

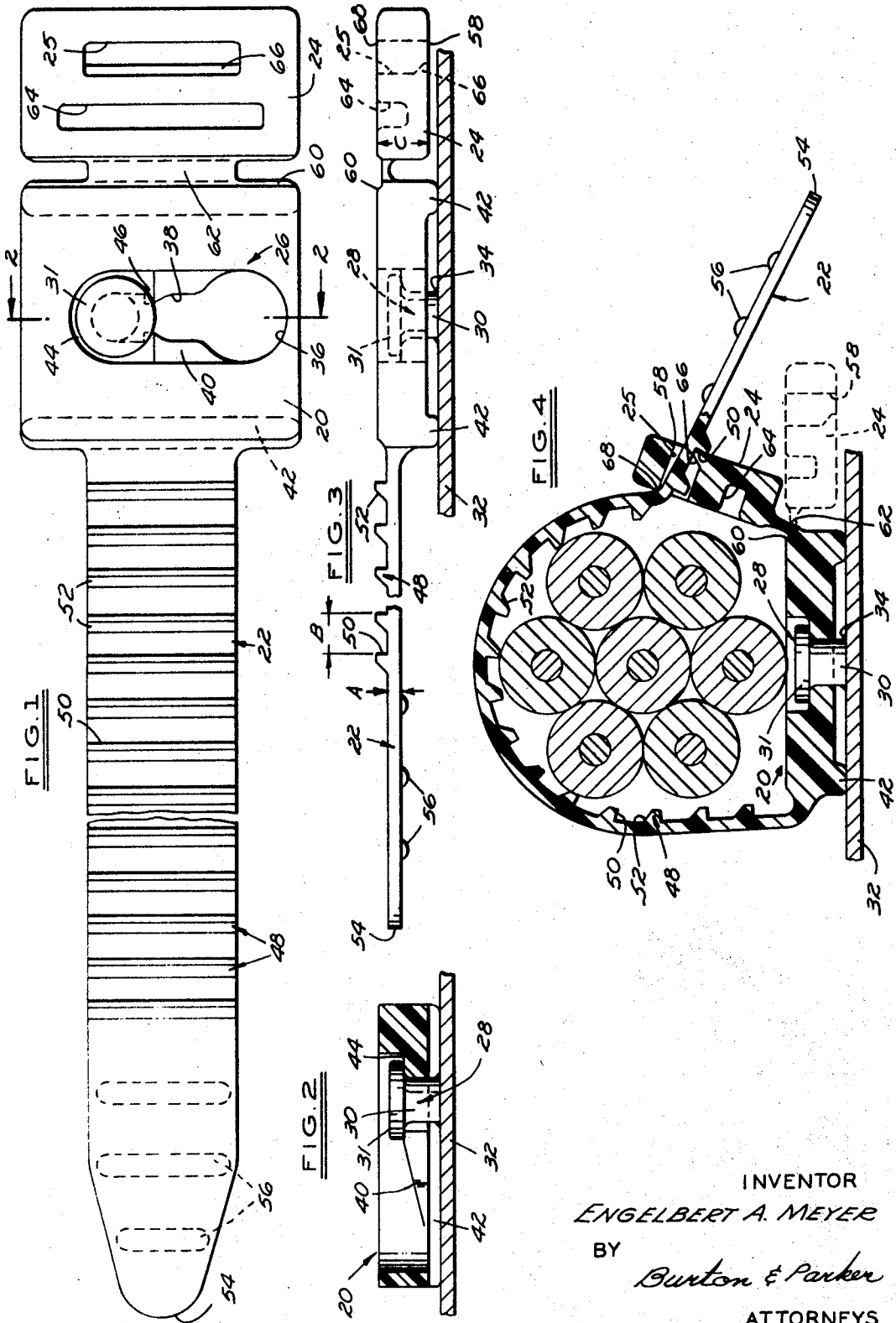
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ADJUSTABLE CLAMP

