively wide and thin transverse cross section so that it is in the form of an elongated strap which is quite flexible for facilitating application of the device around the work means.

In order to facilitate attachment of the fastener 20 to the apertured workpiece or panel 26, the fastener is provided with a stud portion 28 which is integral with the strap or body portion 22. The stud portion 28 extends laterally in one direction from one side of the body portion and is adapted to be inserted through a suitable aperture in the workpiece 26. The stud portion 28 is provided with a plurality of axially spaced annular protuberances or shoulder means 30 and 32 which are selectively engageable behind the apertured workpiece or panel in accordance with the thickness of the panel. The annular shoulders are radially collapsible during application of the stud portion to the apertured workpiece so that the shoulders may pass through the workpiece aperture. The resiliency of the material from which the stud portion is formed is such that after the shoulders have passed through the aperture, they will spring radially outwardly so as to be positioned for engagement with the panel. In order to facilitate application of the stud portion to the apertured panel and initial radial collapsing of the annular shoulders, the entering end of the stud portion and the leading surfaces of the annular shoulders are tapered in the manner shown best in FIG. 3. In addition, the stud portion is provided with an axially extending recess 34 which opens through the body portion. This recess facilitates collapsing of the stud portion during application to the apertured panel. Preferably the stud portion 28 has a substantially oval outer peripheral surface as shown in FIG. 4 and a substantially circular inner surface. As a result, the stud portion is provided with opposite side areas 36 and 38 having relatively thin walls which may be more readily collapsed.

The fastener 20 is provided with integral means which enable the body portion 22 to be secured in a looped condition around the work means 24. More specifically, the fastener 20 is provided with a second stud portion 40 integral with and extending laterally from the body por-

tion 22. The stud portion 40 is formed with a tapering or pointed outer end 42 and substantially radially projecting annular shoulder means 44 spaced from the body portion 22 a distance slightly greater than the thickness of the body portion. The body portion is provided with a plurality of apertures 46 spaced longitudinally thereof, which apertures are adapted selectively to receive the stud portion 40. The diameter or transverse dimension of each aperture 46 is normally smaller than the overall diameter or transverse dimension of the shoulder means 44 of the stud portion 40 so that when the stud portion 40 is fully inserted through an aperture 46, the shoulder means 44 overlies an inner margin of the body portion 22 surrounding this aperture for retaining the body portion in a looped condition as shown in FIG. 1. It will be appreciated that during insertion of the stud portion 40 through one of the apertures 46, the resiliency of the plastic material enables the shoulder means 44 to collapse slightly and the margin of the aperture to stretch sufficiently to enable the shoulder means to pass through the aperture. It will also be appreciated that the diameter of the loop provided by the body portion 22 may be varied to accommodate different work means 24 having different diameters by changing the aperture 46 into which the stud portion 40 is inserted. Preferably, the stud portions 28 and 40 are located adjacent the same end of the body portion 22 and extend laterally in opposite directions from the body portion since this enables the greater length of the body portion 22 to be freely manipulated after the fastener has been applied to the panel 26 and during looping of the body portion about a work means.

FIGS. 5, 6 and 7 show a fastener similar to the device described above as indicated by the application of identical reference numerals with the suffix "a" added to corresponding elements. This embodiment differs only in that the stud portion 40a is concentric with rather than offset from the stud portion 28a and, in addition, the stud portion is provided with an extension 46 which is integrally connected to the outer end of the stud portion 28a within the recess 34a. One advantage of this structure is that when the body portion 22a is looped about a bundle of wires or other suitable work means and connected with the stud portion 40a as shown in FIG. 7, the stud portion 40a is pulled in the general direction of the arrow 48 shown in FIG. 7 so as to impart an axially directed force to the stud portion 28a which tends to axially collapse and radially expand the stud portion 28a. This tendency to expand the stud portion 28a radially when tension is applied to the stud portion 40a causes the shoulder means of the stud portion 28a to engage the workpiece or panel more aggressively for resisting detachment of the fastener from the panel. The concentric arrangement of the stud portions also enables the overall length of the fastener to be reduced.

