United States Patent [19]

Foote

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[54] **LOOPED CABLE END CLAMP**

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[73] Assignee: **Master Lock Company,** Milwaukee, Wis.

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[52] **U.S. Cl.** ..... **70/18,** 24/123 W

[51] **Int. Cl.** **E05b 73/00**

[58] **Field of Search** ..... 70/18, 15, 14, 57, 70/58, 19; 339/276 R, 276 D; 24/123 W; 72/308, 316; 292/308

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[57] **ABSTRACT**

The opposite looped ends of an article protecting cable, which can be brought into adjacency for the reception of a lock, have clamps applied thereto which are polygonal with the angles between adjacent sides being obtuse. Bores extending longitudinally through the clamps receive the cable ends which form the loops. By swaging portions of all sides of a clamp, displaced extents of metal form internal protuberances whose ends bite into the bore-inserted extents of the cable ends in inwardly converging, angular relationship and thus very effectively clamp the inserted portions of the cable ends.

4 Claims, 6 Drawing Figures

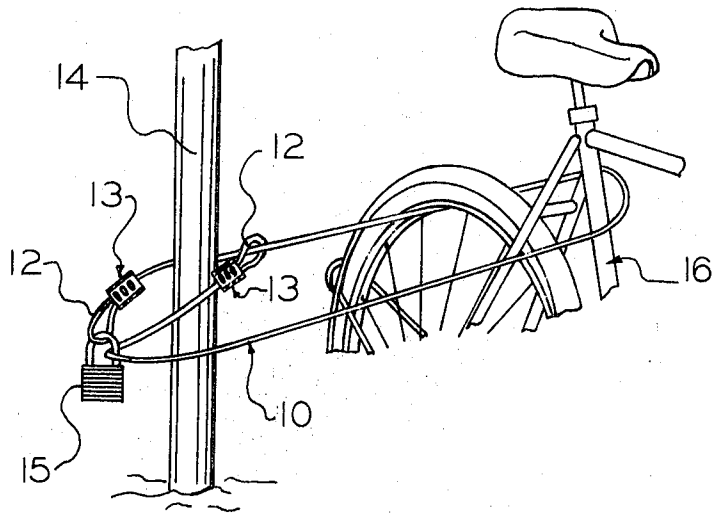


FIG - 1

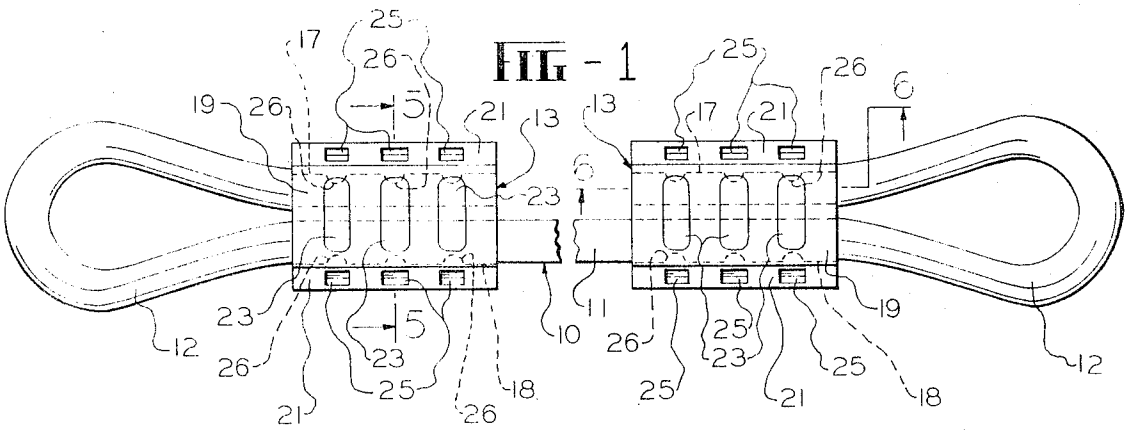


FIG - 2

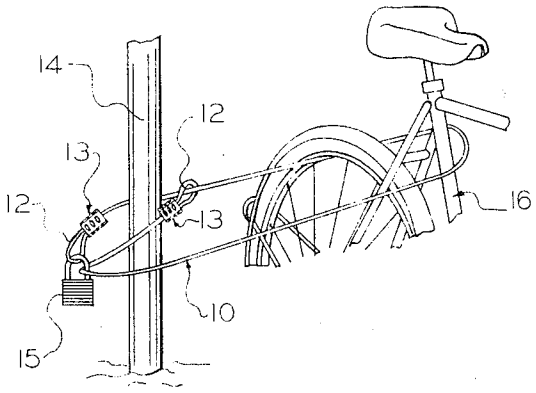


FIG - 3

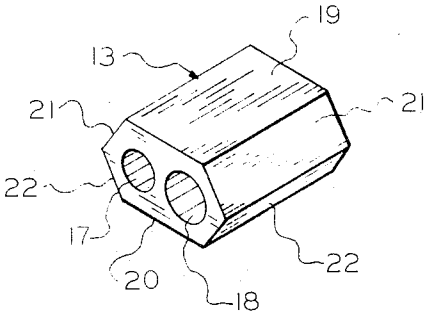


FIG - 4

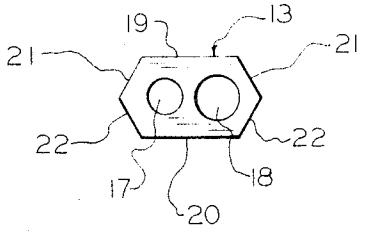


FIG - 5

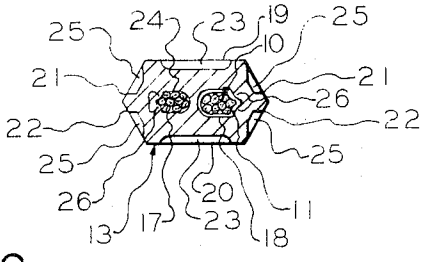
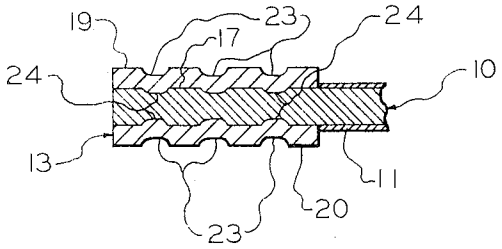


FIG - 6



LOOPED CABLE END CLAMP

BACKGROUND OF THE INVENTION

