Feb. 14, 1967 G. A. TINNERMAN Re. 26,157

MOUNTING CLIPS OR CLAMPS

Original Filed Jan. 27, 1960 3 Sheets-Sheet 1

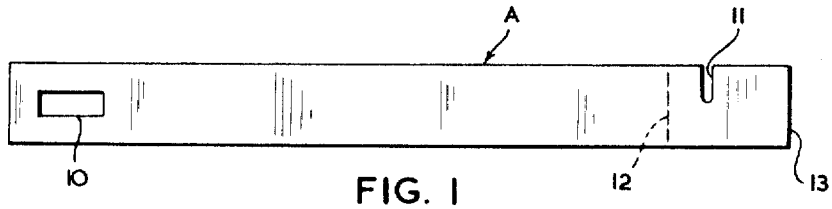


FIG. 1

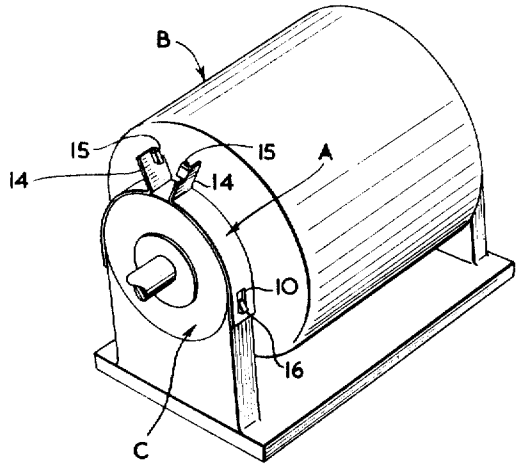


FIG. 2

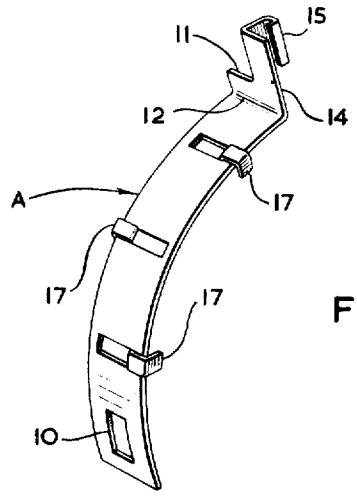


FIG. 3

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FIG. 4



FIG. 4a



FIG. 4b



FIG. 4c

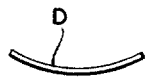


FIG. 4d



FIG. 4e

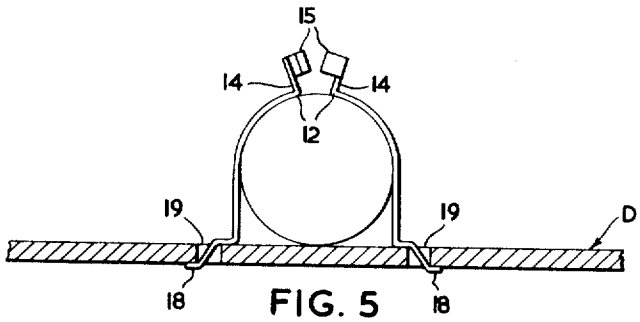


FIG. 5

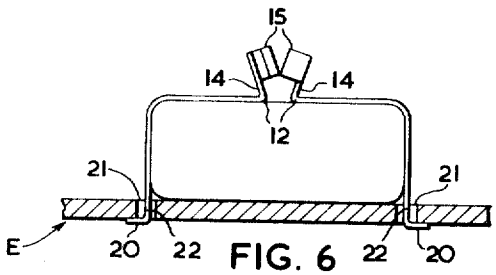


FIG. 6

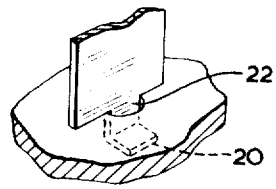


FIG. 6a

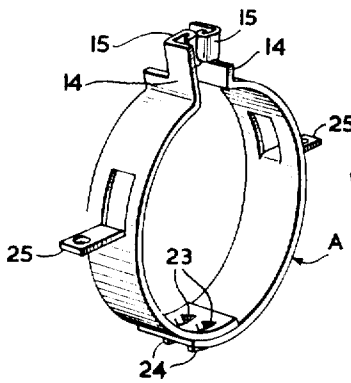


FIG. 7

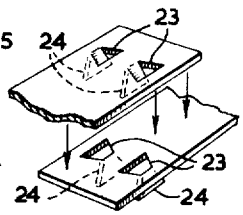


FIG. 7a

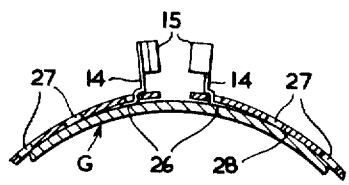


FIG. 8

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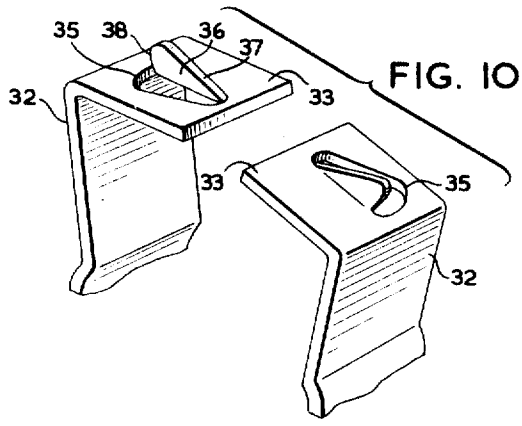


FIG. 10

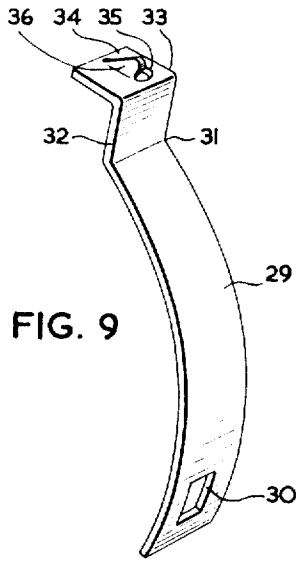


FIG. 9

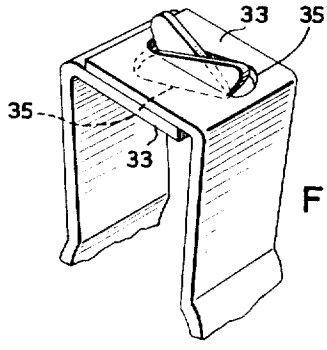


FIG. 11

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United States Patent Office

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26,157

MOUNTING CLIPS OR CLAMPS

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Original No. 3,139,261, dated June 30, 1964, Ser. No. 170,975, Feb. 5, 1962, which is a division of Ser. No. 5,073, Jan. 27, 1960, now Patent No. 3,066,903, dated Dec. 4, 1962. Application for reissue June 24, 1966, Ser. No. 562,979

10 Claims. (Cl. 248—361)

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue.

This invention relates to mounting clips or clamps and is a divisional of application Serial No. 5,073, filed January 27, 1960, now Patent No. 3,066,903, granted December 4, 1962.

Mounted clips have been employed in various fields embodying pairs of metal elements having an anchoring means on one end and lugs on the other, usually connected together by means of a nut and bolt, the tightening of which applies the necessary tension for holding the object which is to be mounted or secured. Such clips are sometimes cumbersome to work with and require time to secure since it is necessary to thread the bolt through the orificed lugs and then apply a nut which has to be tightened to obtain the required tension. Moreover, in this respect, it is obvious that they require extra elements besides the clip, i.e. nut and bolt, to effect securement, whereas it is obvious also that time is often lost in positioning the bolt and applying the screw because such parts are often dropped during the operation and are sometimes misplaced.