A fastener 20b incorporating another embodiment of the present invention is shown in FIGS. 8, 9 and 10. The stud portions 28b and 40b of this embodiment are also in axial alignment. However, the stud portions are formed so that the recess or bore 34b extends axially through both stud portions so that radial collapsing of the stud portion 40b as well as the stud portion 28b is facilitated during application of the fastener to the apertured panel and work means. In order to prevent accidental radial collapsing of the stud portions and unauthorized detachment of the fastener from the apertured panel or from the elongated work means, a drive pin 50 is provided. As shown in FIG. 10, the drive pin is adapted to be inserted into the axially extending bore or recess 34b with a force fit so that substantial radial collapsing of the shoulder means of both the stud portion 28b and the stud portion 40b is precluded.

FIGS. 11 through 15 show a fastener 20c incorporating another embodiment of the present invention. In accordance with this embodiment, it is contemplated that the stud means for securing the fastener to an apertured

workpiece or panel and also for securing the strap or body portion in a looped condition is located at a single side of the body portion. It is further contemplated that the stud portion 28c may be used both for connecting a device to the panel and for securing the body portion in a looped condition and therefore, the additional portion 40 of the stud means of the embodiments of FIGS. 1-7, may be omitted if desired. Otherwise the structure of this embodiment is similar to the structures of the fasteners described above as indicated by the application of identical reference numerals with the suffix "c" added to corresponding elements.

FIGS. 14 and 15 show variations in the procedure for assembling the device 20c with the apertured work structure or panel and the workpiece. In both instances one of the shoulders 30c and 32c serves to engage the apertured workpiece or panel and retain the device with respect thereto and the other of the shoulders 30c and 32c passes through one of the openings 46c which has a diameter which may be equal to but which is preferably slightly less than the diameter of shank sections 31c of the stud portion 28c. FIG. 14 shows an arrangement wherein the stud portion 28c is first passed through one of the apertures in the body portion so that the body portion engages behind a shoulder 30c whereupon the stud portion is inserted through the workpiece or panel. FIG. 15 shows an alternative arrangement wherein the stud portion 28c is first inserted through the apertured workpiece or panel whereupon the body portion is bent around a margin of the workpiece or panel and applied over the stud portion 28 and engaged behind the shoulder 32c.

While the preferred embodiments of the present invention have been shown and described herein, it is obvious that many structural details may be changed without departing from the spirit and scope of the appended claims.

The invention is claimed as follows:

1. A flexible retainer having a longitudinally extending body having at least one aperture formed in one end thereof and a transversely extending lug integrally formed therewith adjacent the end thereof opposite said apertured end, said lug having a body section of equal or smaller size than said aperture and a plurality of axially spaced annular barbs formed thereon larger than said aperture and spaced from said retainer body, said lug further having a hollow recess formed therein and extending through said barbs to permit limited resilient radial collapsing of said lug, said retainer being attached by said lug to a support structure and to an article to be supported by said lug and said body aperture.

2. In combination, a retainer and a support structure for said retainer and an article to be supported on said structure by said retainer, said support structure having an aperture formed therein, said retainer having a hollow lug integrally formed therein adjacent one end and an aperture formed therein in spaced relation to said lug, said lug having a first annular barb formed thereon larger than said support structure aperture and axially spaced on said lug from said retainer, said support structure aperture receiving said lug therethrough, said first annular barb locking said retainer to said support structure, said lug further having a second barb formed thereon in axially spaced relation to said first annular barb and larger than said retainer aperture, said retainer being reversely bent to form a loop receiving said article being supported, said lug being received through said retainer aperture to a point intermediate said first and second annular barbs whereby said second annular barb is interlocked with the apertured portion of said retainer.

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