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F. T. ROBERTS ET AL

3,054,585

CLAMPING MEANS

Filed July 19, 1960

Fig. 1

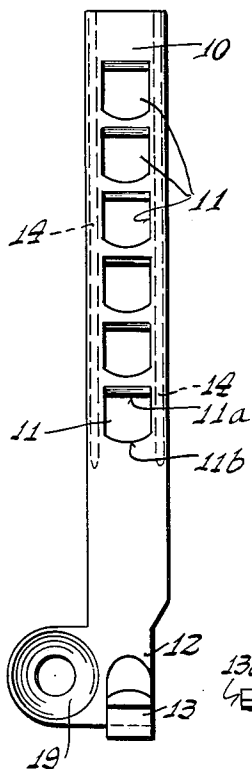


Fig. 2

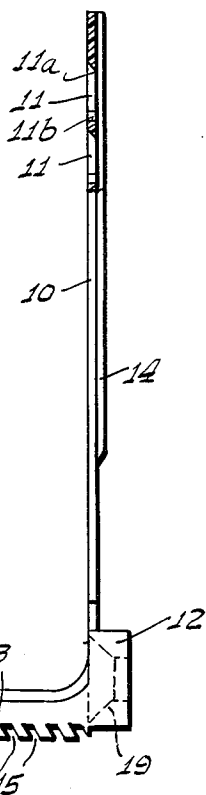


Fig. 3

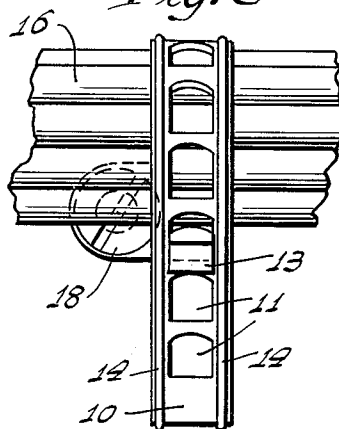


Fig. 4

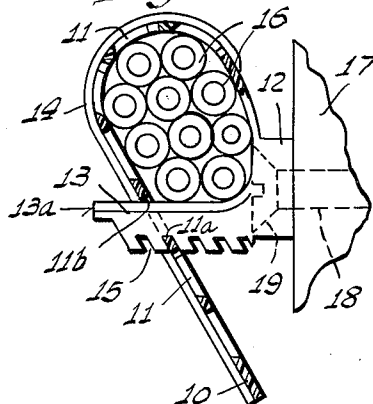


Fig. 6

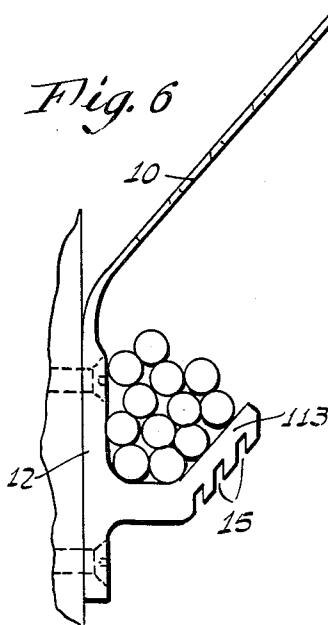


Fig. 7

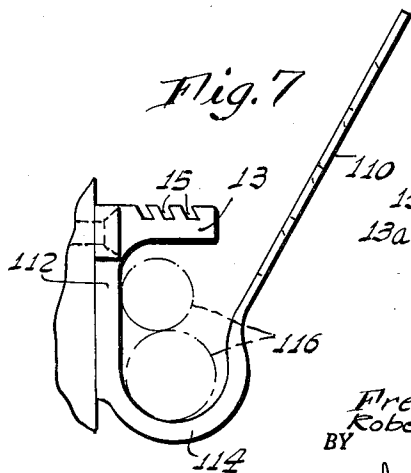
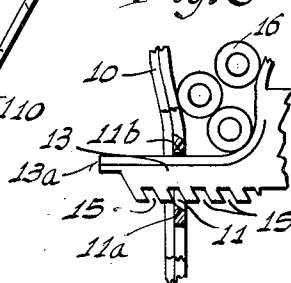


Fig. 5



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3,054,585

CLAMPING MEANS

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9 Claims. (Cl. 248-74)

The present invention relates to a clamping device for reclamping together in a bundle a plurality of wires, cables, conduits or the like elongate elements and is particularly useful in mounting said bundles on a support such as a wall, panel or the like.

Heretofore, strap clamps have been provided for holding wires and the like in bundles but these have been difficult to handle, difficult to release and not positive in their locking. When used for clamping a bundle to a support they have required the group to be placed in the clip before the clip is fastened in position, or have been of a fixed size which would not readily permit the ready addition or removal of wires from the bundle.

