April 5, 1927. 1,623,125

H. LEVINE

ANATOMICAL RESTRAINING APPLIANCE

Filed May 18, 1923

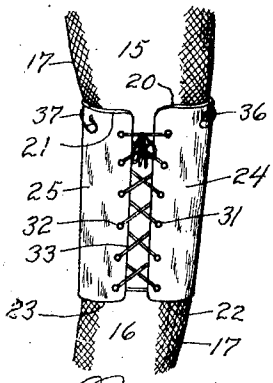


Fig. 1.

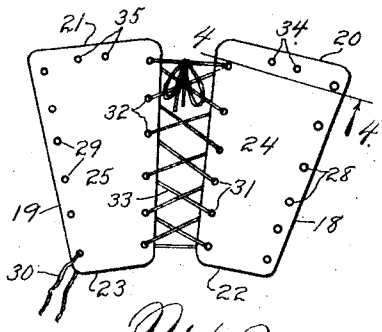


Fig. 2.

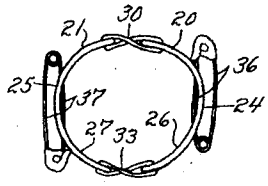


Fig. 3.

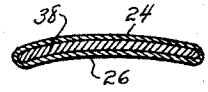


Fig. 4.

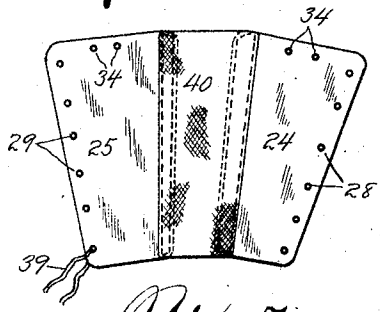


Fig. 5.

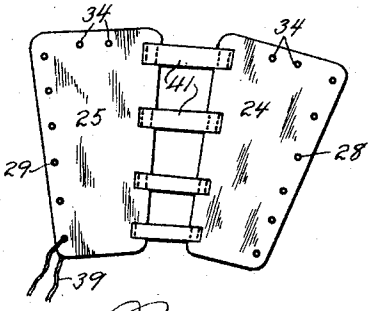


Fig. 6.

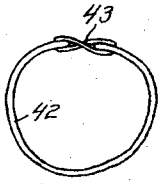


Fig. 7.

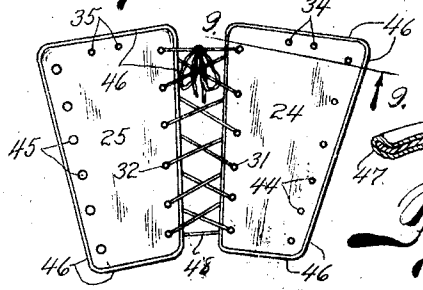


Fig. 8.

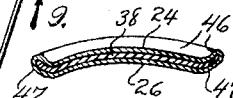


Fig. 9.

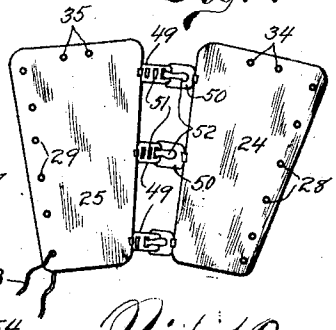


Fig. 10.

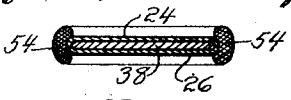


Fig. 11.

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by Wickersham & Ginsta
his Attorneys

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UNITED STATES PATENT OFFICE.

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ANATOMICAL RESTRAINING APPLIANCE.

Application filed May 18, 1923. Serial No. 639,845.

This invention relates to improvements in anatomical restraining appliances, and although it has been more especially devised to provide for a sectionally spaced and adjustably fitted elbow restraining shield, for holding the arm against undue bending at the elbow while otherwise permitting of freedom of movement of the arm, still the improved device may be used for encompassing other portions of an arm or leg of the wearer, under a more or less comfortable restraining pressure, for holding in check, reducing, or the relief of painful other swellings or conditions.

