United States Patent [19]

Reiner

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[45] **Aug. 14, 1973**

[54] **FASTENING DEVICES**

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[21] Appl. No.: **246,340**

[52] **U.S. Cl.** ..... **24/73 ES,** 132/46 R

[51] **Int. Cl.** **A44b 21/00,** A45d 8/00

[58] **Field of Search** ..... 132/46 R, 47, 48 A, 132/48 R; 24/17 AP, 30.5 P, 73 ES, 265 EE, 102 T, 102 A, DIG. 4, 9, 873 R

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Primary Examiner—Donald A. Griffin
Attorney—T. L. Stam

[57] **ABSTRACT**

An improvement in fastening devices of the type comprising two centrally connected resilient loops and in which each loop has an enlargement (as a bead or other ornament) at its outer end, whereby the device may be stretched around an article, as for example a tress of hair, such as a pony tail and fastened by slipping the enlargement on the end of one loop under the enlargement at the end of the other loop. The improvement provides structures wherein the two loops are formed of the resilient material in such a manner that continuous lengths of the material pass through the central contiguous area of the two loops and all loose ends of the material are held within the end enlargements in such a way as to resist being pulled apart by strain or by necking down of the resilient material in normal use of the device. The enlargements are fixedly attached, one at each end to the double loop structure, in such a manner that the two lengths of material which protrude from each enlargement are each positioned at a substantial angle to the longitudinal axis of the device.

11 Claims, 12 Drawing Figures

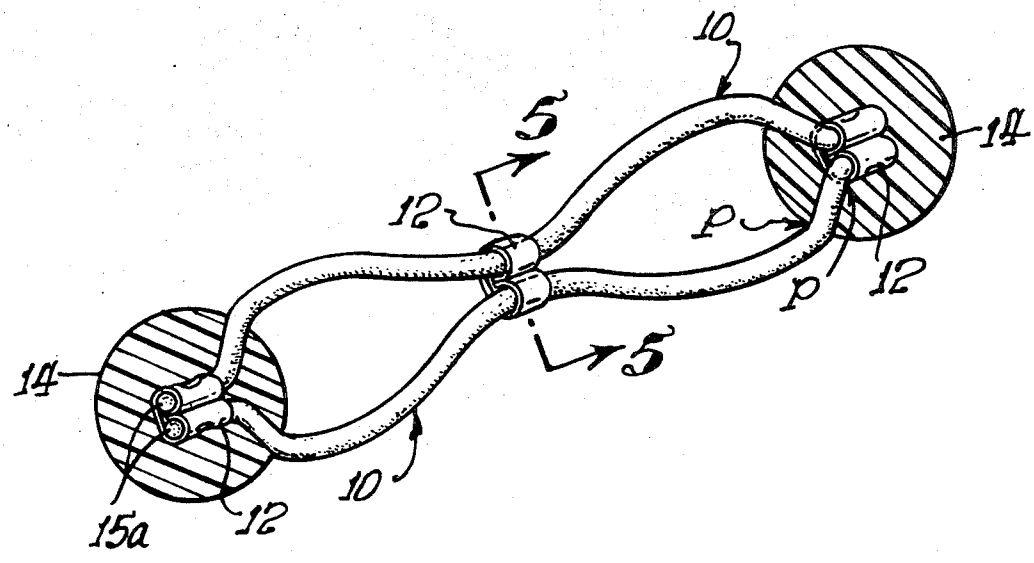


FIG. 1.

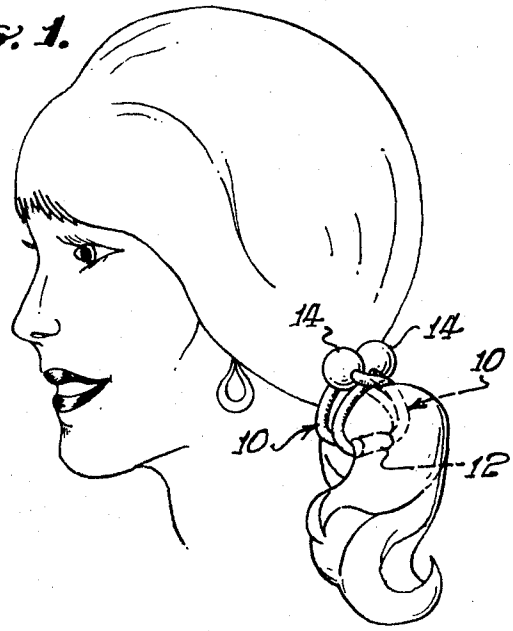


FIG. 3.

