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R. A. SMITH

2,361,506

ADJUSTABLE STRAP

Filed Nov. 28, 1941

Fig. 1.

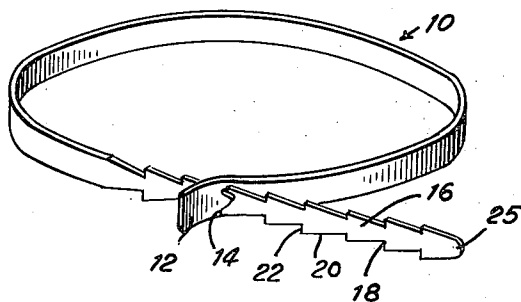


Fig. 2.

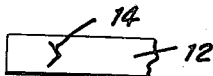


Fig. 3.

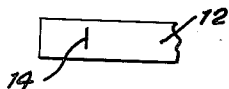


Fig. 4.

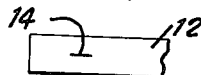


Fig. 7.



Fig. 8.



Fig. 5.

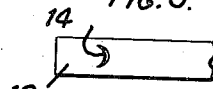


Fig. 6.

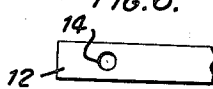


Fig. 9.

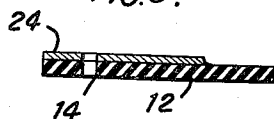


Fig. 11.

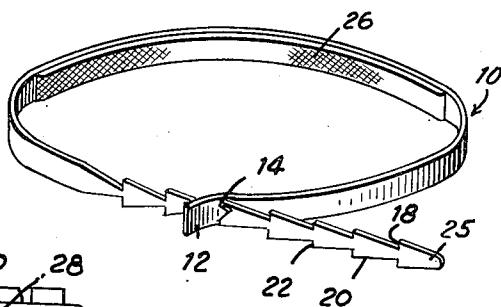


Fig. 12.

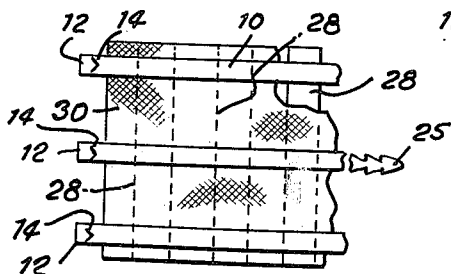
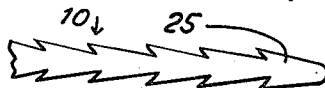


Fig. 10.



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UNITED STATES PATENT OFFICE

2,361,506

ADJUSTABLE STRAP

Robert A. Smith, Mahwah, N. J.; Mary Gray Smith, Margaret Smith Pryde, and Mary Smith van Brederode, executrices of said Robert A. Smith, deceased, assignor to Lewis W. Chubb, Jr., Sharon, Mass., as trustee

Application November 28, 1941, Serial No. 420,807

5 Claims. (Cl. 128—156)

This invention relates to holding means and more specifically to a retaining strap.

In general, the invention provides a device which will efficiently accomplish the results for which it is intended, which is simple and economical of construction, which can expeditiously, conveniently and safely be manipulated, and which can be readily manufactured and assembled.

The invention provides an adjustable elastic band or strap; provides such a strap which automatically adjusts itself within limits to the size of the article to be retained and provides such a strap in which those limits may be varied at the will of the user. Such a strap made, particularly in the central portion, of relatively limp material may have the ends so treated that they are available for a somewhat tightly holding interlocking, thus providing a strap which is without any additional elements. It is so shaped that it can retain objects tightly, and provides such a strap which retains at different times objects of different sizes.

The invention may also provide a bandage or splint which is held on with a predetermined grip.

The invention accordingly comprises an article of manufacture possessing the features, properties, and the relation of elements which will be exemplified in the article hereinafter described and the scope of the application of which will be indicated in the claims.