It has heretofore been proposed to employ elbow restraining means to prevent infants from reaching their face or mouth with their fingers, for obvious reasons, while allowing for a certain freedom in the swing of the arms otherwise than full articulation at the elbows, and analogous devices no doubt have also been used to prevent patients, under some circumstances and regardless of whether they be children or adults, from reaching infected or otherwise affected portions of the body.

Unlike surgical splint or fracture holding casings, however, which of necessity must be so inflexibly rigid as to hold the limb as if it were in a cast, these elbow restraining shields should be of somewhat stiffened pliancy or semi-rigid flexure, especially for the sake of greater comfort, while being maintained substantially rigid longitudinally.

The primary object of my invention, therefore, has been to improve upon former devices of this character, both in point of physical structure and functioning, by the provision of a more efficient, durable, sanitary and comfortably adjustable sectional device, which is not only novel and simple in construction and application but which is also comparatively inexpensive to manufacture and market.

The foregoing as well as other objects and advantages, and the particular manner of accomplishing the same, will be clearly apparent as incidental to the following disclosure, and with these general outlining remarks, therefore, reference will now be immediately had to the accompanying drawings, illustrating certain practical embodiments of the improvements, in which drawings:—

Figure 1 is a view illustrating in side elevation one form of the device as applied in use;

Figure 2 is an elevational view of the device of Fig. 1 as detached, and looking towards the back thereof as unfolded in flatwise position;

Figure 3 is a top plan view of the device as shown at Fig. 1, but with the arm of the wearer omitted;

Figure 4 is a cross-sectional view, taken along the plane of the line 4—4 of Figure 2;

Figures 5 and 6 are elevational views analogous to Figure 2, but showing two slightly different modified forms;

Figure 7 is a top plan view analogous to Figure 3, but showing a slightly modified form in which the paired support members as shown in the other views are now in the nature of an integrally continuous element;

Figure 8 is an elevational view analogous to Figures 2, 5 and 6, but showing a still further slightly modified form;

Figure 9 is a cross-sectional view on the line 9—9 of Figure 8;

Figure 10 is an elevational view analogous to Figures 2, 5, 6 and 8, but showing another modified form; and

Figure 11 is a cross-sectional view analogous to Figure 9, but being a slight modification thereover.

At Figure 1 the view is looking towards the inside of the right arm, although naturally it is the same as looking towards the outside of the left arm, the numeral 15 indicating the upper arm section and 16 the forearm of a person, while 17 designates the sleeve of any clothing worn under the elbow brace, although obviously the device may be applied directly to the arm without the interposition of a garment sleeve or attachment thereto.

Referring first to Figures 1 to 4, the novel article embodies a complementary pair of coacting shields or supporting members, adapted for snug-fitting application to opposite surfaces of the limb of the user for substantially encompassing the same, say the arm at the elbow, but each of said members being of less width than one-half of the circumference of the limb, so that when applied they will be appropriately spaced in longitudinal edgewise relation, to premit of transversely arcuate and circumferential adjustment.

The longitudinal edge portions of these members, at one side, are indicated at 18 and 19, respectively, the members being of

tapering form longitudinally, or convergent along their longitudinal edge faces from their upper to their lower ends, and in the making thereof they are preferably formed of slight transverse curvature, for the purpose of not only being shaped at the outset, as appropriately stiffened members, for facile adaptation to the tapering curvature of the human limb, but also to maintain stiffened rigidity longitudinally thereof, in a self-trussing manner as it were, owing to the longitudinally tapering and transversely arcuate shaping of the members.

The wider or upper edge portions of these longitudinally tapering and transversely arcuate shield members are indicated at 20—21 and the narrower or lower edge portions 22—23, respectively, while the outer or convex surfaces thereof are designated at 24—25 and the inner of concave surfaces by the numerals 26 and 27, respectively.