The present invention provides a clip which obviates these disadvantages of this prior type and provides in one simple element, when used in pairs, a mounting or securing clip which involves two parts only and which is fastened in tension in a very simple operation, one element being reversed in relation to the other to form complementary engageable members.

The invention generally comprises a mounting clip, coupling or the like formed from a single resilient element having anchoring or securing means on one end, and coupling means on the opposite end thereof, and a body lying therebetween and bent adjacent said opposite end to form an offset tension applying shank, the free end of said strip adjacent to the tension applying portion being bent angularly in respect to the first mentioned bend to provide a coupling element having a locking lug offset from the plane thereof to project to one side of the central longitudinal axis of said strip, said clip being usable in pairs with one clip reversed relative to another providing complementary interlockable coupling elements secured together by said offset lugs when said elements are lapped with one another. The strip material may be formed in various ways for strength and may be formed to give it channel-like characteristics for embracing an object to be mounted, portions of which may be disposed within the channel-like formation.

The invention will be clearly understood by reference to the following detailed specification taken in conjunction with the accompanying drawings.

In the drawings,

FIGURE 1 illustrates in plane view a blank of strip material from which the clip is formed according to the generally preferred form of invention;

FIGURE 2 is a perspective view of a motor employing a pair of said clips in connection with the resilient mounting of the motor;

FIGURE 3 is a perspective illustration of a preferred

form of clip according to the present invention, which includes as well tangs struck from the strip extending on each side thereof and bent to give substantially channel-like characteristics of the clip;

FIGURES 4, 4a, 4b, 4c, 4d and 4e illustrate in transverse section various formations of the strip which may be employed according to the present invention;

FIGURE 5 is a schematic, partly sectional, view of the mounting by means of clips of a cylindrical object prior to the engagement in tension of the complementary hook-like elements;

FIGURE 6 is a similar view to FIGURE 5 showing the clips in relation to the clamping of an object of somewhat rectilinear cross-section with a varied formation of anchoring means on the opposite ends of the clip;

FIGURE 6A is a perspective detail of the anchoring formation;

FIGURE 7 is a perspective view of a pair of mounting clips according to the present invention illustrating the manner in which they may be connected together to form a unitary composite ring-like member and illustrating also mounting means in the form of tangs struck therefrom;

FIGURE 7A is a fragmentary perspective detail of one manner in which the anchoring ends of the strips may be formed to complement one another in engagement;

FIGURE 8 is an alternative form of construction showing the formation of clips according to the invention which are anchored in the ends of orificed strap metal which may be adapted to encircle an object to be clamped;

FIGURE 9 is a perspective illustration of a further alternative form of clip;

FIGURE 10 is an enlarged fragmentary view of the top ends of a pair of clips such as illustrated in FIGURE 9 arranged in reversed relation for interlocking;

FIGURE 11 is a similar view to FIGURE 10 showing the top ends of the clips interlocked.

Referring to the drawings, A indicates a strip of resilient material, usually spring steel, and which is provided with a form of securing or anchoring means at one end, such as a slot **10**, and at the opposite end is partially slit transversely as at **11**, the slit extending from one edge of the strip inwardly to a suitable degree, such as approximately half the width of the strip. This slit or notch, as the case may be, is located between a transverse point of bending **12** of the strip and its end **13** opposite to the anchoring end.

As shown in FIGURE 3, the strip A is bent along the line **12** to provide the tension applying portion **14** upstanding from the strip and inclined at least slightly rearwardly towards the remainder of the strip, so that it forms with the strip, at the point **12** of bending, an angle slightly less than 90°. The tension applying portion or shank **14** is bent between the slit **11** and the adjacent end of the strip along axes substantially perpendicular to the line **12** of bending, to form a securing element in turn bent to form an offset locking lug or the hook-like portion **15**, disposed to one side of the central longitudinal axis of said strip. With this general construction, the utility of one form of the clip is generally illustrated by way of FIGURE 2. It is obvious from the formation of the clip as shown in FIGURE 3 that, when used with an identical clip reversed in relation to one another, the clips become complementary and consequently the locking lugs or hook-like portions **15** thereof will lock with one another when applied in a practical manner.