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**ADJUSTABLE CLAMP**

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12 Claims

**ABSTRACT OF THE DISCLOSURE**

This disclosure relates to an adjustable clamp, including a body portion having a slot adapted to receive a securing means, a strap portion extending perpendicular to the axis of the slot, and a hinge portion hingedly attached to a marginal edge of the body portion, opposite the strap, and parallel to the slot. The hinge portion has a slot, parallel to the slot in the body portion, of a depth equal to at least three times the transverse thickness of the strap. The strap portion is provided with a plurality of spaced teeth, parallel to the axis of the slots, and is sufficiently resilient to permit lacing of the strap portion into the slot in the hinge portion to secure a structural member received therein.

**Field of the invention**

This invention relates to an adjustable bracket or clamp for wires, cables, conduits and the like. The clamp of my invention is adapted to support wires or cables, in any position, from a support including automotive and appliance panels.

**Description of the prior art**

The prior art includes the following United States patents: 2,915,268, 2,936,980, 2,979,794, 3,009,220, 3,049,771, 3,086,265, 3,098,271, 3,102,311, 3,149,808, 3,302,913. United States Patent 2,936,980 does disclose in FIGURES 5 and 6 a resilient clamp capable of being releasably secured to a support, however the keyhole slot of this embodiment is defined in the axis of the strap and therefore the clamp may be pulled loose during adjustment of the strap. Further, none of the patents disclose an adjustable ring clamp which provides a positive lock, and still may be removed without damage to the clamp. The clamps disclosed by the prior art which do provide a positive locking action must either be destroyed to be removed, or are too complex to be commercially acceptable.

**Summary of the invention**

The adjustable clamp of my invention includes a body portion having a slot adapted to receive a button secured to the surface of a support, an integral strap portion extending generally perpendicular to the axis of the slot, and a hinge portion, transversely thicker than the strap portion, hingedly attached to a marginal edge of the body portion opposite the strap, and generally parallel to the slot. The hinge portion has a slot, parallel to the slot in the body portion, of a depth equal to at least three times the transverse thickness of the strap. The strap portion is provided with a plurality of spaced gripping elements, parallel to the axis of the slot, and is sufficiently resilient to permit lacing of the strap portion into the slot in the hinge portion to secure a structural

member received therein. The depth of the slot in the hinge portion causes binding of the strap and positive locking of the gripping elements.

In the preferred embodiment of the adjustable clamp of my invention, the body portion has a greater transverse thickness than the hinge portion, and is hingedly attached to the body portion adjacent the top of both portions, spacing the hinge portion from the base of the body portion. The hinge is integral with the body and hinge portions, and has a transverse thickness less than the transverse thickness of the strap portion. The slot in the hinge portion is preferably located adjacent the edge of the hinge portion, opposite the body portion. The hinge portion slot may include an inwardly extending detent, adjacent the bottom of the slot, to provide positive locking with the gripping elements. The slot in the body portion may include an enlarged opening adapted to receive the head portion of a button, and a slot portion adapted to receive the shank portion of the button; permitting removal of the clamp from the support without damage to the clamp.

In the preferred embodiment of the strap portion, the gripping elements are spaced a distance of at least three times the thickness of the strap, and extend from the top surface of the strap portion. The strap may also include a plurality of spaced ribs from the opposite or lower surface of the strap adjacent the distal end, to provide initial retention of the strap in the slot of the hinge portion prior to drawing the strap tightly against the wires or cables secured by the strap. The gripping elements preferably extend the full width of the strap to assure a positive locking action.

**Brief description of the drawings**

FIGURE 1 is a top view of the adjustable clamp of my invention;

FIGURE 2 is an end cross sectional view of the clamp shown in FIGURE 2, in the direction of view arrows 2—2;

FIGURE 3 is a side view of the clamp shown in FIGURES 1 and 2, in combination with a support and button; and

FIGURE 4 is a side cross sectional view of the assembly shown in FIGURE 3 applied to a cable.