The present invention overcomes these difficulties by providing a novel tie or clamp, preferably of one-piece construction, which can adapt itself to bundles of various sizes and which will positively interlock to hold the bundles in position, yet may be readily released to add to or withdraw elements from the bundle.

Another object of the invention is to provide a novel clamp for securing a plurality of elements to a support in which the clamp itself provides a means for supporting the wires or elements while they are being positioned in the clamp and the clamp moved to interlocked relationship.

Another object of the invention is to provide a clamp which can be readily manufactured at a low cost, is easy to install and is capable of a wide variety of uses.

In carrying out these objects the present invention comprises a thin, flexible strap having a plurality of longitudinally spaced holes or apertures therein and terminating in a relatively rigid portion having a branch projecting therefrom at an angle to the plane of the strap. The outer surface of the branch is provided with slots inclined away from the end of the branch which is adapted to be inserted in the apertures in the strap so that the strap adjacent the apertures or holes can be disposed in the slot and positively interlocked therewith to effectively hold the cables, wires or the like elongate elements in position. With the present invention the strap can be readily released from its positive interlock when it is desired to add or subtract from the number of wires or elements in the bundle and can be returned to its effective positive interlocked clamping position to hold them in place. The rigid base of the present invention can be provided with suitable securing means for anchoring the clamp to a support to effectively locate and position the wires or elements with respect to the support.

A feature of the invention resides in the provision on the base of the clamp of means for supporting the wires or elements as they are put in position. This is especially advantageous when laying up a bundle of wires on a panel, wall or like support.

Another feature of the invention resides in the relationship between the dimensions of the hole in the strap and the branch which permits the strap to be inserted over or removed from the branch only with the plane of the strap substantially perpendicular to the axis of the branch, thus effectively providing a positive interior lock which cannot slip.

While the clamp of the present invention can be assembled from a plurality of elements and can be made of metal or the like materials, it is herein illustrated as being molded in one piece from a suitable plastic material.

Other features and advantages of the invention will be

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apparent from the specification and claims when considered in connection with the accompanying drawings in which:

FIGURE 1 shows a plan view of the clamp of the present invention.

FIG. 2 is a side view of FIG. 1, partly in section.

FIG. 3 is a front elevation of the clamp of the present invention showing the strap moved to locked relationship.

FIG. 4 is a side view, partly in section, of the clamp in final position.

FIG. 5 is a detailed fragmentary view, partly in section, showing the position of the strap with respect to the branch as it is inserted over the branch.

FIG. 6 is a side view of another form of the invention.

FIG. 7 is a side view of a still further form of the invention.

The tie or clamp of the present invention is herein illustrated as securing together a bundle of wires, cables, conduits and the like elongate elements. As shown in the drawings, the clamp of the present invention comprises a relatively thin, flexible strap 10 having a plurality of longitudinally spaced apertures or holes 11 therein. The strap terminates in a substantially rigid base portion 12 having a branch 13 projecting therefrom at an angle to the plane of the strap.

While the clamp may be made of metal or a combination of metal and plastic and formed of a plurality of elements secured together, it is presently preferred to form the clamp as a one-piece unit of a moldable plastic material.

If desired, the thin, flexible portion of the strap can be provided with reinforcing ribs 14 extending along the strap adjacent each side of the spaced holes or apertures therein.

The branch is adapted to be inserted into the apertures or holes in the strap and is provided on its outer or under-surface with a plurality of slots 15 inclined away from the end 13a of the branch, which is adapted to be inserted through the apertures in the strap, so as to form a positive interlock with the strap, as shown in FIG. 4, to clamp the elongate elements 16 into a bundle. In this connection it is to be noted that the edges 11a, 11b of the holes are spaced apart a distance substantially equal to the depth of the branch and the edge 11a is beveled so that it engages the bottom of the slot when in clamped position. In order to move the strap to clamped position around the bundle of wires 16 or the like, the strap is positioned around the bundle and the end of the branch is inserted into the selected one of the holes and the strap is maintained perpendicular to the axis of the branch. This permits the strap to move along the branch without binding to a position adjacent one of the slots 15. Due to the geometry and relation of the hole and slot the strap moves into an inclined position with respect to the branch and the edge 11a moves into engagement with the bottom of slot 15 and the edge 11b moves into engagement with the top of the branch. The strap is thus effectively and positively locked in clamping position. If the clamp is to be used merely to bundle together the plurality of wires, cables or the like continuous elements, a mounting means is not required. However, in the illustrated form of the invention the rigid base is provided with a means for mounting the clamp to a support 17 or the like. While the clamp may be secured to the support by rivets, snap fasteners, nails or the like fastening means, it is herein illustrated as being secured to the support by a screw 18 passing through a countersunk hole 19 formed in the rigid base.

