

Description

This invention relates generally to apparatus for disposition of electrical cables and pertains more particularly to clamps for retentively engaging cables.

In various installations of electrical wiring, need arises for clamps and the like to dress cables into and in prescribed locations. Various known clamps incorporate relatively movable components which are openable for receipt of a cable and then adapted, by self-resiliency or appropriate latching structure, to tightly circumscribe the cable and maintain same in the desired position or location.

Presently known clamps are typically dedicated for use with a given cable configuration, i.e., on individual cable of circular cross-section or a cable bundle of circular or rectangular cross-section, on the other hand. To date, the art has not evolved a simple and efficient clamp having capability for clamping either type of cable at the user's option.

One known adjustable clamp for releasably retaining articles of various cross-section is described in US-A-3,670,369. This comprises an integral plastic body including an elongate base having a generally flat interior surface, a retaining member upstanding from one end of the base and cantilever-supported by the base, means for releasably retaining the free end of the retaining member at a predetermined plurality of positions to accommodate various cross-sections of the article being retained.

According to the present invention a device of this type is characterized in that the retaining member includes a hinge and a rigid beam cantilever-supported by the hinge, the interior surface of the rigid beam including a first flat section continuous with an arcuate interior surface of the hinge such that an article is clamped between the first flat section of the beam and the arcuate surface of the hinge and wherein the interior surface of the beam further includes a second flat section adjacent to and at an angle with the first section whereby movement of the beam causes a change in position of the second section with respect to the flat interior surface of the base which at some point brings the second section and base surface parallel to each other clamping a cable therebetween.

Accordingly there is provided an efficient yet relatively simple and inexpensive apparatus for clamping cables or other elongate articles of various cross-section.

In use, upon deflection of the beam towards the base, after insertion of a round cable in the hinge or insertion of a flat cable upon the flat interior surface of the base, the hinge is compressed upon the round cable, and either the first section of the beam adjacent the hinge forcibly engages the round cable or the second section of the beam and the interior facing surface of the base compressingly engage the flat cable. In either case, the beam is retained in its cable-engaging relation

by engagement of the free end of the beam with a latching member, which is itself deflectable to release the beam and return the hinge to its relaxed state.

In the relaxed state of the hinge, wherein the beam is not engaged with the latching member, the second flat section of the beam is disposed at an acute angle relative to the flat interior surface of the base, such that deflection of the beam into retentive engagement with the latching member gives rise to parallelism between the second flat section of the beam and the flat interior surface of the base.

Once the desired clamping is achieved, or even before, the clamp may be fixed to a surface by, for example, an adhesive backing.

In the accompanying drawings, by way of example only:—

Figure 1 is a front elevation of a clamp embodying the present invention;

Figure 2 is a top plan view of the Figure 1 clamp;

Figure 3 is a left side elevation of the Figure 1 clamp;

Figure 4 is a sectional view of the Figure 1 clamp as would be seen from plane V—V of Figure 1;

Figure 5 is a front elevation of the Figure 1 clamp in an operative retaining relation with a cable having circular cross-section; and

Figure 6 is a front elevation of the Figure 1 clamp in an operative retaining relation with a cable having rectangular cross-section.

With reference now to Figures 1—4, clamp 10 is an integrally formed plastic body having an elongate base 12, a hinge 14 upstanding from one longitudinal end of base 12, a rigid beam member 16 supported in cantilever fashion by hinge 14 and a latching member 18 upstanding from base 12 opposite hinge 14.

Base 12 has its interior surface configured in first elevated flat portion 20, in leftward arcuate portion 22 continuous flat portion 20, in leftward arcuate portion 22 continuous with arcuate interior surface 24 of hinge 14, and in rightwardly extending surface portion 26 continuous with necked down portion 28 of latching member 18. Hinge 14 is a bendable spring hinge which is supported for pivotal movement about base end 30.

Hinge 14 may be viewed to extend from base end 30 to portion 32 with an internal surface 24 which has a configuration of a half-circle. For retention of circular cross-section cable for example, beam 16 has first flat interior surface portion 34 continuous with arcuate surface 24 which with base arcuate surface 22 collectively provides for such cable retention as shown in Figure 5.

Beam 16 has a second flat interior surface portion 36 forming an obtuse angle with beam surface 34 and extending therefrom to beam end chamfer 38. End chamfer 38 and beam exterior surface 40 intersect at the line surface 42.