**Description of the preferred embodiment**

The embodiment of the adjustable clamp shown in the drawings includes a body portion 20, a strap portion 22 and a hinge portion 24 having a slot 25 adapted to receive the strap portion. The body portion has a keyhole slot indicated generally at 26, which is adapted to receive a headed button or stud 28, illustrated in FIGURES 3 and 4. This embodiment of the button includes a shank portion 30 secured to the surface of the support 32, and a head portion 31 spaced from the support. The stud may be welded to the support, as indicated at 34 and described in United States Patent No. 3,153,468 or secured by other suitable means including adhesive bonding. The keyhole slot defined in the body portion 20 includes an enlarged opening 36 adapted to receive the enlarged head portion 31 of the button, and a slot 38 adapted to receive the shank portion 30 of the button. The head portion of the button is biased up an inclined ramp portion 40 defined adjacent the slot as the body portion is shifted to seat the button shank in the slot 38; which tensions the longitudinal base

portions 42 of the body portion against the support. The keyhole slot terminates in a button seat 44, adjacent the slot, which receives the head portion of the button. And the entrance to the button seat is restricted by opposed detents 46, to prevent accidental withdrawal of the button.

The elongated strap portion 22 extends from the body portion generally perpendicular to the axis of the keyhole slot 26, such that the securement of the body portion to the stud is not affected by manipulation of the strap, or tightening of the strap in the hinge portion slot 25. The strap is provided with plurality of upwardly extending gripping elements 48, which extend across the entire width of the strap to assure locking action with the slot in the hinge portion 24. The gripping elements include a locking shoulder 50 facing the body portion 20 of the clamp, and a cam surface 52 facing toward the distal or free end 54 of the strap. The distance between adjacent gripping elements, or the distance between adjacent locking shoulders B, is preferably at least three times the transverse thickness of the strap A. In the embodiment of the strap illustrated in the drawings, the distance between the gripping elements is approximately four times the transverse thickness of the strap. This relationship has been found important to assure positive locking of the strap in the slot 25 in the hinge portion. If the gripping elements are more closely spaced, the strap will tend to slip out of the slot.

In the preferred embodiment of the clamp of my invention, the strap includes a few downwardly extending ribs 56 adjacent the distal end 54 of the strap. The rounded ribs 56 initially retain the strap in the slot 25 in the hinge portion, prior to tightening, because the resiliency of the strap tends to bias the strap upwardly when the strap end is received in the slot. In the relaxed position of the hinge portion, shown in phantom in FIGURE 4, the ribs engage the lower inner edge 58 of the slot, opposite the strap portion, retaining the strap portion in the slot during assembly. The strap is preferably tapered at the end, and the strap portion must be sufficiently resilient to permit lacing of the strap into the slot 25 in the hinge portion, as shown in FIGURE 4.

The hinge portion is hingedly attached to a marginal edge 60 of the body portion generally parallel to the axis of the slot 26, opposite the strap portion 22, by an integral resilient hinge 62. The transverse thickness of the hinge 62 is less than the transverse thickness of the strap A to permit biasing of the hinge portion upwardly, as shown in FIGURE 4, to receive and lock the strap. The hinge portion is preferably hinged adjacent the top of the hinge and body portions to avoid interference between opposed surfaces as the hinge portion is biased upwardly. The body portion 20 of this embodiment of my invention has a greater transverse thickness than the hinge portion, thereby spacing the hinge portion from the base 42 of the body portion. The slot 25 in the hinge portion is generally parallel to the axis of the slot 26, and is configured to receive the rectangular strap 22. The hinge portion of this embodiment has been provided with a groove 64 to reduce the amount of material utilized in forming the clamp.

In the preferred embodiment of my invention, the depth C of the slot 25 in the hinge member is greater than three times the transverse thickness A of the strap portion. The importance of this relationship can be seen in FIGURE 4. The cable is shown in phantom for reference purposes. When the end 54 of the strap is inserted into the slot 25 and tightened over the cable, the hinge portion is biased upwardly and the strap is wedged between the lower inner edge of the slot, having an inwardly projecting detent 66, and the upper outer edge 68. When the tension on the strap is relaxed, the detent engages a locking shoulder 50 of a gripping element, and the strap is locked in place. The camming surfaces 52 permit easy entry of the strap in the slot. The strap is wedged against

the detent, and cannot be removed except by twisting the strap, which allows the strap to be removed without damage to the clamp. The wedging action is provided by the fact that the depth of the slot is greater than three times the thickness of the strap.

