March 23, 1954

G. G. BERGH ET AL

2,672,738

FLEXIBLE AND EXPANSIBLE BAND

Filed Oct. 31, 1951

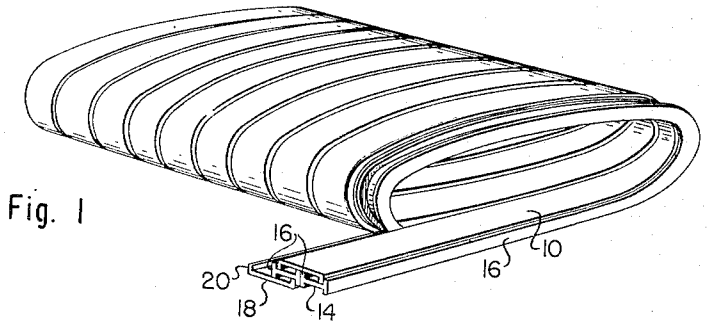


Fig. 1

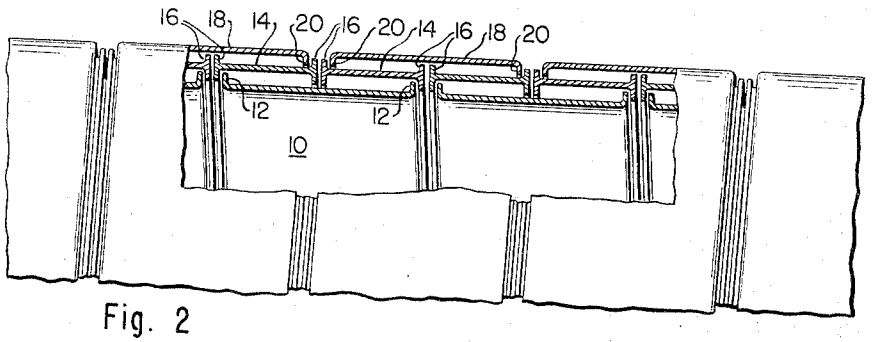


Fig. 2

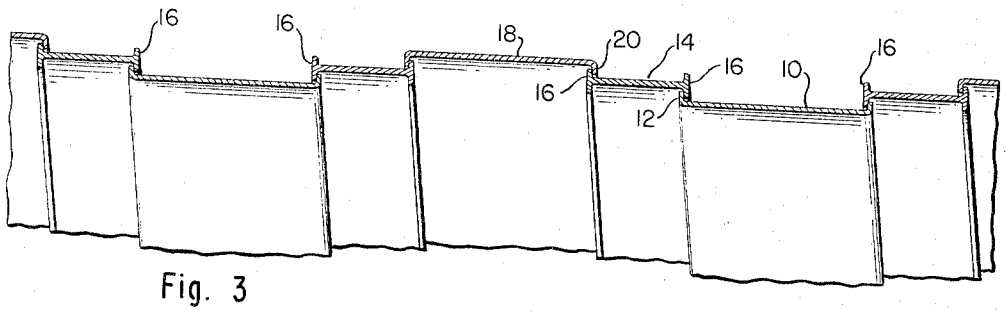


Fig. 3

INVENTORS
GEORGE G. BERGH
ROBERT G. BERGH

BY

Kenway, Jenney, Witter & Hildreth
ATTORNEYS

Patented Mar. 23, 1954

2,672,738

UNITED STATES PATENT OFFICE

2,672,738

FLEXIBLE AND EXPANSIBLE BAND

George G. Bergh and Robert G. Bergh, Attleboro Falls, Mass., assignors to Bergh Bros. Co., Inc., Attleboro Falls, Mass., a corporation of Massachusetts

Application October 31, 1951, Serial No. 254,172

4 Claims. (Cl. 63—11)

1

This invention relates to flexible and expansible bands, and more particularly to expansible metallic straps, bracelets and necklaces or similar bands used for supporting or connecting articles by reinforced hollow expansible tubes deriving spring tension from the coiled walls of the bands themselves.