Along the side edge faces 18 and 19 are disposed the longitudinal series of complementary apertures or eyelets 28 and 29, for the reception of a lacing cord 30, and likewise along the opposite side edge faces are disposed the apertures or eyelets 31 and 32, for the reception of a lacing cord 33, the lacing cord 33 in this instance functioning as a flexible hinging connection between the members, and the lacing cord 30 as the final adjusting or tautening connection, although of course the reverse would be true if the final lacing were to be done from the inside instead of from the outside of the arm.

34 and 35 respectively designate paired apertures or eyelets at the top edge faces of the supporting members for the reception of safety pins, or their equivalents, to hold the device more securely in place against longitudinal displacement by fastening the pins 36—37 through the sleeve 17 of a garment, if one be worn underneath, although obviously this is not strictly essential and might be otherwise provided for anyhow.

The supporting members may be formed from any suitable material, non-metallic or metallic, having fairly stiff, semi-pliable, slightly springy, flexile, or even non-springy flexible properties. In the latter event they might be of any suitable texture, and it is obvious that, if desired, they might be made of moisture-proof material throughout, such as with leather, composition, stiff rubber, etc., or they might be covered with a moisture-proof material or substance.

A satisfactory and perhaps a less costly structure, however, is illustrated by the cross-sectional view at Figure 4, and in essence at Figures 9 and 11, wherein the surface facings 24 and 26 form a casing, of suitable moisture-proof material, encompassing an inner member or base 38 of pasteboard or any other suitable material, or the inner facing 26 could be a separate layer of moisture-proof material, or the inner facing 26, and for that matter the outer facing 24 also, could be in the nature of a substantial coating of paint, enamel, shellac, varnish or analogous coating; but obviously all of these features are full equivalents of each other and require no further illustration or more specific description.

The modified forms of Figures 5 and 6 only differ from each other, and from the structures formerly described, in that a single longitudinal strip 40 of flexible material, in the one instance, and a plurality of transverse strips 41, in the other instance, either of which may be slightly elastic or wholly inelastic, are stitched or otherwise attached to the supporting members and function as the flexible hinge therebetween, in lieu of either of the lacings 30 or 33, the final adjusting or tightening up lacing cord being designated at 39. It will also be noted that the upper portion of the flexible hinge strip 40 is slightly wider than its lower portion, and likewise that the upper hinge strap 41 is slightly longer than the lower one, or at any event that the edge face portions of the supporting members connected thereby are disposed in downwardly convergent directions.

In the modified form of Figure 7, the paired supporting members of all of the other forms are substituted for by an integrally continuous individual member of transversely curving flexibility, continuous in the sense that it is not formed of separate members, but of course it has spaced longitudinal edges, and in flatwise position it would be of proper tapering form, so that when bent circularly it will substantially conform to the shape of the human arm. This single member is indicated by the numeral 42 and the tightening up lacing cord therefore is designated at 43.

In the modified form of Figure 8, the lacing cord 48 is illustrated as the hinging lacing connection between the supporting members, but it also serves as the final adjusting or tightening up lacing cord, the other lacing cord being omitted. It is to be understood that this comparison is made particularly with reference to Figures 1 to 4, because in comparison with Figures 5 and 6, respectively, the lacing cord 48 initially functions equivalently to the flexible hinging connections 40 and 41 and subsequently as the final adjusting cord.

In this Figure 8, therefore, the longitudinal series of apertures 28 and 29 with their associated lacing cord are dispensed with, and in lieu thereof there are employed a longitudinal series of stud heads 44 cooperating with complementary clasping sockets formed on the underneath faces of button elements 45, after the fashion of glove fastening means.

At Figures 8 and 9 the edges of the supporting members are shown slightly flared outwardly, as at 46—47, which will guard against any tendency of the edges to bite into or pinch the tender flesh of the user, and of course this feature may be adopted also in all of the other structures if desired.