PRIOR ART

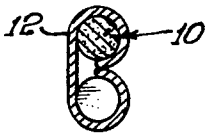


FIG. 2.

PRIOR ART

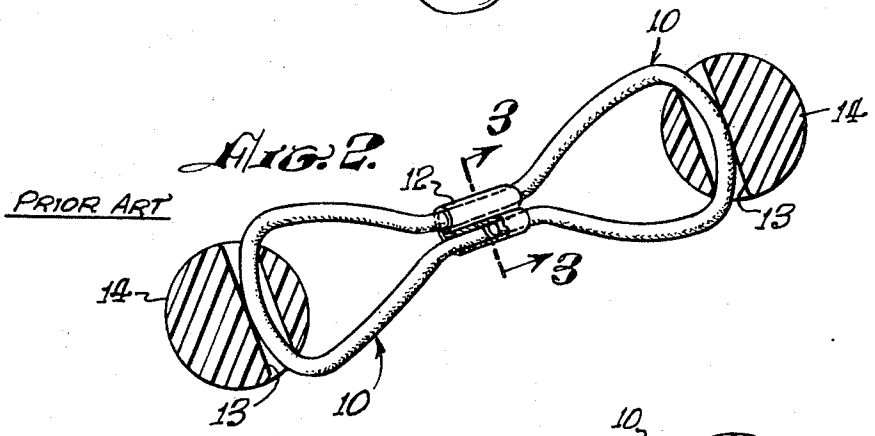


FIG. 4.

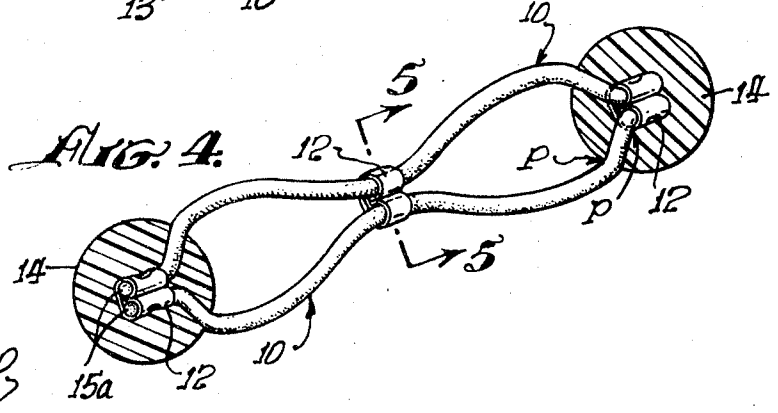


FIG. 5.

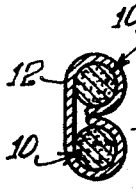


FIG. 6.

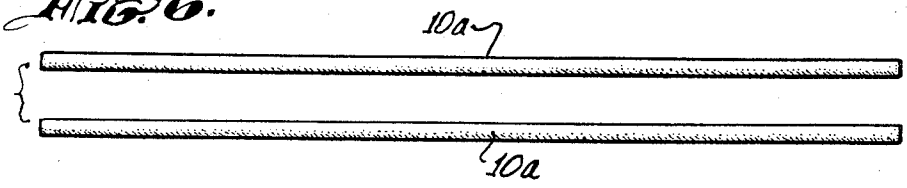


FIG. 7.