The principal object of our invention is to provide an expansible metallic band being capable of greater than 100% expansion. In the past, certain types of expansible bands have been capable of greater than 100% expansion but hitherto such bands have had numerous drawbacks. In the first place, previously employed bands capable of greater than 100% expansion when expanded have exhibited large gaps between the expanding elements of the band and when used for wristbands, necklaces or the like, these widening gaps have had the tendency to draw the skin inward and to pinch the user. Another drawback in previous expansible bands has been that they were complicated and expensive in manufacture. Also in the instances where greater than 100% expansion was attempted, the construction has been complicated and prone to failure.

Therefore, among the objects of our invention is to provide a greater than 100% expansion band which will not pinch the skin, which will be relatively simple in construction and not prone to failure.

In the accomplishment of these and other objects of our invention, we employ four separate flanged strips of metal and wind them around a mandrel having the cross sectional shape desired for the finished product. The innermost strip is provided with two outturned marginal flanges, and the outermost strip is provided with two inturned marginal flanges. In between the outer and inner strips two further strips having a shallow H cross section are provided with the outturned and inturned marginal flanges at each side.

It is a feature of our invention that these flanges interlock and by virtue of the intermediate strips, we attain substantially greater than 100% expansion while still maintaining a rugged and secure construction. The flanges on all elements remain perpendicular to the mandrel about which they are wound. For this reason the said flanges are secure against unwanted collapsing during the construction stages. Furthermore when in position, these flanges hold the band firmly together and also prevent the engaging flanges from becoming lodged in the gaps between two of the elements of the band.

2

A further feature of our invention is that the upstanding flange portions of the intermediate strips tend to support the skin of a user in the area of the gap between the expanding elements of the band, and thus when the band contracts the tendency of the band to pinch the skin of the user is substantially reduced.

A further feature of our invention is that the innermost strip may be prewrapped in a totally contracted position, and thereafter when the intermediate strips and outer strip are wrapped thereover, the entire band will have a preloaded spring tension tending to assist holding it in the fully contracted position.

Further objects and features of our invention will best be understood and appreciated from the following detailed description of a preferred embodiment thereof, selected for purposes of illustration and shown in the accompanying drawings in which:

Fig. 1 is a view in perspective of a typically wound section of the band of our invention;

Fig. 2 is a view in side elevation with a portion broken open to show the detailed construction of the wrapped strips in cross section; and

Fig. 3 is a cross sectional view of one layer of the band in the expanded condition.

In the preferred embodiment herein shown the band is made of beryllium copper and includes in its general organization an innermost strip 10 wound around a mandrel (not shown) to form a shallow oval shape. At each edge of the strip 10 an outturned marginal flange 12 is provided. Immediately outwardly from the strips 10 two intermediate strips 14 are wound. These intermediate strips 14 are constructed in a shallow H cross section and have marginal flanges 16 which both extend inwardly and outwardly from the strips 14. The strips 14 lie directly upon strip 10, being supported at their point of adjacency in the middle of the strip 10 by their own flanges 16 and being supported at their other ends adjacent to the edge of strip 10 by flanges 12 on the strip 10. Directly on top of the strips 14, an outer strip 18 is wrapped and is supported against strips 14 by means of inturned marginal flanges 20 which rest against the strips 14. The outer strips 18 are also supported centrally by the upstanding portion of flanges 16 when the band is in the contracted position.

Turning now to Fig. 3, it will be seen that the construction herein shown provides substantially greater than 100% expansion. With the band fully expanded the left-hand flange 16 of left-hand intermediate strip 14 comes up against the

right-hand flange 20 of the outer strip 18. Also the left-hand flange 12 of the inner strip 10 comes up against the right-hand flange 16 of the intermediate strip 14. This sequence carries forward throughout the band, and it will be seen that in the preferred embodiment herein shown, the expansion is roughly 150%.

With regard to wrapping the elements previously described, it should be noted that the flanges 12, 16 and 20 are all perpendicular to the general axis of the band itself, and therefore, will be perpendicular to the mandrel about which the strips are initially wound. Thus the flanges do not have a tendency to collapse during the wrapping stage. It will also be noted that the flanges 12, 16 and 20 support the various strips in parallel relationship to the general axis of the band, and provide a central support for the mid-areas of strips 10 and 18 when in the contracted position. This insures a uniform and accurate formation of the curves of each strip and prevents the development of unwanted concavities across the middles of strips 10 and 18. During expansion as illustrated in Fig. 3, the centers of strips 10 and 18 are no longer supported by flanges 16 and also the intermediate strips 14 are only supported at one end and on opposite sides. This condition, no doubt, would cause collapsing and buckling if the strips were wound in such an expanded relationship, but since they are wound while the band is fully contracted, they receive their permanent set in the parallel relationship shown in Fig. 2, and therefore, do not collapse when expanded.