Latching member 18 has its lower part 18a



inclined clockwise toward base 12 in Figure 1 and forming an acute angle therewith and its upper part 18b inclined counterclockwise of base 12. Ribs 44 are somewhat triangular and project from surface 18c of member 18. The upper ribs on part 18b facilitating operator movement of the member 18 and point almost perpendicular to surface 18c. The lower ribs on part 18a serving as detents for latching line surface 42 of beam 16 and as such project slightly downward from surface 18c on portion 18a.

Base 12 may have an adhesive layer 46 applied thereto with peel-away protective film 48 on the undersurface of layer 46 to facilitate mounting of the clamp to a harness board or the like.

Clamp 10 is shown in its relaxed state in Figure 1, i.e., wherein beam 16 and latching member 18 are not retentively engaged and hinge 14 is in an unbent form. Member 18 is in self-biased upstanding disposition. In this state, the clamp may be opened for insertion of a cable by lifting beam 16 upwardly against the self bias of hinge 14. Following insertion of the cable, the clamp parts return to the Figure 1 relaxed state.

Considering latching member 18 in further detail, its lower ribs 44 on part 18a have their apices in locations which are successively vertically spaced from base 12 and which are successively longitudinally spaced relative to base 12. Concomitant to such spacing is the motion imparted to beam 16 in the course of operator input thereto to entrap a cable resident in clamp 10. This motion, as a direct result of operator downward force on beam 16, has one component causing line surface 42 to move into engagement with the rib 44 immediately therebelow and thereby to displace latching member 18 rightwardly from its Figure 1 disposition until surface 42 rides beyond such engaged rib and seats retentively therebelow, members 18 returning under self-bias from its momentary rightward displacement. The downward angle of the upper surface of the ribs 44 to serve to facilitate the downward movement of beam 16 engaging therewith. A second beam motion component is occasioned by compression and pivotal movement of hinge 14 which results in a slight translational displacement of beam 16 rightwardly from its Figure 1 disposition, to thereby slightly displace line surface 42 toward latching member 18 into entrapped relation to the rib 44 thereof thus transversed.

The entrapment of a circular cross-section cable 50 by this practice is shown in Figure 5. Here, line surface 42 has traversed three of ribs 44 from its Figure 1 disposition and line surface 42 is entrapped by the last-traversed rib. Surface portion 34 of beam 16 bears forcibly against cable 50, which is otherwise engaged by arcuate surface 24 of hinge 14 and arcuate surface 22 of base 12 pinching it therebetween the degree of which depends upon how far beam 16 is depressed. To release cable 50, latching member 18 is pushed rightwardly to release beam 16.

In Figure 6, two-conductor cables 52, such as

generally flat household wiring, is entrapped in clamp 10. Here, surface portion 36 is displaced from its acute angle orientation with respect to base surface 20 in the clamp relaxed Figure 1 state and in lesser acute angle relation in the constrained state of Figure 5, into substantial parallelism with the base surface 20. Such parallel disposition of surfaces 36 and 20 conforms substantially the same to the surfaces of cable 52 with which they are in forcible engagement. Note further that the height of base surface 20 can be changed, depending on its application, to vary the distance between it and portion 36. This is particularly advantageous, since the clamp 10 can be easily modified for clamping different size cables therebetween.

Claims

1. A releasable retainer comprising an integral plastic body (10) including an elongate base (12) having a generally flat interior surface (22, 20, 26), a retaining member (14, 16) upstanding from one end of the base (12) and cantilever-supported by the base, means (18) for releasably retaining the free end (42) of the retaining member (14, 16) at a predetermined plurality of positions (44) to accommodate various cross-sections of the article being retained, characterised in that the retaining member (14, 16) includes a hinge (14) and a rigid beam (16) cantilever-supported by the hinge (14), the interior surface of the rigid beam including a first flat section (34) continuous with an arcuate interior surface (24) of the hinge (14) such that an article is clamped between the first flat section (34) of the beam (16) and the arcuate surface (24) of the hinge (14) and wherein the interior surface of the beam (16) further includes a second flat section (36) adjacent to and at an angle with the first section (34) whereby movement of the beam (16) causes a change in position of the second section (36) with respect to the flat interior surface (22, 20, 26) of the base (12) which at some point brings the second section (36) and base surface (22, 20, 26) parallel to each other for clamping a cable therebetween.

2. A retainer in accordance with claim 1 further characterised by a first elevation platform (20) positioned on the base (22, 20, 26), the height of the platform (20) above the base (22, 26) determining the distance between the platform (20) and the said second section (36) whereby a change in the height of the platform changes the point at which a cable is clamped therebetween.