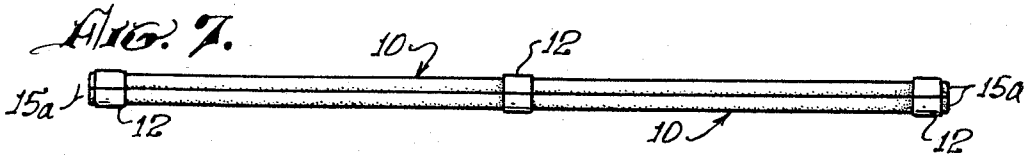


FIG. 8.

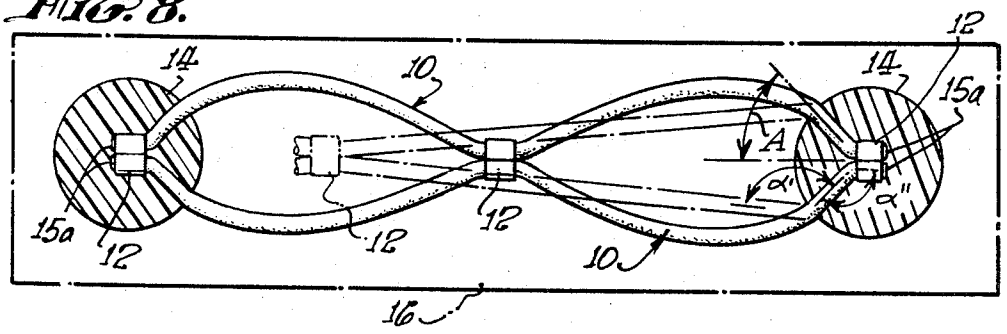


FIG. 9.

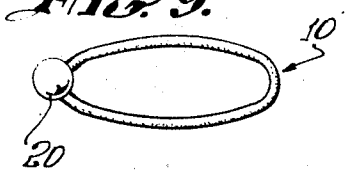


FIG. 10.

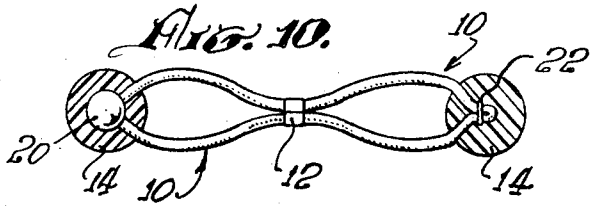


FIG. 12.

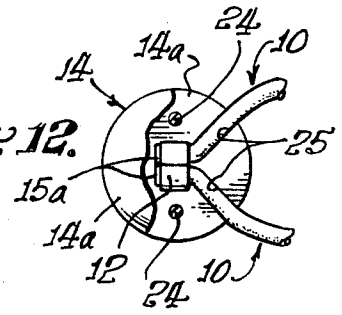
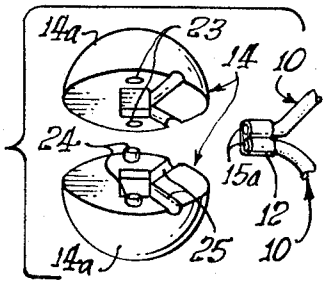


FIG. 11.



FASTENING DEVICES

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to fastening devices, and more particularly to double-loop fastening devices, useful for example as hair holding devices.

2. Description of the Prior Art

Prior art fastening devices of the class under discussion are generally formed by taking a single length of resilient material; stringing two stops in the form of enlargements slidably on the resilient material; and forming the material into a generally figure eight configuration with the two free ends meeting at the center of the figure eight and with the enlargements retained at opposite sides of the center. A clamp is then firmly placed at the center to clamp the two loose ends of material to one another and to hold the material in the double loop form. Such an arrangement is shown in FIGS. 2 and 3 of the drawings.

