United States Patent

Boye et al.

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[54] **FASTENING CLIP INTENDED TO BE FASTENED WITH NAIL-DRIVING TOOL**

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[52] **U.S. Cl.** ..... **248/300,** 85/10 E, 227/9

[51] **Int. Cl.** **F16l 3/00**

[58] **Field of Search** ..... 85/10 E, 36; 29/432; 227/9, 227/10, 11, 147; 248/71, 216, 300

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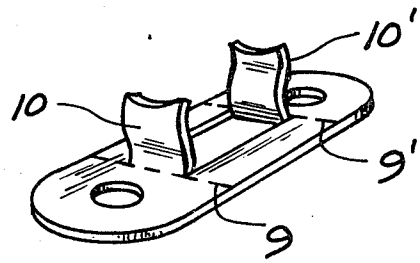
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[57] **ABSTRACT**

A fastening clip for fastening wires, pipes, etc. to a support comprises a plate including an opening from the edges of which two tongues of equal length extend. These tongues have a substantially S-shaped lengthwise cross section and are partly bent so as to extend with their ends over the opening in the plate thereby forming a passage for a nail to be driven into the support by a nail-driving gun. The clip, together with the nail which protrudes between the ends of the tongues, is retained in the muzzle of the gun by matching the outer outline of the tongues to the inner diameter of the muzzle. A washer is placed upon the end of the tongues for steadying the nail in the clip while the same is retained in the muzzle. The washer also serves to flatten the tongues against the support with the head of the nail pressing against the washer when the gun is fired.

4 Claims, 13 Drawing Figures



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SHEET 1 OF 2

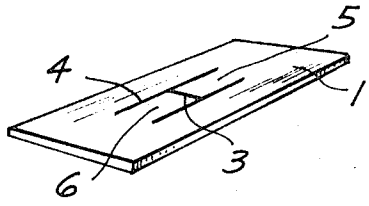


FIG. 1

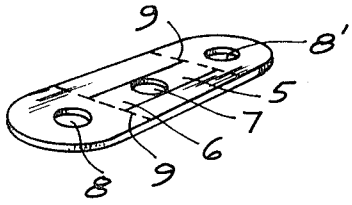


FIG. 2

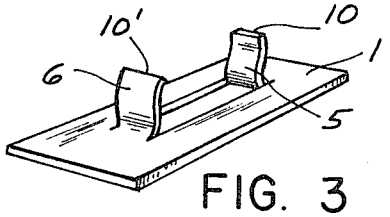


FIG. 3

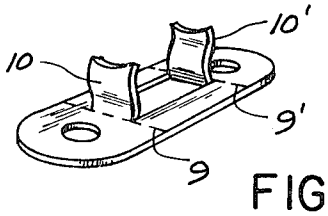
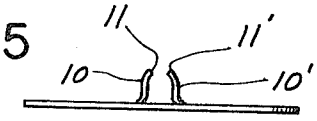