In the modified form of Figure 10 complementary adjustable clasping elements 49 and 50 are shown as attached to adjacent longitudinal edge portions of the supporting members, the upper sets thereof being longer than the lower ones for the same reason set forth relatively to the flexible hinge connections 40 and 41, respectively, of Figures 5 and 6. The adjustment of these clasping elements is provided for by a series of apertures 51 through one set thereof cooperating with hinged tongues 52 of the other set, as will be well understood. In this construction the clasping elements may be employed as the initial hinging connections between the supporting members, and the lacing cord 53 used as the final tightening up means. It will be obvious, however, that the reverse might be true, and in both of the structures of Figures 8 and 10 the lacing cords need not further be disturbed, after the device has once been properly adjusted to the limb of the user, as it will only be necessary now to unfasten the clasping elements, when taking the device off, and clasping them together again in replacing the device.

In the modified form of Figure 10 it will be clearly understood, without specific illustration, that a strip of fairly heavy material may be longitudinally applied underneath the clasping elements, to guard against pinching pressure on the flesh, and the same feature might likewise be supplied with reference to the lacing cords of the several forms, whether or not a garment sleeve be worn underneath the device. Such a protective strip might thus be separately supplied in position, or it might be attached along one edge to the underneath face of one of the supporting members.

Furthermore, it may be said that at Figure 9, as well as at Figures 4 and 11, the cross-sectional views are shown of exaggerated thickness, for the purpose of clearer illustration as will be understood, and Figure 11 in substantial effect only differs from Figure 9 in the employment of edge pads 54 in substitution for the outwardly flaring edge portions 46—47. These edge pads 54, of soft material, might extend entirely around each of the supporting members, although it would doubtless be sufficient if they were only disposed along the top and bottom edges thereof.

Finally, it may be emphasized that in all of the forms, with the exception of that shown in Figure 7, each of the shield members is of one-part or non-sectionally individual stiffly flexible integral structure transversely and substantially rigid longitudinally, is made of a less width than one-half of the circumference of the limb to be applied to; is preferably made moisture proof; is preferably of elongated tapering formation and in its making formed slightly arcuate transversely, for the purposes before stated and for the further purpose that, being made slightly arcuate initially, they are better adapted for continued arcuate bending, to snugly fit the limb, than if made flatwise in form; and that in all of the forms, with the exception of those shown in Figures 1 and 8, the complementary longitudinal edge faces of the shield members are maintained slightly spaced apart, with both pairs of longitudinal edge faces being circumferentially adjustable, excepting in Figures 5 and 8 where only one pair of the longitudinal edge faces are, strictly speaking, circumferentially adjustable.

Having thus fully described my invention, what I claim is:—

1. A device of the character disclosed, embodying a pair of individually non-sectional longitudinally tapering limb supporting shields, made of stiffly flexible material that is formed slightly arcuate in cross-section and is of a width less than one-half of the circumference of the limb to which they are to be applied in opposite snug fitting relation, the said shields being springy transversely and substantially rigid lengthwise, lacing means hingedly and adjustably connecting one complementary pair of the longitudinal edge portions of said shields, with their tapering edge faces disposed in edgewise spaced relation, and lacing means adjustably connecting their remaining longitudinal edge portions, with their tapering edge faces disposed in edgewise spaced relation.

2. A device of the character disclosed, embodying a pair of individually non-sectional longitudinally tapering limb supporting shields, made of stiffly flexible material with a facing of moisture proof material formed slightly arcuate in cross-section and of a width less than one-half of the circumference of the limb to which they are to be applied in opposite snug fitting relation, the said shields being springy transversely and substantially rigid lengthwise, lacing means hingedly and adjustably connecting one complementary pair of the longitudinal edge portions of said shields, with their tapering edge faces disposed in edgewise spaced relation, and lacing means adjustably connecting their remaining longitudinal edge portions, with their tapering edge faces disposed in edgewise spaced relation.

In testimony whereof I affix my signature.

HYMAN LEVINE.