3. A retainer in accordance with claim 1 wherein the retaining means (18) comprises a latching member (18) cantilever-supported by the opposite end of the base (12) and a plurality of successive detents (44) along a first portion (18a) of said latching member (18) for selectively retaining the free end (42) of the beam (16).

4. A retainer in accordance with claim 3 wherein the latching member (18) includes a second portion (18b) inclined to the first portion such that the movement of the latching member (18) to disen-

inclined clockwise toward base 12 in Figure 1 and forming an acute angle therewith and its upper part 18b inclined counterclockwise of base 12. Ribs 44 are somewhat triangular and project from surface 18c of member 18. The upper ribs on part 18b facilitating operator movement of the member 18 and point almost perpendicular to surface 18c. The lower ribs on part 18a serving as detents for latching line surface 42 of beam 16 and as such project slightly downward from surface 18c on portion 18a.

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The entrapment of a circular cross-section cable 50 by this practice is shown in Figure 5. Here, line surface 42 has traversed three of ribs 44 from its Figure 1 disposition and line surface 42 is entrapped by the last-traversed rib. Surface portion 34 of beam 16 bears forcibly against cable 50, which is otherwise engaged by arcuate surface 24 of hinge 14 and arcuate surface 22 of base 12 pinching it therebetween the degree of which depends upon how far beam 16 is depressed. To release cable 50, latching member 18 is pushed rightwardly to release beam 16.

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2. A retainer in accordance with claim 1 further characterised by a first elevation platform (20) positioned on the base (22, 20, 26), the height of the platform (20) above the base (22, 26) determining the distance between the platform (20) and the said second section (36) whereby a change in the height of the platform changes the point at which a cable is clamped therebetween.

3. A retainer in accordance with claim 1 wherein the retaining means (18) comprises a latching member (18) cantilever-supported by the opposite end of the base (12) and a plurality of successive detents (44) along a first portion (18a) of said latching member (18) for selectively retaining the free end (42) of the beam (16).

4. A retainer in accordance with claim 3 wherein the latching member (18) includes a second portion (18b) inclined to the first portion such that the movement of the latching member (18) to disen-



gage the free end (42) of the beam (16) therefrom is facilitated.

5. A retainer in accordance with claim 4 wherein the first portion (18a) of the latching member (18) is biased toward engagement with the free end (42) of the beam (16) and the detents (44) are successively vertically and longitudinally spaced relative to the base (12), and at least one of said detents (44) providing for parallelism of the base (12) and the said second flat section (36) of the beam when the free end (42) is in engagement therewith.

6. A retainer in accordance with claim 5 wherein the detents (44) on the first portion (18a) are formed from adjacent ribs, the ribs have apices which extend downwardly towards the base (12) and the said second portion (18b) includes ribs which facilitate grasping.

7. A retainer in accordance with claim 5 wherein the base (12) includes a generally flat exterior surface on which is positioned an adhesive means (46) for affixing the retainer to a surface.

8. A retainer in accordance with claim 3 wherein the said first portion (18a) of the latching means (18) is biased toward engagement with the free end (42) of the beam (16) and at least one of the detents (44) provides for parallelism of the base (12) and the said second flat section (36) of the beam (16).

9. A retainer in accordance with claim 8 wherein the detents (44) on the first portion (18a) are formed from adjacent ribs, the ribs have apices which extend downwardly towards the base (12) and wherein a second portion (18b) of the latching member is inclined to the first portion and includes ribs which facilitate grasping.

Patentansprüche

1. Lösbare Haltevorrichtung, die einen einteiligen Kunststoffkörper (10) aufweist, der ein längliches Grundteil (12), das eine im allgemeinen ebene Innenfläche (22, 20, 26) hat, ein Halteteil (14, 16), das aufrechtstehend an einem Ende des Grundteils (12) vorgesehen und freitragend durch das Grundteil abgestützt ist, und eine Einrichtung (18) zum lösbaren Halten des freien Endes (42) des Halteteils (14, 16) in einer vorbestimmten Anzahl von Positionen (44) umfaßt, um sich an unterschiedliche Querschnitte des zu haltenden Gegenstandes anzupassen, dadurch gekennzeichnet, daß das Halteteil (14, 16) ein Gelenk (14) und einen starren Träger (16) umfaßt, der freitragend durch das Gelenk (14) gestützt ist, daß die Innenfläche des starren Trägers einen ersten ebenen Abschnitt (34) enthält, der in eine gewölbte Innenfläche (24) des Gelenks (14) derart übergeht, daß ein Gegenstand zwischen dem ersten ebenen Abschnitt (34) des Trägers (16) und der gewölbten Fläche (24) des Gelenks (14) geklemmt wird, und wobei die Innenfläche des Trägers (16) ferner einen zweiten ebenen Abschnitt (36) enthält, der benachbart zu dem ersten Abschnitt (34) und unter einem Winkel zu diesem angeordnet ist, und wobei die Bewegung des Trägers (16) eine