Referring to FIGURE 2, the motor B, having its bearing mounted in the resilient ring C, is secured in a very simple manner by engaging lugs **16** of the mounting base in the slot **10** of each clip, whereupon by urging the tension applying portions **14** of the clip towards one another by a suitable tool, the hook-like portions **15** thereof are engaged with one another to provide for

very firm clamping of the object in question by means of the tension exerted by the tension applying portions **14** of the clips. It should be noted that in the securing operation connecting a pair of these clips, the formation of the clips is such that the shank of one is directly in the path of the hook-like element of the other. Therefore, when the shanks are engaged by pliers or a similar tool as to draw the hooks toward each other for interengagement, the shank of each will function as a stop plate engageable by the hook-like member of the opposite clip so that the shanks cannot be pressed to a point which would cause them to lose their tension applying resiliency.

Where it may be desired to straddle the part being clamped as, for instance, the rubber ring C (FIGURE 2) or other element to be secured in such manner, the present invention embodies striking from the strip the tangs **17**, which are bent over the edge on each side of the strip as required, thus to form in effect a channel-like formation by means of the projecting co-operating lugs thus formed.

The strip A from which the clip is formed may be given various formations for strengthening purposes, such as is illustrated in FIGURE 4, which includes a plain strip a, an outwardly convex strip b, a strip having opposed tangs c struck therefrom, an outwardly concave strip d, an outwardly channeled strip e, and a centrally ribbed strip g.

As will be clear from FIGURES 5 and 6, the clips are subject to various formations. In FIGURE 5, the securing or anchoring means for the clips takes the form of the compound bent end **18** designed to extend through an anchoring orifice **19** in a mounting element D. In FIGURE 6 clips are shown adapted for securing an object of generally rectilinear cross-section and wherein the anchoring means is in the form of bent ends **20** to be inserted in receiving orifices **21** of the mounting element E. As shown in FIGURE 6A, the bent anchoring means **20** may take the form of a narrower shank **22** formed on the anchoring end of each clip.

The clip of the present invention embraces formations such as to provide for union of two such clips to form a ring-like clamp. One form of complementary means of uniting the clips together is illustrated in FIGURE 7, and in more detail in FIGURE 7A. In this instance the anchoring or securing ends of the clips are formed by striking from the strip tangs in a manner to form substantially trapezoidal openings **23** and, of course, forming tangs **24** of substantially trapezoidal outline which project substantially at right angles to the plane of the strip and located partially to one side thereof. Consequently, when the clips are reversed one to the other, the tangs **24** of one meet with the longer side of the trapezoidal openings of the other and may be projected therethrough. Consequently, due to the trapezoidal formation of the tangs **24**, a firm anchoring of the strip is achieved as against axial pull. Accordingly the composite ring-like clamp formed by the clips may be used in the manner of a pipe clamp or the like, whereas tangs **25** may be struck from each clip to project laterally therefrom to provide a ready mounting means.

In an alternative form of clip illustrated in FIGURE 8, the body of the clip may be smaller and formed with suitable bent lugs or the like **26** such as to enter into an orifice **27** of conventional perforated strap iron **28** as a means of joining the free ends of a strip of strap iron together in a clamping application, such as around a pipe or the like G. Otherwise the clips are of similar formation.