Retaining straps have been known heretofore, such as book straps, which have had special locking means attached to their ends. Sometimes these means have taken the form of buckles. The straps have frequently required the use of two hands either to adjust the buckles or to tie restraining knots in the strap even after the ends of the strap have been brought next to each other. The present invention contemplates a strap which can be tightened into final position by a tug of one end through the other. Furthermore, certain straps have been elastic, e. g., elastic rubber bands, but these ordinarily have had no adjustability other than that arising from their elasticity. The usefulness of any one was strictly limited to certain sized articles. Sometimes the strap would be so taut as to harm the article held and to endanger the band or strap itself; sometimes the strap would be too loose for safety; or perhaps too tight or too loose, making an inconvenient nuisance. The strap described herein, however, when elastic, retains the advantages of the elasticity of the

material of the strap with adjustability whereby the strap may be adjusted to a length substantially equal to a perimeter of an article to be held and then the elasticity of the strap is ready to give the final snug grip which is neither too tight nor too loose. As a result neither the gripped article nor the strap is harmed by a use of the strap and at the same time the article is held firmly and satisfactorily.

The strap which presents these novel advantages has the further surprising advantage that it is hardly more than a simple strip of material. The new coactions between the parts arise from the shape of the material of the strap itself, nor is that shape complicated or difficult to attain since it consists of a series of notches and a slot. Under some conditions, more than one slot may be advantageous. Any ordinary material may be used. It may be elastic and quite flexible. In those cases where it is so limp that the notches might fail to function other than as a smooth edge, the material may be stiffened or made more rigid or less elastic in the region of the notches and/or the slot.

For a fuller understanding of the nature and objects of the invention reference should be had to the following detailed description taken in connection with the accompanying drawing, in which:

Fig. 1 is a perspective view of a device embodying one form of the invention;

Fig. 2 is a view of one end of the device shown in Fig. 1;

Figs. 3-6 are views of modifications of the end shown in Fig. 2;

Fig. 7 is an enlarged cross section of the other end of the device shown in Fig. 1; and taken at one of the notches therein;

Fig. 8 is an enlarged cross section of a modified form of the end shown in Fig. 7;

Fig. 9 is a view in longitudinal cross section of a modified form of an end of the device shown in Fig. 1;

Fig. 10 is a view of a modified form of the other end of the device shown in Fig. 1;

Fig. 11 is a perspective view of a device like that shown in Fig. 1 and carrying an attached article; and

Fig. 12 is a view of a plurality of devices like that shown in Fig. 1 and carrying together an attached article.

In the drawing 10 denotes a strap or similar article which is made of any material having at least some flexibility. Preferably it is composed of an elastic material such as rubber. One end

12 of the strap is provided with the slot or perforation 14 through which the other end of the strap is passed. The said other end 16 of the strap has certain conformations adapted lockingly to engage the two ends of the strap together. These conformations may take the form of notches 18 along the edge of the strap. Between the notches the edges of the strap may have tapering edges 20, that portion of each edge 20 which is farthest from the tip 25 of end 16 being most displaced from the longitudinal axis of the strap. A part of each notch forms an abutment 22. The abutments, which may be perpendicular to the longitudinal axis or which may be at an angle therewith (see Fig. 10), are adapted to prevent that portion of the end 16 projecting through the slot 14 from being pulled through the slot 14 except when manually forced to do so by someone desirous of loosening the strap or by stresses beyond the intended use of the strap.

The slot 14 may preferably be V-shaped with the point of the V pointing perpendicularly away from the adjacent tip of the adjacent end. The slot may take other shapes. For specific purposes they may be parallel or perpendicular to the edges of the strap or crescent-shaped or circular (see Figs. 3-6, respectively).

The material of the central portion of the strap may be so thin or limp that there is danger, if the ends were only so, that the end 16 of the strap might undesirably pull out of the slot through which it is fastened. Under such circumstances one or both ends of the strap, including, if desired, all the slotted and notched portions, may be stiffened so that they are not as limp or flexible or elastic as the rest of the strap. This may be accomplished in any convenient fashion. For example, the ends may be variously treated, by chemical action, or by vulcanization or by making them of a rubber mixture which differs from the rubber of the central portion. The ends may be coated with a coating of material which hardens thereon. A layer 24 of cellulosic or other stiffening fabric may be attached mechanically or adhesively to the rubber or other material of the strap along the end portions thereof (see Fig. 9). The term "fabric" as used in the present specification and claims is intended to include cellulosic or other materials which are knitted, netted and woven as well as those in sheet form. The area strengthened may include those portions of the ends 12 and 16 which have the perforations and notches.

The strap may have any suitable cross section. The form shown in Fig. 1 has a rectangular cross section. A circular cross section is shown in Fig. 8.