The structure described in the preceding paragraph is subject to several disadvantages. In the first place, the structure does not lend itself to any mass production technique since laborious hand operations are required to manually string the enlargements and form each device into the required shape for clamping. Secondly, the only mechanical connection, i.e., the clamp, which holds the two free ends of the material together is in a position such that the possibility of the loose ends pulling out when the device is stretched are maximum. This is true because if the enlargements at the ends are pulled longitudinally outwardly the force vectors along the resilient material are almost directly longitudinal of the clamp. Moreover, this tendency to pull apart is accentuated by the fact that resilient materials used in such devices tend to neck down, i.e., to become thinner as they are stretched, the net effect being that the free ends of the double loop are quite easily pulled out of the clamp to destroy the device. The inventor herein has tested such devices and found that they fail upon the application of forces of as little as 12–15 pounds, which are forces which can easily be exceeded in normal use.

Another disadvantage of such prior art devices is that the enlargements are necessarily loosely strung. The result is that they are seldom in a position for immediate use and the user must pull them to the outer ends of their respective loops before applying the device.

OBJECTS AND SUMMARY OF THE INVENTION

It is a primary object of the present invention to provide new and improved fastening devices of the type comprising two centrally connected resilient loops and in which each loop has an enlargement at its outer end.

Another object of the present invention is to provide improved fastening devices of the class described particularly adapted for use as a hair holding device.

A further object of the present invention is to provide fastening devices of the class described which are of improved strength and which may be manufactured by mass production techniques.

Yet another object of the present invention is to provide fastening devices of the class described wherein the end enlargements are fixedly attached to the resilient material which forms the loops thereof.

These and other objects of the invention are achieved by providing double loop resilient fastening devices in

which the end enlargements are fixedly attached at the outer ends of the two loops, to overcome the objectionable prior art practice, in which the enlargements are loosely strung and must be properly positioned and held by the user in normal operation of the device. Moreover, in devices according to the present invention, all loose ends of the resilient material are retained in fixed position within the end enlargements in such a manner as to extend from the enlargements at substantial angles from the longitudinal axis, as distinguished from the prior art practice of clamping the loose ends between the two loops, and the novel arrangement markedly improves the strength of the devices and resistance to breakage under normal use, in a manner to be more fully explained hereinafter.

The invention will best be understood from the following description, taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view illustrating the use of a device of the class described as a hair fastening device.

FIG. 2 is a perspective view, partially in section, of a prior art fastener of the class described.

FIG. 3 is a sectional view, taken along the line 3—3 of FIG. 2.

FIG. 4 is a perspective view, partially in section, of a preferred embodiment of the present invention.

FIG. 5 is a sectional view, taken along the line 5—5 of FIG. 4.

FIGS. 6, 7, and 8, are elevations (FIG. 8 being partially in section) illustrating a manner of making the device shown in FIGS. 4 and 5. FIG. 8 includes a dotted line showing of a part of the device in its stretched conditions.

FIG. 9 is an elevational view, partially in section, of an elastic type band of known type which may be used in the formation of yet another preferred embodiment, according to the present invention.

FIG. 10 is an elevational view, partially in section of another embodiment of the present invention which may constructed using the hair holding device of FIG. 9 as the starting material.

FIG. 11 is an exploded view of one end of a fastening device according to the present invention, illustrating still another embodiment, in disassembled form.

FIG. 12 is an elevation, partially in section, of the end of the fastening device shown in FIG. 11, after assembly.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The teachings of the present invention may best be explained by first describing the general nature of fastening devices of the type here involved, and the prior art structure of such devices. FIG. 1 illustrates a fastening device of the class here under discussion, used as a hair fastening device. Such devices comprise two loops 10 of elastic or resilient material, separated from one another by a clamp 12 and having enlargements or stops 14 at the outer ends. As shown in FIG. 1, the device is used by stretching it over a tress of hair and slipping one of the enlargements or stops under the other.

FIGS. 2 and 3 illustrate structures utilized, prior to the present invention, for devices of the general type illustrated in FIG. 1. Characteristically, the two loops 10 of such devices are formed of a single length of resil-

ient material formed into a substantially figure-eight shape (to form the two loops) with the ends of the elastic material clamped together at the center of the device, as shown. The enlargements or stops **14** necessarily have to be loosely strung upon the resilient material prior to applying the clamp **12**, as is clearly evident in FIG. **2**.