Positionsänderung des zweiten Abschnittes (36) bezüglich der ebenen Innenfläche (22, 20, 26) des Grundteils (12) bewirkt, das an irgendeinem Punkt den zweiten Abschnitt (36) und die Grundfläche (22, 20, 26) in eine parallele Lage zueinander zum Einklemmen eines Kabels dazwischen bringt.

2. Haltevorrichtung nach Anspruch 1, die sich ferner dadurch auszeichnet, daß eine erste erhabene Plattform (20) auf dem Grundteil (22, 20, 26) angeordnet ist, die Höhe der Plattform (20) über dem Grundteil (22, 26) den Abstand zwischen der Plattform (20) und dem zweiten Abschnitt (36) bestimmt, und daß bei einer Änderung der Höhe der Plattform sich die Stelle ändert, an der ein Kabel zwischen diesen eingeklemmt wird.

3. Haltevorrichtung nach Anspruch 1, bei der die Halteeinrichtung (18) ein Rastteil (18) aufweist, das freitragend durch das gegenüberliegende Ende des Grundteiles (12) abgestützt ist, sowie eine Mehrzahl von aufeinanderfolgenden Rastnasen (44) längs eines ersten Abschnittes (18a) des Rastteils (18), um das freie Ende (42) des Trägers (16) wahlweise festzulegen.

4. Haltevorrichtung nach Anspruch 3, bei der das Rastteil (18) einen zweiten Abschnitt (18b) enthält, der zu dem ersten Abschnitt derart geneigt ist, daß die Bewegung des Rastteils (18) zum Freigeben des freien Endes (42) des Trägers (16) von diesem unterstützt wird.

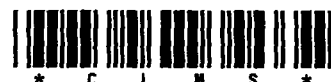
5. Haltevorrichtung nach Anspruch 4, bei der der erste Abschnitt (18a) des Rastteils (18) in Richtung auf den Eingriffszustand mit dem freien Ende (42) des Trägers (16) vorbelastet ist, daß die Rastnasen (44) aufeinanderfolgend vertikal und in Längsrichtung im Abstand relativ zu dem Grundteil (12) vorgesehen sind, und daß wenigstens eine der Rastnasen (44) zur Parallelität des Grundteils (12) und des zweiten ebenen Abschnittes (36) des Trägers vorgesehen ist, wenn das freie Ende (42) in Eingriff damit ist.

6. Haltevorrichtung nach Anspruch 5, bei der die Rastnasen (44) auf dem ersten Abschnitt (18a) von benachbarten Rippen gebildet werden, wobei die Rippen Scheitelpunkte haben, die sich in Richtung auf das Grundteil (12) nach unten erstrecken wobei der zweite Abschnitt (18b) Rippen enthält, die das Ergreifen unterstützen.

7. Haltevorrichtung nach Anspruch 5, bei der das Grundteil (12) eine im allgemeinen ebene Außenfläche aufweist, auf der eine Kleebeeinrichtung (46) zur haftenden Anbringung der Haltevorrichtung an einer Fläche angeordnet ist.

8. Haltevorrichtung nach Anspruch 3, bei der der erste Abschnitt (18a) des Rastteils (18) in Richtung auf den Eingriffszustand mit dem freien Ende (42) des Trägers (16) vorbelastet ist und wenigstens eine der Rastnasen (44) zur Parallelität des Grundteils (12) und des zweiten ebenen Abschnittes (36) des Trägers (16) vorgesehen ist.

9. Haltevorrichtung nach Anspruch 8, bei der die Rastnasen (44) auf dem ersten Abschnitt (18a) von benachbarten Rippen gebildet werden, die Rippen Scheitelpunkte haben, die sich nach unten in Richtung auf das Grundteil (12) erstrecken und bei der ein zweiter Abschnitt (18b) des Rastteils zu



dem ersten Abschnitt geneigt verläuft und Rippen enthält, die das Ergreifen unterstützen.