This invention is particularly desirable cooperatively with a bandage or splint, as shown in Fig. 11 and Fig. 12. When one end is drawn through the other the strap and bandage or splint, etc., is secured in place, the elasticity of the material giving a snug fit but one which is not harmful because sufficient give is provided by the elasticity itself. A medication and/or dressing 26, and/or splint, may be attached to the band so that the user merely places the strap and dressing together around the part of the body to be protected (e. g., a finger, leg, trunk, etc.) and draws the end 16 through the slot to the desired tightness.

The operation of the above described strap is most simple. The strap is placed around an object and end 16 is brought through slot 14. A

pull then causes the taper surfaces 20 successively to pass through the slot 14 until the strap is firmly in position with one or a pair of abutments 22 seating against the end 12 at the slot 14. The elasticity of the material causes the strap to bind around the object without cutting into it. There is obtainable in this fashion a firm but harmless grip for articles in a continuous succession of sizes.

In certain instances it may be desirable to employ a plurality of straps. There is an advantage in doing so when a large article or a plurality of articles is to be gripped together or is to be carried so that it may be positioned against or around some other object. In Fig. 12 is shown a plurality of splints 28 assembled with a bandage or gauze 30. Either the splints or the gauze or both are attached to a plurality of straps 10. The combination may be used as desired. It may be wrapped, for example, around an arm and then each strap pulled up as tight as is necessary. The straps in the region beyond the gauze or the straps and the gauze together and/or the straps individually yield sufficiently with respect to the specific contours, etc., present that no harm is done by drawing them up tightly. On the other hand, they are firm enough to provide whatever unyielding strength is necessary under the circumstances.

Since certain changes may be made in the above article and different embodiments of the invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

What I claim as new and desire to secure by Letters Patent is:

1. A restraining strap consisting of a strip of material extensibly resilient over its entire length, the ends of said strap being adapted to releasably interlock, one end portion being provided with a closed slot, the other end portion being provided with a plurality of notches in each edge of said strap, the notches in one strap edge being positioned substantially opposite the notches in the other strap edge, said notches being so shaped as to resist removal of the notched strap end from said slot, the interlocking portions of said strap being less resilient than the intermediate portions thereof, said slot being V-shaped with the point of the V directed toward the notched end of said strap, to provide a laterally extending wedge bearing against the notched portion of said strap when the strap ends are interlocked.

2. A restraining strap consisting of a strip of material extensibly resilient over its entire length, the ends of said strap being adapted to releasably interlock, one end portion being provided with a closed slot, the other end portion being provided with a plurality of notches in each edge of said strap, the notches in one strap edge being positioned substantially opposite the notches in the other strap edge, said notches being so shaped as to resist removal of the notched strap end from said slot, said slot being V-shaped with the point of the V directed toward the notched end of said strap, to provide a laterally extending wedge bearing against the notched portion

of said strap when the strap ends are interlocked.

3. A restraining strap consisting of a strip of resilient rubber, the ends of said strap being adapted to releasably interlock, one end portion being provided with a closed slot, the other end portion being provided with a plurality of notches in each edge of said strap, the notches in one strap edge being positioned substantially opposite the notches in the other strap edge, said notches being so shaped as to resist removal of the notched strap end from said slot, said slot being V-shaped with the point of the V directed toward the notched end of said strap, to provide a laterally extending wedge bearing against the notched portion of said strap when the strap ends are interlocked.

4. In combination, a restraining strap formed of a strip of material extensibly resilient over its entire length, the ends of said strap being adapted to releasably interlock, one end portion being provided with a closed slot, the other end portion being provided with a plurality of notches in each edge of said strap, the notches in one strap edge being positioned substantially opposite the notches in the other strap edge, said notches be-

ing so shaped as to resist removal of the notched strap end from said slot, and a bandage or like article affixed to the inner face of the intermediate portion of said strap, whereby the bandage may be applied with the proper initial strap tension by interlocking the ends of said strap, the ends being adapted to slip to a looser engaging position as the result of a predetermined increase in tension on said bandage.

5. In combination, a bandage or like article and a plurality of spaced restraining straps affixed to the outer face thereof, each said strap being formed of a strip of material extensibly resilient over its entire length and having its ends adapted to releasably interlock, one end of each strap being provided with a closed slot, the other end being provided with a plurality of pairs of notches whereby it may be releasably held in a plurality of predetermined positions when inserted in said slot, each said strap being independently adjustable in restraining position whereby the tension on different predetermined portions of said bandage may be independently controlled.

ROBERT A. SMITH.