In the form of the invention shown in FIGS. 1-5, the clamp is mounted and secured to the support with the branch 13 projecting outwardly from the support so that the top surface 13b thereof forms a receiving means for

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receiving and supporting the elongate members to be clamped thereto. After the bundle has been completed and is supported on the branch, the thin, flexible portion of the strap 10 is bent around the bundle and is positioned with the plane of the strap perpendicular to the top edge of the branch, as shown in FIG. 5. It will be noted in this position that the upper and lower edges of the selected hole will just clear the branch.

In moving the strap along the branch, pressure in the direction of the support is applied to the bundle of wires which is displaced laterally toward the support in order to permit the strap to assume the perpendicular relationship with the branch. After the strap has been moved to the proper slot 15 providing the clamping pressure, it is moved into the slot, as shown in FIG. 3. With the pressure removed from the wires the weight of the bundle moves the bundle away from the support and causes the beveled edge 11a of the aperture or hole to engage the bottom of the slot and causes the opposite edge 11b of the aperture to engage the top of the branch, thus effectively positively interlocking the bundle to the support. Should it be desired to add to or subtract elongate elements from the bundle, it is merely necessary to move the bundle to the position in which the strap is disposed in a plane vertical to the top edge of the branch, remove the strap from the slot and slide it along the branch to released position.

In the form of the invention shown in FIG. 6, the branch is provided with an upturned forward edge 113 so as to better receive and hold the bundle as it is being built up. After the bundle has been built up, the end of the strap 10 is moved into interlocked relation with the proper slot 15 in the branch and securely clamps the bundle in position.

In the form of the invention shown in FIG. 7, the base portion 112 secured to the end of the flexible strap is bent at 114 to form a receiving channel for supporting the elongate articles 116 and is particularly useful in clamping pipes or large conduits to a support. After the conduits have been put in position, the flexible strap 110 is moved into interlocked relation with the slots in the branch which is disposed above the article-supporting portion of the base and clamps the pipes or the like thereto.

From the foregoing it will be seen that the tie or clamp of the present invention is of simple construction, easy to operate, provides a positive interlock of the clamp in clamping position and can readily be manufactured and placed in operation.

Further, the device of the present invention can be utilized to secure bundles of wires, cables, conduits or the like together and/or to a bulkhead or panel and because of its construction and arrangement of parts will provide a support for the wires or the like as they are being laid up and permits additions to or removal from bundles without destroying the clamp.

Variations and modifications may be made within the scope of the claims and portions of the improvements may be used without others.

We claim:

1. A clamp adapted to secure a plurality of elongate elements together in a bundle comprising a thin, flexible strap having a plurality of longitudinally spaced holes therethrough and having a substantially rigid branch at one end projecting at an angle to the plane of the strap, said branch having an end to be inserted through one of said holes in the strap when the strap is perpendicular to the branch and having a plurality of slots in the undersurface thereof inclined away from said end of the branch, said branch when inserted through said selected hole permitting the strap, when inclined in the direction of the slots, to positively interlock with one of the inclined slots.

2. A one-piece clamp adapted to secure a plurality of cables, conduits or the like together comprising a body of plastic material forming a thin, substantially flat, flexible strap having a plurality of holes therethrough at spaced

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intervals and having a substantially rigid portion at one end provided with a substantially rigid branch projecting at an angle to the plane of the strap, said branch having an end to be inserted through a selected one of said holes when the strap is perpendicular to the branch and having a plurality of slots in the outer surface thereof inclined away from said end of the branch to positively interlock with the strap adjacent the selected hole when the strap is inclined in the direction of the slot.

3. A clamp adapted to secure a plurality of cables, conduits or the like together comprising a thin, flexible strap having a plurality of holes therethrough and having a substantially rigid branch formed at one end and projecting at an angle to the plane of the strap, said branch having an end to be inserted through a hole in said strap, a plurality of slots in the outer surface thereof and inclined away from the end of the branch, said branch being insertable through a selected one of the holes to permit the strap to interlock with one of the inclined slots, said branch having a depth to permit the insertion thereof into a hole in the strap only when the strap is perpendicular to the branch, the edge of the hole adjacent the slotted portion of the branch being beveled to engage the base of the inclined slot when interlocked therewith with the opposite edge of the hole being in engagement with the opposite side of the branch.

4. A clamp to secure a plurality of cables, conduits or the like together on a support comprising a thin, flexible strap having a plurality of holes therethrough and having an integral substantially rigid base at one end, said base being provided with a branch projecting therefrom at the end opposite said strap and at an angle to the plane of the strap and having an end adapted to be inserted through a hole in said strap when the strap is perpendicular to the branch, means on the base for securing the clamp to a support with the branch in position to receive and support the weight of the cables, said branch having a plurality of slots in the undersurface thereof inclined away from said end of the branch, said strap extending around said cables with said branch extending through a selected one of the holes to permit the strap, when inclined in the direction of the slots, to interlock with one of the inclined slots and clamp the cables thereto.