Revendications

1. Dispositif de retenue déclenchable comprenant un corps plastique (10) d'une pièce, comprenant une base (12) de forme allongée qui présente une surface intérieure plate dans son ensemble (22, 20, 26), une pièce de retenue (14, 16) se dressant à partir d'une extrémité de la base (12), et supportée en porte-à-faux par la base, des moyens (18) pour retenir de manière déclenchable l'extrémité libre (42) de la pièce de retenue (14, 16) dans une pluralité prédéterminée de positions (44) pour s'adapter à des sections transversales variées de l'objet qui est retenu, caractérisé en ce que la pièce de retenue (14, 16) comprend une charnière (14) et une poutrelle rigide (16) supportée en porte-à-faux par la charnière (14), la surface intérieure de la poutrelle rigide comprenant une première portion plate (34) qui se raccorde à une surface intérieure arquée (24) de la charnière (14) de façon qu'un objet soit serré entre la première portion plate (34) de la poutrelle (16) et la surface arquée (24) de la charnière (14), et en ce que la surface intérieure de la poutrelle (16) comprend encore une deuxième portion plate (36) contigüe à la première portion (34) et faisant un certain angle avec elle, ce qui fait que le mouvement de la poutrelle (16) produit une modification de position de la deuxième portion (36), par rapport à la surface intérieure plate (22, 20, 26) de la base (12), qui amène, à un certain point, la deuxième portion (36) et la surface de base (22, 20, 26) à être parallèles pour serrer un câble entre elles.

2. Dispositif de retenue selon la revendication 1, caractérisé de plus par une première plate-forme (20) surélevée placée sur la base (22, 20, 26), la hauteur de cette plate-forme (20) au-dessus de la base (22, 26) déterminant la distance entre la plate-forme (20) et ladite deuxième portion (36), ce qui fait qu'une modification de la hauteur de la plate-forme déplace l'endroit où un câble est serré dans l'intervalle.

3. Dispositif de retenue selon la revendication 1, dans lequel le moyen de retenue (18) comprend une pièce de verrouillage (18), qui est supportée en porte-à-faux par l'extrémité opposée de la

base (12), et une pluralité d'arrêts successifs (44) le long d'une première partie (18a) de ladite pièce de verrouillage (18) pour retenir de façon sélective l'extrémité libre (42) de la poutrelle (16).

4. Dispositif de retenue selon la revendication 3, dans lequel la pièce de verrouillage (18) comprend une deuxième partie (18b) inclinée par rapport à la première partie, de façon à faciliter le mouvement de la pièce de verrouillage (18) pour en dégager l'extrémité libre (42) de la poutrelle (16).

5. Dispositif de retenue selon la revendication 4, dans lequel la première partie (18a) de la pièce de verrouillage (18) est sollicitée à s'appliquer contre l'extrémité libre (42) de la poutrelle (16) et les arrêts (44) sont successivement espacés verticalement et longitudinalement par rapport à la base (12), et l'un au moins desdits arrêts (44) assure le parallélisme de la base (12) et de ladite deuxième portion plate (36) de la poutrelle lorsque l'extrémité libre (42) est engagée avec lui.

6. Dispositif de retenue selon la revendication 5, dans lequel les arrêts (44) sur la première partie (18a) sont constitués par des nervures adjacentes, les nervures comportent des sommets qui s'étendent vers le bas en direction de la base (12), et ladite deuxième partie (18b) comporte des nervures qui facilitent la saisie.

7. Dispositif de retenue selon la revendication 5, dans lequel la base (12) présente une surface extérieure, plate dans l'ensemble, sur laquelle un moyen adhésif (46) est disposé pour fixer le dispositif de retenue contre une surface.

8. Dispositif de retenue selon la revendication 3, dans lequel ladite première partie (18a) de la pièce de verrouillage (18) est sollicitée à s'appliquer contre l'extrémité libre (42) de la poutrelle (16), et au moins l'un des arrêts (44) assure le parallélisme de la base (12) et de ladite deuxième portion plate (36) de la poutrelle (16).

9. Dispositif de retenue selon la revendication 8, dans lequel les arrêts (44) sur la première partie (18a) sont constitués par des nervures adjacentes et les nervures comportent des sommets qui s'étendent vers la base en direction de la base (12), et dans lequel une deuxième partie (18b) de la pièce formant verrou est inclinée par rapport à la première partie et comporte des nervures qui facilitent la saisie.