As previously explained, such structures require slow manual operations in being manufactured and are less than ideal in operating characteristics. Thus, the enlargements or stops **14** are loosely strung, as at **13**, and must be positioned and held in position by a user. Secondly, the loose ends **15** of the resilient material are clamped centrally, as shown in FIGS. **2** and **3**, thus placing the mechanical connection in the position which affords the greatest possibility that the ends will be pulled apart in normal use. Thus, as the device is stretched from the rest position of FIG. **2** the material of loops **10**, already at a small angle to the clamp **12**, becomes even more longitudinally aligned with the clamp **12** so that the forces tending to pull the material free from the clamp **12** can be resisted substantially only by radially inwardly directed forces exerted by the clamp **12**. Since the material has a tendency to neck down when stretched the holding force decreases as the device is stretched and it is quite easily pulled apart.

FIGS. **4** to **12** illustrate the means provided by the present invention for overcoming the aforementioned disadvantages of the prior art, including several embodiments and several schemes for assembly of devices according to the present invention. It is characteristic of the present invention that devices of the type under discussion are provided, wherein the enlargements or stops **14** are in fixed position on the loops **10** and wherein any loose end is fastened within an enlargement at an end of the device. A further improvement is provided by spreading the material of the loops within the fixed enlargements so that forces exerted in stretching the device are mechanically resisted by the material of the enlargements to effectively resist necking down of the resilient material of the loops **10** within the clamps **12**.

Reference is made particularly to FIGS. **4** and **5**, illustrating one preferred embodiment of the present invention. The device comprises two loops **10** formed by clamping two lengths of material at the ends and in the center, as by clamps **12** and in which the clamps at the ends are embedded in plastic enlargements or stops **14**. Comparison of the device of FIGS. **4** and **5** with that of FIG. **2** and **3** makes it apparent that both structures may be used in the same manner. However, the device of FIGS. **4** and **5** differs (1) in that the enlargements **14** are fixed in position; (2) in that the resilient material of which the loops **10** are made passes through the central clamp **12** in unbroken lengths, as shown in FIG. **5** thus replacing the weak point of prior art devices (as shown in FIG. **3**); and (3) all loose ends are in clamps embedded in the enlargements **14** in an arrangement wherein the strands of material emerging from each enlargement are held at substantial angles to the clamp within the enlargement and emerge from the enlargement at substantial angles to the longitudinal axis of the device. The last mentioned novel feature is separately advantageous in that, as the device is stretched in normal use, the force directions are such that there is substantial mechanical resistance additional to the holding power of the clamp and the material of the enlargement to resist the tendency of the resilient material to pull out of the clamps **12**. Thus, with stretching, as shown in dotted lines in FIG. **8**, each emerging length of the material of the loop is mechanically pinched, both at the point of exit from the enlargement **14** and at the point of exit from the clamp **12** tending to resist necking down and pulling out of the resilient material within the enlargement. Otherwise expressed, stretching forces along the material break down at the points P into vectors, one of which continues along the material, tending to stretch it and neck it down and the other, at an angle thereto which is mechanically dissipated, first by the material of the enlargement and then by the material of the clamp. The result is to substantially increase the force necessary to pull the device apart, as compared with prior art devices, wherein practically all of the stretching forces are much more nearly disposed longitudinally of the clamp. This feature is also illustrated in FIG. **8** wherein the dotted dines applied to the right half of the figure indicate the disposition of the resilient loop material relative to the enlargement in the stretched condition of the device, the angle A representing the angular disposition of the material to longitudinal axis of the clamps **12** and the angles α'' and α' representing angular relationships of contiguous lengths of the resilient material to itself as it emerges from the clamp **12** to the material of enlargement **14** and as it emerges from the enlargement **14** respectively. These angular relationships lessen the danger of necking down and of the material and separation from the clamp in the manner previously described. It should be understood that structures according to FIGS. **4** and **5** may be made by any desired method. However, one of the advantages of the present invention is that its structures lend themselves to mass production techniques. For this reason and for the reason that such a discussion may be helpful in general understanding of the other advantages of the invention, it is considered desirable to describe some methods for manufacturing devices according to the present invention. In this respect, reference is now made to FIGS. **6** to **8**, illustrating one method of making the embodiment which is depicted in FIGS. **4** and **5**. Thus, two lengths of resilient material **10*a***, may be laid side by side and clamped together at a desired spacing, as with clamps **12**, as shown in FIG. **7**. The distance between clamps is chosen so as to form loops **10** of a desired length. It should also be understood that the lengths of clamps **12** may be varied to suit a desired appearance or to fit a desired manufacturing technique, or both. Obviously, the structure formed in FIG. **7** may be made by hand, with clamps **12** of any desired length, but the intermediate structure lends itself to a variety of schemes of mechanization. Thus, two continuous lengths of resilient material may be fed side by side into a machine provided with means to automatically apply clamps **12** at spaced intervals and to cut the thus joined strands as desired. In one method of manufacture such a machine is programmed to alternately clamp a single clamp and then two clamps quite close to one another along the length of the side by side continuous strands of material. The continuous lengths of strands are then cut between each pair of the closely adjacent clamps, to form a structure such as shown in FIG. **7**. In another mechanization scheme, individual but longer clamps **12** are mechanically positioned and the resulting structure is cut in the middle of alternate clamps to provide structures