FIG. 4

FIG. 5



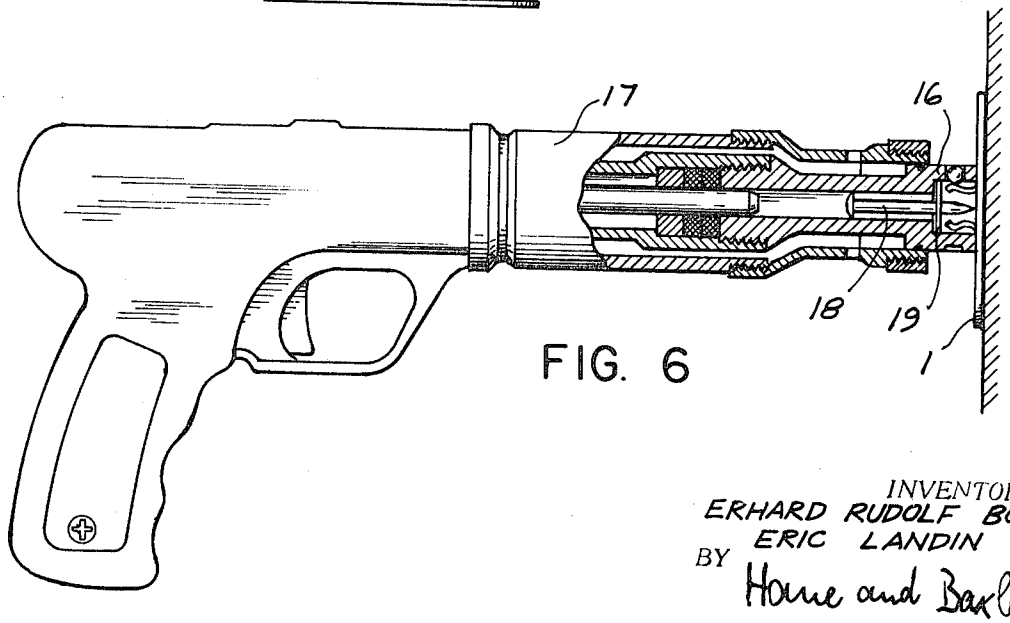


FIG. 6

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Fig. 8a

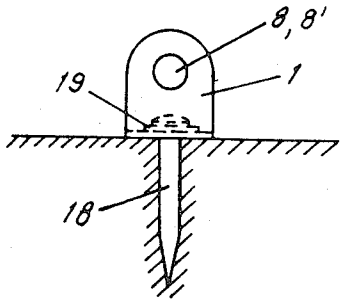


Fig. 9

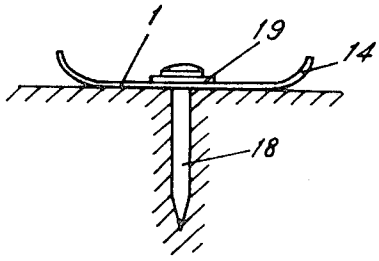


Fig. 9a

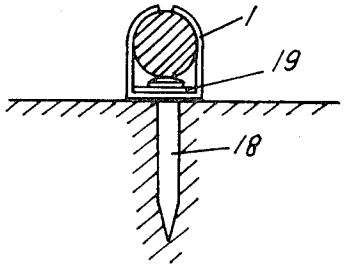


Fig. 8

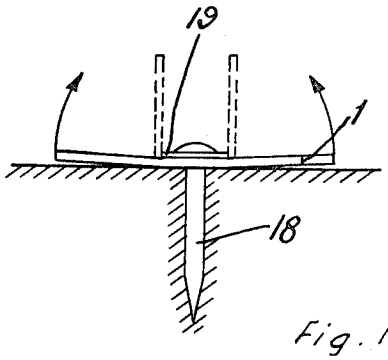


Fig. 7

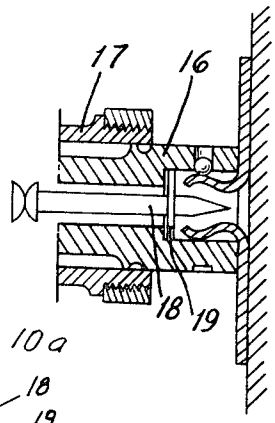


Fig. 10

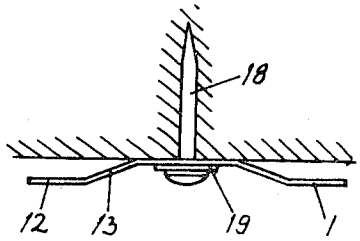
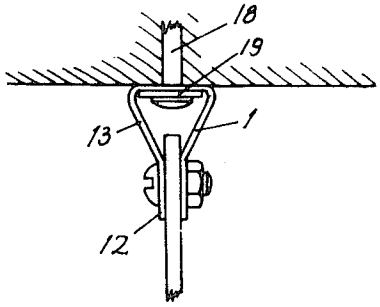


Fig. 10a



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FASTENING CLIP INTENDED TO BE FASTENED WITH NAIL-DRIVING TOOL

The present invention relates to a fastening clip for, e.g., electric wiring, lashing wire, pipes and reinforcing bars to be fastened to a base with the aid of a nail-driving tool.

It is previously known to use fastening clips for, e.g., electric wiring, which clips have been designed to be fastened with nails to a base, using a nail-driving gun. These clips are fixed to the nails intended for them. The nail-driving tool has moreover been provided with a special adapter, which has been specially designed to coact with the clip, as a guiding and fixing member for the clip when loading the tool and when driving in the nail.

The purpose of the present invention is therefore to eliminate the disadvantages involved in the use of a special adapter and clips to which nails have been prefixed. According to the invention a clip is provided which can easily be nailed to a base with a nail-driving tool of a standard type for normal nailing, such as the nail-driving tool according to Swedish Pat. No. 216,217, without using any extra accessories. According to the invention a clip is moreover obtained which does not need to be provided with a nail fixed to it beforehand, but which can be fastened directly with a standard nail for the driving tools. Since the nail and clip need not be fastened together beforehand, the advantage of greatly simplified inventory keeping is gained, as only the nail, for instance, need be exchanged for a nail of a different length when the material in the base varies. By the present invention a clip is moreover provided which can easily be adapted to and shaped to fit the part to be fastened in the clip.