It is conventional to provide a flexible cable having looped end portions for the securement of a movable property item to a fixed support with the ends of the cable being looped for inter-engagement and for the application of a lock. Heretofore, four-sided clamp fittings have been applied to the looped cable ends and wall indents bite into the inserted portions of the cable ends which form the loops. While the conventional cable end clamps will withstand reasonable pull strains, it is desirable that their strength be substantially improved so as to resist the efforts of tamperers and thieves directed at releasing the cable loops, which then permits disengagement of the lock from the cable and release of the supposedly protected property item. With the foregoing in mind, the present invention provides a looped cable end clamp or fitting which is polygonal in shape, with more than four walls (preferably hexagonal) with the angles between adjacent sides being obtuse. The opposed top and bottom walls of a clamp are relatively wide, while the angularly related walls which connect the side edges of the top wall with those of the bottom wall are relatively narrow. All of said walls have portions thereof swaged inwardly and the swaged extents of one wall, relative to those of an adjacent wall, form inwardly directed, converging detents or protuberances which bite into the clamp inserted cable end portions in a "toed" manner, greatly enhancing the securement of the loop-forming cable end portions within their clamps, thereby rendering it far more difficult for a tamperer to withdraw and open the cable end loops. Actual tests have established that, due to the novel structure of the improved clamps, looped cable ends to which they are applied will withstand pull strength in excess of 5000 pounds, which greatly exceeds the pull strength tests of conventional looped cable end clamps.