It will be understood by those skilled in the art that various materials may be used for the clamp of my invention and the structural assembly shown in FIGURES 3 and 4. In the automotive industry, for example, steel is used primarily for the support, with stainless steel being used for the button, as well as cold rolled zinc plated steel. The clamp is preferably resilient, yet not subject to fracture upon repeated folding of the hinge 62 and the strap portion 22. A suitable material for this purpose is polypropylene, however other suitable materials may be found. Various modifications may also be made to the structure of the embodiment disclosed herein without departing from the purview of the appended claims:

What is claimed is:

1. An adjustable clamp, comprising: a body portion having a slot adapted to receive a button secured to the surface of a support, an integral strap portion extending generally perpendicular to the axis of said slot, and a hinge portion transversely thicker than said strap portion hingedly attached to a marginal edge of said body portion opposite said strap portion generally parallel to the axis of said slot, said hinged portion having a slot adapted to receive said strap portion generally parallel to the slot in said adaptor portion, said strap portion sufficiently resilient to permit lacing of said strap portion through the slot in said hinge portion, said strap portion having a plurality of spaced gripping elements extending substantially parallel to the axis of said slots, and said hinge portion slot of a depth equal to at least three times the transverse thickness of said strap to cause binding of said strap in said hinge portion slot.
2. The adjustable clamp defined in claim 1, characterized in that said body portion has a greater transverse thickness than said hinge portion.
3. The adjustable clamp defined in claim 2, characterized in that said hinge portion is hingedly attached to said body portion adjacent the top of both portions and said hinge portion is spaced from the base of said body portion.
4. The adjustable clamp defined in claim 1, characterized in that said hinge portion is hingedly attached to said body portion adjacent the top of said body portion by an integral resilient hinge of a transverse thickness less than the transverse thickness of said strap portion.
5. The adjustable clamp defined in claim 1, characterized in that said hinge portion slot is located adjacent the edge of said hinge portion opposite said body portion.
6. The adjustable clamp defined in claim 1, characterized in that said gripping elements are spaced a distance of at least three times the thickness of said strap.
7. The adjustable clamp defined in claim 1, characterized in that said spaced gripping elements extend from the top surface of said strap portion.
8. The adjustable clamp defined in claim 7, characterized in that said strap includes a plurality of spaced ribs extending from the opposite lower surface of said strap adjacent the distal end thereof.
9. The adjustable clamp defined in claim 7, characterized in that said gripping elements extend substantially the full width of said strap.
10. The adjustable clamp defined in claim 1, characterized in that said hinge member slot includes an inwardly extending detent adjacent the bottom of said slot.
11. The adjustable clamp defined in claim 1, characterized in that said body portion slot has an enlarged opening adapted to receive the head portion of a button, and a slot portion adapted to receive the shank portion of the button.
12. The adjustable clamp defined in claim 1, in combination with a support having a button secured thereto,

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said button having a shank portion secured to said support and a head portion spaced from said support, the body portion of said adaptor receiving said button and tensioned against said support by said button head.

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CHANCELLOR E. HARRIS, Primary Examiner

U.S. Cl. X.R.

10 24-16, 73; 248-73,74

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UNITED STATES PATENT OFFICE  
CERTIFICATE OF CORRECTION

Patent No. 3,471,109 Dated October 7, 1969

Inventor(s) E. A. Meyer

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In column 4, line 29, change "adaptor" to --body--.

In column 5, line 2, change "the" to --said--;  
line 3, delete "of said adaptor".

SIGNED AND  
SEALED  
AUG 18 1970

(SEAL)

Attest:

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