With further reference to Fig. 3, it will be seen that when the band is in the expanded condition the outturned portions of flanges 16 extend into the gap between outer strips 18 and thereby help hold the skin of a user outwardly from the gap and tend to minimize the pinching effect caused by contraction of the band.

The flanges 12, 16 and 20 are also particularly arranged to minimize jamming of the band itself. Thus, it will be seen that if the outturned portions of flanges 16 were missing, the depending flanges 20 might drop into the gap between the two strips 14. Such would also be true with respect to flanges 12 of strip 10 in the event that the depending elements of flanges 16 were missing.

In most uses the band of our invention will be disposed in a curved or circular position as for a wristband or necklace, and therefore, the outer edge in the curved position will continuously exert a contracting force on the entire band. However, even when the band is used in a perfectly flat condition, it may be preloaded to assure full contraction. This may be done by first winding strip 10 on the mandrel with the edge flanges 12 of each successive wind abutting against the next succeeding edge flange 12. Thereafter the inner strip 10 may be slightly expanded to permit winding the intermediate strips 14 thereon with the depending portions of flanges 16 fitting between the adjacent outturned flanges 12 of the strip 10. When this is done it will be seen that the entire band will have a slight preloaded spring tension urging the band toward contracted position.

It should be noted that the band of our invention is adaptable for many uses including ornamental uses related to jewelry, as well as numerous functional uses such as lap robe straps

in automobiles, baggage handles and even certain other uses wherein the hollow central portion of the band itself is employed. Of course, the oval cross section herein shown has the advantage of strongly resisting unwrapping of the band by twisting. However, it will be understood that the band could be made in circular form without substantial disadvantage and would be equally strong provided both of its ends were securely anchored against unwrapping.

Since numerous minor variations of this preferred embodiment of our invention will now be apparent to those skilled in the art, it is not intended to confine the invention to the exact form herein shown, but rather to limit it in terms of the appended claims.

Having thus described and disclosed a preferred embodiment of our invention, what we claim as new and desire to secure by Letters Patent is:

1. A flexible and expansible band of the type wherein spring metal strips are helically wound and are provided with interlocking flanges, comprising, an inner strip, outturned marginal flanges on said inner strip, a pair of intermediate strips, both inturned and outturned marginal flanges on each said intermediate strip, an outer strip, inturned marginal flanges on said outer strip, said strips being wound with the successive intermediate strips lying adjacent and contiguous to each other and overlying successive inner strips in pairs, the marginal flanges of said inner strips extending outwardly between the inturned flanges of each pair of intermediate strips thereby slidably interlocking them into pairs, and the outer strips slidably interlocking successive pairs of intermediate strips with one inturned flange of the outer strip extending inwardly between the outturned flanges of an intermediate strip of one pair and the other inturned flange of said outer strip extending inwardly between the outturned flanges of the adjacent inner strip of the next succeeding pair.

2. The flexible and expansible band defined in claim 1 further characterized by the said flanges on the inner and outer strips being of equal height, and the said flanges on the intermediate strips extending both inwardly and outwardly therefrom by an amount equal to the height of the flanges on the inner and outer strips, whereby said flanges will support said strips against channeling and collapsing.

3. The flexible and expansible band defined in claim 2 further characterized by all said flanges being at right angles to all said strips, and all of said strips being arranged cross sectionally parallel to the axis of said band.

4. The flexible and expansible band defined in claim 3 further characterized by said band having a cross sectional contour in which the widest dimension is substantially greater than the narrowest dimension.

GEORGE G. BERGH.
ROBERT G. BERGH.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
501,815	Aitchison et al.	July 18, 1893
1,279,852	Eklund	Sept. 24, 1918
2,517,011	Meyers	Aug. 1, 1950