The invention is explained in detail in the following description and claims, with reference to the attached drawings, in which:

FIG. **1** shows a view of a blank for a fastening clip according to the invention; in which:

FIG. **2** shows a view of a modified blank; in which

FIG. **3** shows a view of a fastening clip according to the invention; in which

FIG. **4** shows a preferred form of a fastening clip made of the blank shown in FIG. **2**; in which

FIG. **5** shows a side view of a fastening clip according to the invention; in which

FIG. **6** shows a partly cutaway view of a nail-driving tool with nail and clip in position for nailing to a base; in which

FIG. **7** shows a section through the front part of a nail-driving tool with a nail partly driven in when fastening a clip; in which

FIGS. **8** and **8***a* show a front view and a side view, respectively of a fastening clip used, for instance, for a reinforcing bar; in which

FIGS. **9** and **9***a* show a preformed fastening clip according to the invention used as a fastener for a pipe, a cable or the like; and in which

FIGS. **10** and **10***a* show another embodiment of a preformed fastening clip used as a suspension strap for pipes, ventilation ducts etc.

In FIG. **1** a blank is shown for making a clip according to the invention. The blank is made of a material that can be bent, particularly metal. In accordance with the figure, the blank consists of a flat plate **1**, preferably of a substantially rectangular shape, which has been stamped out of a plate or band. In the center of the plate **1** there is an H-formed slot **2,3,4** made by, for instance, punching. The slot delimits two flap parts or tongues **5** and **6**, which are bent into guides having a shape and function which will be described in more detail in the following.

In FIG. **2** a modified blank is shown for a fastening clip according to the invention. In addition to the H-formed slot **2,3,4** this blank has a cutout section **7** in the center obtained, for instance, through punching, which cutout section **7** has some appropriate form, for instance, square or circular. The purpose of this circular section will be described in more detail in the following. Furthermore, the opposite ends of the blank are rounded off and have holes **8** and **8'** near the rounded ends, which holes are symmetrically located in relation to the center of the plate. The plate **1** is also provided with two parallel bending notches **9** and **9'**, which are symmetrically arranged in relation to the center of the plate end and which are at a distance from each other that is at least as great as the diameter of a washer **19**, used for the nailing. The purpose of said two holes and bending notches will be described in more detail in the following.

In FIG. **3** a view is shown of a fastening clip according to the invention. The clip consists of the plate **1** and two bent-up parts **10** and **10'** located at a distance from each other and centrally positioned in the plate. These bent-up parts, which have been obtained by pressing up the flaps **5** and **6** according to FIGS. **1** and **2**, are designed to guide and fix the clip in a nail-driving tool **17**. This guiding and fixing of the clip in the nail-driving tool is effected in such a way that the bent-up parts, hereinafter called guides **10** and **10'**, have their width and distance from each other adapted to a sleeve-shaped muzzle part **16**, shown in FIG. **6**, of the nail-driving tool, so that when the clip is inserted into said muzzle part **16** to the position shown in FIG. **6**, a grip will be obtained between the guides **10** and **10'** and the muzzle part **16**.

FIG. **4** shows a view of a fastening clip according to the invention, which clip has been shaped from the blank according to FIG. **2**.

In FIG. **5**, a side view of a clip is shown. As will be noted from this figure, the guides **10** and **10'** are symmetrically formed, and slightly S-curved, the upper ends **10** and **10'** are then bent in towards each other. The distance between these ends is such that the head of a nail intended for it, or particularly a washer fixed to the nail, extends beyond the ends, while the rest of the nail can pass freely between them. The length and S curve of the guides are so that a secure grip in the muzzle part of the nail-driving device is obtained and so that they leave space for a nail **18** provided with a washer **19**, inserted into the fastening clip in the tool, as shown in FIG. **6**.