5. A one-piece clamp to secure a plurality of cables, conduits or the like together on a support comprising a thin, flexible strap having a plurality of holes therethrough and having a substantially rigid base at one end provided with a branch projecting therefrom at an angle to the plane of the strap and having an end adapted to be inserted through a hole in said strap, means in the base for securing the clamp to a support with the branch in position to receive and support the weight of the cables, said branch having a plurality of slots in the undersurface thereof inclined away from said end of the anvil, said strap extending around said cables with said branch extending through a selected one of the holes to permit the strap to interlock with one of the inclined slots and clamp the cables thereto, said branch having a depth to permit the insertion thereof into a hole in the strap only when the strap is perpendicular to the branch, the edge of the hole adjacent the slotted portion of the branch being beveled to engage the base of the slot, when interlocked therewith, and the opposite edge of the hole engages the opposite side of the branch.

6. A one-piece clamp to secure a plurality of cables, conduits or the like together on a support comprising a thin, flexible strap having a plurality of holes therethrough and having a thicker, substantially rigid base at one end provided with a branch projecting therefrom at an angle to the plane of the strap and having an end adapted to be inserted through a hole in said strap when the strap is perpendicular to the branch, means in the base for securing the clamp to a support, said base having a portion to receive and support the weight of the

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cables, said branch having a plurality of slots in the outer surface thereof inclined away from said end of the branch, said strap extending around said cables with said branch extending through a selected one of the holes to permit the strap, when inclined in the direction of the slots, to interlock with one of the inclined slots and clamp the cables thereto.

7. A one-piece clamp to secure a plurality of cables, conduits or the like together on a support comprising a thin, flexible strap having a plurality of holes therethrough and terminating at one end in a substantially rigid base provided with a branch projecting therefrom at an angle to the plane of the strap and having an end adapted to be inserted through a hole in said strap when the strap is perpendicular to the branch, means formed in the base for securing the clamp to a support with the branch projecting outwardly from the support in position to receive and support the weight of the cables, said branch having the end portion thereof extending upwardly to retain the cables on the support and having a plurality of slots in the undersurface thereof inclined away from said end of the branch, said strap extending around said cables with said branch extending through a selected one of the holes to permit the strap, when inclined in the direction of the slots, to interlock with one of the inclined slots and clamp the cables thereto.

8. A one-piece clamp to secure a plurality of cables, conduits or the like together on a support comprising a thin, flexible strap having a plurality of longitudinally spaced holes therethrough and having a substantially rigid base at one end provided with a branch projecting therefrom at an angle to the plane of the strap and having a cable-supporting portion disposed in spaced relation to said branch, means on the base for securing the clamp to a support with a cable-supporting portion disposed below said branch and in position to support the weight of the cables, said branch having an end to

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be inserted through one of said holes when the strap is perpendicular to the branch and provided with a plurality of slots in the outer surface thereof inclined away from said end of the branch, said strap extending around said cables and having the strap adjacent the selected hole interlocked with one of the inclined slots, when inclined in the direction of the slots, to clamp the cables thereto.

9. A one-piece clamp of plastic material adapted to secure a plurality of cables, conduits or the like together on a support comprising a thin, flexible strap having a plurality of holes therethrough and having an integral, thicker, substantially rigid base at one end provided with a branch projecting therefrom at an angle to the plane of the strap, means in the base for securing the clamp to a support with the branch in position to support the weight of the cables, said branch having an end adapted to be inserted through a selected hole in the strap and having a plurality of slots in the outer surface thereof inclined away from said end of the branch, said strap extending around said cables and said branch being insertable through said selected holes to permit the strap to interlock with one of the inclined slots and clamp the cables thereto, said branch having a depth to permit the insertion thereof into a hole in the strap only when the strap is perpendicular to the branch, the edge of the hole adjacent the slotted portion of the branch being beveled to engage the base of the slot when interlocked therewith and the opposite edge of the hole engages the opposite side of the branch.

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1,127,529 France ----- Dec. 18, 1956

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,054,585

September 18, 1962

Fred T. Roberts et al.

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 1, line 10, for "reclamping" read -- clamping --;
line 66, for "interior lock" read -- interlock --; column 4,
line 56, for "anvil" read -- branch --.

Signed and sealed this 5th day of February 1963.

(SEAL)

Attest:

ERNEST W. SWIDER
Attesting Officer

DAVID L. LADD
Commissioner of Patents