In the alternative form of construction illustrated in FIGURE 9, the clip body **29** is provided with anchoring means such as a slot **30** at one end and at the opposite end it is bent as at **31** to provide the upstanding tension applying portion **32** similar to the construction shown in FIGURES 2 and 3, the adjacent free end thereof being bent as at **33** to provide the angularly disposed coupling

element **34**. The coupling element **34** is punched or otherwise processed to form an elongated orifice **35** and an outwardly bent locking lug **36**. The orifice **35** is defined along one edge thereof by a straight edge parallel to the longitudinal axis of the clip and disposed slightly to one side of this theoretical axis so that the locking lug **36** is, therefore, disposed to one side of, though closely adjacent to, the longitudinal center axis of the clip. Correspondingly, the orifice **35** overlaps and extends beyond the longitudinal axis of the clip and is of tapered shape as to provide in the lug **36** struck therefrom a gradually outwardly sloped edge **37** rising from the terminal end of the lug adjacent the free end of its coupling element to a point of maximum extent rearwardly thereof, as to provide a locking shoulder **38** at the opposite end of the lug. By reason of this formation, the orifice **35** also gradually increases in width from one end thereof to the other as to provide a passage in the securing element **33** of substantial area; whereas the resulting sloped edge **37** on the lug has the function of guiding the coupling element of another cooperating similarly formed clip which is reversed with respect to the other (FIGURES 10 and 11) in such a manner that its lug will ride under the coupling element of the opposite clip and become lodged in the orifice **35** of the opposite clip, as shown in FIGURE 11, and the clips become interlocked under tension when their opposite ends have been anchored in a manner similar to that shown in FIGURE 2 whereby to secure the object to which they are applied. This locking, therefore, is accomplished in a very simple manner. The clips may be unlocked in a very simple manner also by reason of the orifice **35** of the uppermost coupling element **33**. This will be apparent from a consideration of FIGURE 11 where it will be noted that a solid portion of the underlying coupling element **33** will underlap the orifice **35** of the uppermost coupling element **33**. Consequently, by placing a screwdriver or other tool in orifice **35** of the uppermost coupling element **33** and pressing down against the underlapping solid portion of the underlying coupling element **33**, the clips are readily disengaged from locked position. It will be noted that the locking lugs **36** of a pair of clips reversed to one another, as in FIGURES 10 and 11, will usually bear against each other substantially along the center longitudinal axis of the clip, and that the orifice **35** in the underlying coupling element of the joined pair is covered by a solid portion of the uppermost coupling element of the pair. Consequently, by reason of this symmetrical formation which provides complementary opposites when one clip is reversed to the other, it does not matter as to which coupling element is uppermost in the union effected.

It is obvious that the mounting clip provided by the present invention is extremely simple in construction and is adapted to perform a clamping or coupling function which is effected in a particularly simple manner. Moreover, it is also obvious that it is of a character which lends itself to easy manufacture by automation, and that it may be adapted to many clamping or securing uses.

While it is preferred to form the clip from strip-like resilient material, it is obvious that it could be formed from resilient bar stock of somewhat small cross-section, by bending the stock substantially in the manner described in result to provide a tensioning portion and securing elements for coupling purposes. Moreover, while such clip will generally be formed from spring steel, it is obvious that it may be formed from other materials practical to the intended purpose of use. It is therefore intended that the foregoing description should not be interpreted in a sense more limited than the subject matter defined by the appended claims.

What I claim as my invention is:

1. A mounting clip comprising a strip of resilient formable material having securing means on its first end and coupling means on its second end and a body lying therebetween, said strip being bent adjacent said second end

to form an offset tension applying shank, a free end of said tension applying shank being bent upon itself angularly in respect to the first mentioned bend to provide along one edge thereof an outwardly projecting securing element forming said coupling means, said clip being usable in pairs with one clip reversed relative to another providing complementary interlapping and interlockable securing elements engageable with one another under tension to clamp an object when said first ends are secured.

2. A mounting clip as claimed in claim 1 wherein said shank is partially slit in a transverse direction, said slit being spaced from said free end and extending inwardly from one edge of said shank, and bent between said slit and said free end along axes substantially perpendicular to the first mentioned bend to form a hook like element outwardly projecting therefrom, thereby forming said coupling means, said clip being usable in pairs with one reversed relative to another to provide complementary interlockable hook like elements being engageable with one another under tension to clamp an object when said first ends are secured to it.