To the best of applicant's knowledge and belief the looped cable end clamps of the prior art are at most four-sided and do not possess the full advantages of applicant's clamps which are polygonal and include more than four sides wherein adjacent sides of walls meet in obtuse angles. Thus, when each side or wall is swaged the inwardly directed detents formed by the displaced metal are "toed" relative to the clamp inserted cable loop extents and have great retention characteristics.

SUMMARY OF THE INVENTION

Specific objects of the invention are to provide clamps or fittings for the looped ends of an article protecting cable wherein said clamps have their multiplicity of sides arranged for unusual swaged detent engagement with inserted cable extents with the wider sides of the clamp being formed with detents which engage both the clamp-inserted portions of a looped cable end; wherein the clamps are easy to apply and swage; and wherein a cable so equipped may be applied relative to an article to be protected in various effective arrangements and be secured by an applied lock.

The invention has as its further objectives the provision of clamps for looped cable ends which are not vulnerable to a tamperer, which are strong and durable and unique and attractive in appearance, which are practical to manufacture and install, and which are otherwise well suited for the purposes set forth.

BRIEF DESCRIPTION OF THE DRAWING

In the accompanying drawing in which the same reference characters designate the same or similar parts in all of the views:

FIG. 1 is a fragmentary view of a protective cable having looped end portions to which the improved clamps or fittings are applied, there being plan views of the latter;

FIG. 2 is a view on a smaller scale of a looped-ended cable equipped with the improved clamps as applied for protective purposes to a bicycle and to a post-like support, one looped end of the cable being threaded through the other looped end and secured by means of a padlock;

FIG. 3 is an enlarged end and top perspective view of a clamp before application to a looped cable end and before the walls have been swaged;

FIG. 4 is an end view thereof;

FIG. 5 is a transverse sectional view taken on line 5—5 of FIG. 1; and

FIG. 6 is a longitudinal sectional view taken on line 6—6 of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

To safeguard certain movable, hard-to-lock up possessions such as bicycles, motorcycles, boats, motors, small vehicles and carts, furniture items, garden and lawn equipment, and the like, an elongated, flexible steel cable **10** is provided which is preferably provided with a vinyl coating **11.** Each end portion of the cable is doubled back to provide suitable sized loops **12.** Applied to each looped end portion of the cable to prevent loop withdrawal or opening is a fitting or clamp, designated generally by the numerals **13** and which in their unique structure and loop relationship, are the subject of the present invention. As will appear hereinafter, for the protection of a movable property item, the cable **10** may be applied to the latter and to an immovable object such as a post **14,** or tree or other support. A shackle-equipped padlock **15** when applied to adjacent portions of the cable locks the latter to the post or support **14** and to the item to be protected, which, in FIG. **2,** is illustrated as being a bicycle **16.**

A clamp **13** is a metallic member provided with a pair of adjacent bores **17** and **18** extending longitudinally therethrough. A clamp is multi-sided or polygonal and it is of the essence of the invention that it have more than four sides wherein contiguous sides or walls meet in obtuse angles. The clamps **13** illustrated are hexagonal and include relatively wide and parallel top and bottom walls **19** and **20** with a longitudinal margin of one being connected to a longitudinal margin of the other by connected and angularly related side walls **21** and **22** which are relatively narrow. It should also be observed that one of the bores, as bore **17,** is of smaller diameter than its comparison bore **18.** The latter receives a coated extent of the cable and the former receives a doubled-back loop forming portion of the cable from which the vinyl coating has been stripped, as will best be seen in FIGS. **5** and **6.**

To provide a cable of a desired length with non-releasable looped ends, a suitable extent of the cable material has each end portion thereof inserted through the larger bore **18** in a clamp **13,** the latter originally being in its unswaged condition of FIGS. **3** and **4.** Each

cable end portion is extended beyond the other end of its clamp **13** and is then doubled back to provide a loop **12** of a desired size. The extremity of each doubled-back cable portion has a vinyl coating **11** stripped therefrom to an extent commensurate with the length of its clamp. Each doubled-back and stripped end portion of the cable is then inserted into the smaller diameter bore **17** of the clamp co-extensive therewith. The cable extents occupying the clamp bores **17** and **18** have frictional fits therein, but the unique polygonal shape of the clamps **13,** which allows for the swaging operations next to be described, insures the positive retention of the doubled over portions of the cable within the clamps **13** in a manner to withstand extreme pull forces so as to insure the retention of the closed loops **12** outwardly of the outer ends of the clamps. Preferably each loop should be of a size which will permit the threading therethrough, if desired, of the opposite loop and its clamp **13** so that a property retaining arrangement, such as is disclosed in FIG. **2** may be attained, if desired.