FIG. **6** shows a fastening clip according to the invention inserted into a nail-driving tool **17**. Before the clip is inserted into the tool, the same is loaded with a nail **18**, for instance, a standard nail gun-type nail-driving tools, provided with a washer **19**. The nail-driving tool **17** is shown in a position ready to drive in the nail and for fastening the clip to a base. When the nail is driven in, the washer **19** will be caused by the nail to force the guides into contact with the base. When a clip made from the blank according to FIG. **1** is used, the guides will be somewhat deformed between the washer **19** and the base. On the other hand, if a clip made from the blank according to FIG. **2** is used, this deformation will substantially be avoided, and the guides **10** and **10'** will assume a position in the same plane as the plate **1** after having been nailed, since there will be sufficient space for the nail to pass freely between the free ends of the guides through the central cutout part **7** when the guides are forced down to the plane of the plate **1**. By an appropriate choice of material for the fastening clip the spring force of the guides **10** and **10'** will hold the fastening clip in the nail-driving tool so securely that the clip will be retained in the tool, no matter in what direction it is pointed. An intermediate stage during the nailing of the fastening clip is shown in FIG. **7**.

In FIGS. **8** and **8***a* it is shown how the fastened clip is bent over to serve as a fixing or fastening member for reinforcing bars, pipes, cables or the like. Shaping of the clip can be performed with the aid of some suitable tool, for instance, a screwdriver. Through the notches **9** and **9'** previously described, which are arranged in such a way that they will be located fairly close to the outer edge of the washer **19**, the final shaping of the fastening clip for the purpose for which it is intended is facilitated. As can be noted from FIG. **8***a*, the previously described holes **8** and **8'** near the ends of the fastening clip may be utilized as suspension members for, e.g., reinforcing bars.

In FIGS. **9**, **9***a*, **10** and **10***a*, examples are shown of modified embodiments of preshaped fastening clips according to the in-

vention. In addition to having the previously mentioned notches, the fastening clips shown in these examples are preshaped in such a way that after having being bent at the notches they obtain the shape desired for the function for which they are intended. This preshaping can, for instance, take place in connection with the stamping of the clip. Thus, the clip can, for instance, be preshaped as shown in FIG. **9** and given the final shape shown in FIG. **9***a* when it is intended to serve as a holder for an object with a circular cross section, for instance, a pipe or a cable. The preshaped clip shown in FIGS. **10** and **10***a* can, for instance, be used as a holder for a band-shaped object, such as a suspension strap, a fastening lug or the like.

The present invention is not limited to the examples described in the foregoing or shown in the drawings, and other embodiments can be readily conceived provided they fall within the scope of the concept of the invention.

It should be obvious that one can omit bending up the plate after it has been fastened, and the plate will then function as a washer instead of as a fastening member. The plate is then preferably given a circular form. By using the plate according to the present invention as a washer, it becomes unnecessary to use a nail-driving tool with a magnetic muzzle.

We claim:

1. A fastening clip for wires, pipes and similar parts attachable to a support by means of a nail-driving gun having a muzzle portion, said fastening clip comprising:

a plate member including an opening and a pair of tongues integral with the plate member and protruding from one side of the plate member substantially normal thereto at two opposite edges of said opening, said tongues being of substantially equal length and terminating in inwardly curved and spaced-apart end portions, the facing edges of said end portions being substantially coplanar in a plane substantially parallel to the plate member and overlying part of said opening thereby providing a passage for a headed nail to be driven in conjunction with the clip by the nail-driving gun, the maximal outer peripheral outline of the tongues being selected so that an imaginary circle just encircling said outline fits the inner diameter of the muzzle portion of the gun with which the clip and the nail are to be driven thereby releasably retaining the clip and the nail in said muzzle portion, said tongues having a substantially S-shaped lengthwise cross section, the maximal distance between the outwardly facing bulges of the tongues defining the diameter of said imaginary circle; and

a washer placeable upon the outside of the inwardly curved tongue portions, said washer having an outer diameter at the most equal to the diameter of said imaginary circle and an inner diameter fitting the shank of the nail to be driven, the distance between the tongue ends being greater than the nail diameter and the inner diameter of the washer being also greater than the distance between the tongue ends.

2. The fastening clips according to claim **1** wherein said plate member includes a pair of mounting holes disposed in alignment with each other and said tongues, said mounting holes being disposed on opposite sides of the tongues substantially equally spaced from the roots thereof.

3. The fastening clip according to claim **2** wherein said plate member further includes a pair of score lines, each disposed between the respective mounting hole and the adjacent tongue, said score lines extending across the width of the plate member to define two outer flaps each including a mounting hole and upwardly bendable into planes substantially parallel to the planes of the tongues.

4. The fastening clip according to claim **1** wherein the lengths of said tongues are such that the tongues fit substantially flat in the opening in said plate member and thus within the plane thereof when the tongues are pressed down into the plate member opening by the pressure of the washer upon the tongues in response to operation of the nail-driving gun.

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