such as shown in FIG. 7 but wherein the center clamp is twice as long as the end clamps. Other arrangements are obviously possible, within the scope of the present teaching and in each case an intermediate structure is formed wherein the loose ends are in the clamps at the ends of the structure as at **15***a* and the two strands of material passing through the centrally positioned clamp are unbroken.

Structure as described in the preceding paragraph may then be formed into a finished device by fixedly attaching enlargements or stops at the ends thereof, and one example of a method for accomplishment of such final assembly is to encase the outer clamps **12** of a structure as shown in FIG. 7 in plastic material. This may be accomplished, as shown in FIG. **8**, by positioning the FIG. 7 intermediate structure in a mold plate **16** arranged with means to position the structure as shown so that enlargements **14** may be molded to the end clamps **12**. It is desirable to spread the resilient material to substantial angles from the longitudinal axis of the device in the mold cavities, as indicated by the angle A in FIG. **8** and guide or holding means, not shown, may be provided in the mold cavities **16**, for this purpose. Devices resulting from the previously described procedures are best shown in FIG. **4**.

An alternate structure and procedure which provides another preferred embodiment is shown in FIG. **10**. Such devices may be formed using loop devices of a type described in U. S. Pat. No. 3,431,632 which are sometimes used as hair holding devices, as the intermediate or starting structures. Such devices, shown in FIG. **9**, comprise a single loop of resilient material **10** the loose ends of which are fastened together by a connecting device such as a nail-head connector **20**. The opposite bight end of the ponytail holder is then tied or stapled as at **22** to form the bight into a compact end and a clamp **12** is applied at the center of the device to hold the two strands of material together at that point whereby to form two loops. The resulting "intermediate" structure is thus formed into two side lengths of resilient material in which the outer ends are connected and in which a centrally positioned clamp forms the two loops. The structure is such that the only free or "loose" ends of resilient material are within the nail-head connector **20**. The intermediate structure thus formed is then provided with fixedly attached enlargements in the manner previously described, with the tied and/or connected ends **22** and **20** respectively, embedded in the material of the enlargements **14** and with the resilient material arranged to protrude from said enlargements at substantial angles to the longitudinal axis of the device.

The enlargements **14** may be formed in any desirable manner and it is considered to be within the scope of this invention to form such enlargements by means other than the molding procedure previously described. It is necessary only that the resilient material be continuous at the center clamp and that the connections or ties at the outer ends of the two loops be tightly mechanically held within the enlargements. Further advantage of the present invention is realized if the resilient material **10** is constrained to emerge from the enlargements at substantial angles to the longitudinal axis of the device. FIGS. **11** and **12** illustrate one such alternate structure. Thus, enlargements **14** may be formed of two half-portions **14***a*, provided with complementary sockets and studs **23** and **24** respectively, adapted to be snapped together and frictionally held together. The half-portions may be provided with channels and depressions, as at **25**, of appropriate disposition, shape and size to accommodate and tightly hold the connections at the loop ends and to accommodate and to tightly hold the material **10** at substantial angles to the longitudinal axis of the device.