3. A mounting clip as claimed in claim 1 or 2 wherein said tension applying shank forms a stop plate located on said clip relative to its securing element as to be positioned in the path of and engageable by the securing element of the opposite clip of a pair being engaged whereby to avoid bending of said tension applying shank and loss of tension applying resiliency.

4. A mounting clip formed of a single length of resilient material for use with a similar clip to form a pair of complementary clips, said clip having a body portion for partially encompassing an article; connecting means at one end of the clip, a tension applying portion at the opposite end extending outwardly at an angle from said body portion, and a coupling element on said tension applying portion and spaced thereon outwardly from the article embracing section of said body portion and extending in a direction opposite from said body portion and having a lug projecting therefrom formed with a shoulder extending outwardly and facing rearwardly toward said body portion, said element also having a rearwardly facing abutment, said shoulder being formed to engage the abutment on a complementary clip when said coupling elements are drawn together to substantially encompass an article to interengage and to stress said tension applying portions.

5. A clip as claimed in claim 4, the outer end of said locking lug extending to the rear of its base so that said lug has a hook-like engagement with said abutment.

6. A mounting clip formed of a single length of resilient material for use with a similar clip to form a pair of complementary clips to secure an article to a support, said clip having a body portion, means at one end to anchor the clips, a tension applying portion at the opposite end extending outwardly at an angle from said body portion, and a coupling element spaced thereon outwardly from said body portion and extending away from said body portion, said coupling element comprising a flange on said tension applying portion angularly disposed to said portion and extending in a direction opposite to said body portion and toward the coupling element of a complementary clip, a locking lug projecting from said flange formed with a shoulder facing rearwardly toward said body portion, and a rearwardly facing abutment formed on said flange, said shoulder on said locking lug engaging the rearwardly facing abutment of a complementary clip when said coupling elements are interengaged to stress the tension applying portions of complementary clips.

7. A clip as claimed in claim 6, the outer end of said tension applying portion being slit partially across said clip and the portion beyond the slit being bent along an outwardly extending line to form said flange.

8. A clip as claimed in claim 6, the outer end of said tension applying portion being bent transversely to form said flange and said locking lug projecting outwardly from said flange.

9. Fastening means for securing an article to a support, said fastening means for engaging a support on opposite sides of a part of an article and for extending over such part to maintain an article on a support, said fastening means comprising a pair of identical, complementary clips each formed of a length of resilient material having a body portion, means at one end formed to be secured to a support, a tension applying portion at the opposite end of said body portion so that said tension applying portion faces the corresponding portion of the complementary clip, said tension applying portions of said clips having interengaging coupling means thereon spaced outwardly from said body portions, each of said coupling means comprising a flange substantially perpendicular to said tension applying portion extending in a direction opposite from said body portion toward the coupling element of the complementary clip, so that said flanges overlap when said coupling elements are interengaged to stress said tension applying portions and secure an article to a support, each flange having a shoulder facing rearwardly toward said body portion and a rearwardly facing abutment, said shoulder on one of said clips engaging the abutment on the complementary clip to interengage said coupling elements and maintain said tension applying portions stressed while the tension in said portions retains said coupling elements in engagement.

10. Fastening means as claimed in claim 9, said tension applying portion of each clip making an angle of not greater than 90° with the body portion and said tension applying portions, before engagement of said coupling elements, forming an acute, outwardly opening angle, so that interengagement of said coupling elements brings said tension applying portions closer to parallel.

References Cited by the Examiner

The following references, cited by the Examiner, are of record in the patented file of this patent or the original patent.

UNITED STATES PATENTS

2,377,061	5/1945	Zimmerman	248—74
2,843,346	7/1958	Cunningham	248—26

FOREIGN PATENTS

709,039	8/1941	Germany.
304	2/1858	Great Britain.

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