With the unswaged clamps applied to the loop forming end portions of the cable **10** the next step is to provide each side or wall of each clamp with swaged depressions. For the relatively wide top and bottom walls, **19** and **20** of a clamp **13** a plurality of transverse swages **23** are effected and due to the width of said walls the swaged extents **23** span both bore-housed extents of the double over cable end portions. The swaged extents **23** displace metal of a clamp inwardly to form "toed" indents **24** which bite into and deform top and bottom portions of the inserted cable extents. Each of the relatively narrow side walls **21** and **22** of a clamp is provided with suitable swaged extents **25.** Due to the inclination of said walls **21** and **22** the displaced metal provides detents **26** and deforms the inserted cable extents in areas peripherally removed from the indents **24.** The swage produced detents **26** from the walls **21** inwardly converge relative to the swage produced detents **26** from the walls **22** due to the obtuse angularity between adjacent walls **21** and **22.** Thus, the deformation of and bites into the inserted portions of the cable ends is "toed" and extremely effective for retention purposes, as will best appear from FIG. **5.**

There are many obvious and convenient ways in which a cable with the end loop retaining clamps may be applied to a property item to be protected. Merely by way of illustration FIG. **2** shows a typical application. The cable **10,** originally in its out-stretched condition, is extended through portions of the property item (the bicycle **16**) in a manner to prevent the disengagement of the item from the cable when the ends of the latter are secured. In the illustration the bicycle is to be anchored to a support such as a post or tree **14** and a running noose about the support is formed in the manner shown in FIG. **2,** one looped end of the cable having been threaded through the other looped end. Securement is effected by applying the shackle of a padlock **15** to the loop of the free end of the cable and to another portion of the cable inwardly of the other looped end. When the shackle is locked within the padlock body a pull on the cable will merely tend to tighten the noose portion thereof and the protected item cannot be removed from the support **14** to which it is anchored. Obviously the cable which encircles both the protected item and the immovable support **14** may be locked by having its looped ends brought together and both engaged by the padlock shackle. The unique polygonal structure of the clamps **13** providing a multiplicity of "toed" detents which bite into the clamp housed portions of the cable will prevent the loops from pulling out or opening even though great pull forces should be imposed thereon by a thief or tamperer.

From the foregoing description it will be evident that the improved looped cable end clamps are simple and relatively inexpensive to manufacture, they are convenient to apply and are strong and tamper proof, and are generally well adapted for the purposes indicated.

I claim:

1. The combination with a cable having a doubled-back end portion to form a loop, of a clamp applied to contiguous portions of the cable inwardly of the loop, consisting of a polygonal member wherein adjacent walls meet one another in obtuse angles, there being a pair of adjacent longitudinal bores in said member receiving said contiguous portions of the cable, and detents extending inwardly from all of the walls of said member with the detents in one wall being inwardly converging relative to the detents in immediately adjacent walls, said detents biting into and securing the bore-housed extents of the cable and being "toed" relative thereto.

2. The combination recited in claim **1** wherein a pair of opposite walls of said polygonal member are relatively wide with the longitudinal margins of one being connected to the longitudinal margins of the other by pairs of connected and angularly related, relatively narrow walls, each detent which extends inwardly from said wide walls engaging both of the bore-housed cable extents.

3. The combination recited in claim **2,** wherein the detents which extend inwardly from said wide walls are relatively elongated, are transverse of said wide walls, and span both bore-housed cable extents.

4. The combination recited in claim **2** wherein the detents are formed by surface swaging of said walls and said detents tightly engage and deform the bore-housed portions of the cable.

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