From the foregoing it may be seen that the present invention provides new and improved fastening devices of the type comprising two centrally connected resilient loops and in which each loop has an enlargement at its outer end, the improved devices being capable of manufacture by mass production techniques and being characterized by greater strength and ease of application than prior art devices.

Obviously, many variations and modifications of procedures, constructional details, materials and relative dimensions are possible within the spirit of the present invention as described hereinabove. It is to be understood that the specific examples shown and described herein are intended to be by way of illustration only and that the invention is not to be considered to be limited thereby but rather only by the scope of the appended claims.

What is claimed is:

1. A fastening device comprising two centrally connected loops, each of said loops having an enlargement at its longitudinal outer end, said loops comprising resilient material, two continuous lengths of said material being in side by side relationship, clamp means holding said lengths together substantially midway of their length whereby the material of both lengths is continuous and unbroken as it passes through said clamp means, said continuous lengths of material being fastened together at each of the longitudinal outer ends thereof, each of said fastened together ends being fixedly engaged within one of said enlargements, each of said enlargements being of solid construction, whereby the entirety of the length of resilient material within said enlargement is tightly engaged by the said enlargement and relative movement of said material relative to said enlargement is inhibited.

2. A fastening device according to claim **1**, wherein the two lengths are two separate discrete pieces of resilient material, having second and third clamp means holding the free outer ends thereof together at the longitudinal outer ends of the device.

3. A fastening device according to claim **2** wherein said two enlargements are solid molded pieces in which said second and third clamp means are respectively embedded and fixedly engaged.

4. A fastening device according to claim **2** wherein each of said enlargements comprises a plurality of complimentary portions including means whereby said portions may be fixedly attached to one another to fixedly engage the clamped outer ends of resilient material and to form the enlargement.

5. A fastening device according to claim **4** wherein the plurality of portions forming each of said enlargements are provided with complementary grooves, each of said grooves being of a size to tightly accommodate a single run of said resilient material, said grooves diverging from one another as they extend radially outwardly from the interior of the enlargement to the exterior thereof.

6. A fastening device according to claim **3**, wherein each of said fastened outer ends is fixedly engaged in

one of said enlargements whereby two runs of material enter into each of said enlargements, said two runs of material being spread apart from one another at the points of entry into each of said enlargements, whereby the said material is held within the enlargement at substantial angles to the longitudinal axis of the fastening device.

7. A fastening device according to claim 1 wherein the two lengths of material are comprised of a single piece of said material, the free ends of which are connected together by a mechanical fastening device to form a ringlet of said material, said clamp means holding the material of said ringlet together substantially midway of its length to form said two loops.

8. A fastening device according to claim 7 wherein the continuous length of material of said ringlet opposite to said mechanical fastening device is provided with means to tightly pinch the material together adjacent the edge thereof whereby said pinched end, the free ends held together by said mechanical fastening device, and said clamp means define said two centrally connected loops.

9. A fastening device according to claim 8 wherein said pinched end and said mechanical fastening device are fixedly engaged within said enlargements.

10. A fastening device according to claim 8, wherein said enlargements are solid molded pieces in which said pinched end and said mechanical fastening device are respectively embedded and fixedly engaged.

11. A fastening device comprising two centrally connected loops of resilient material, each of said loops having a solid enlargement at its longitudinal outer end, each of said enlargements being fixedly attached around said material whereby two runs of said material enter into each of said enlargements, the two runs of material within each of said enlargements being fastened together at the outer ends of the material within the enlargement, said two runs of material being spread apart from one another at the points of entry into each of the enlargements whereby the said material is held within each of the enlargements at substantial angles to the longitudinal axis of the fastening device.

* * * * *