Dec. 30, 1969 T. W. POWELL 3,486,409

TUBULAR BRAIDED ARTICLE

Filed March 26, 1968 2 Sheets-Sheet 1

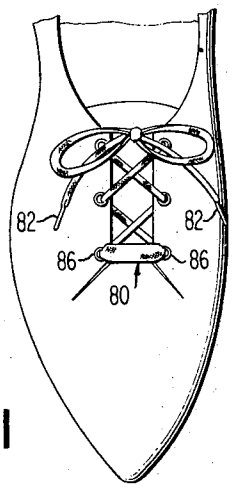

FIG. 1

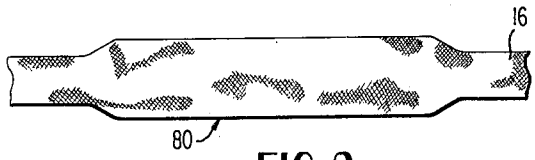

FIG. 2

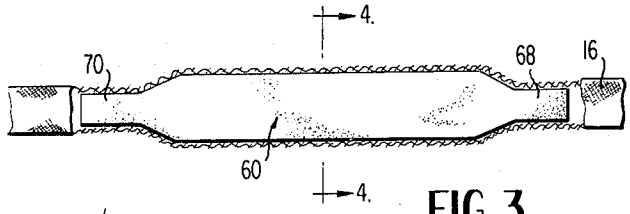

FIG. 3

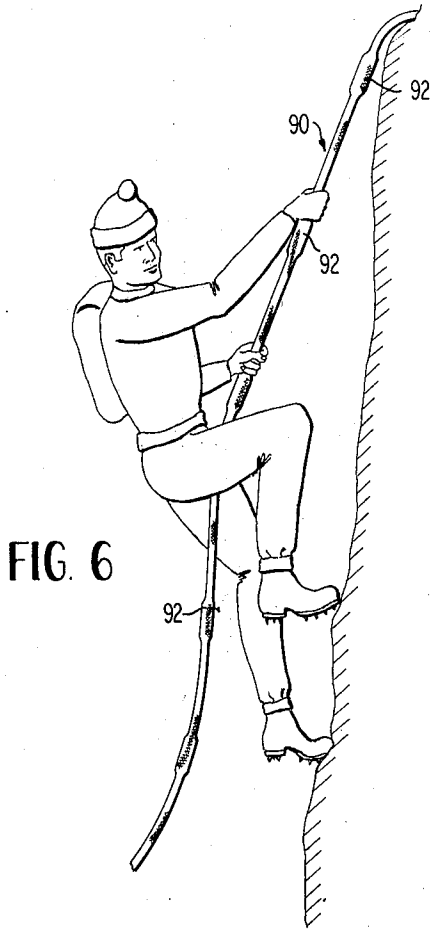

FIG. 6

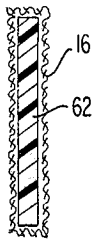

FIG. 4

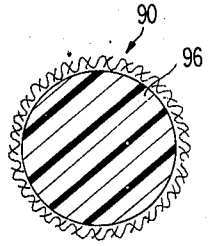

FIG. 5

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TUBULAR BRAIDED ARTICLE

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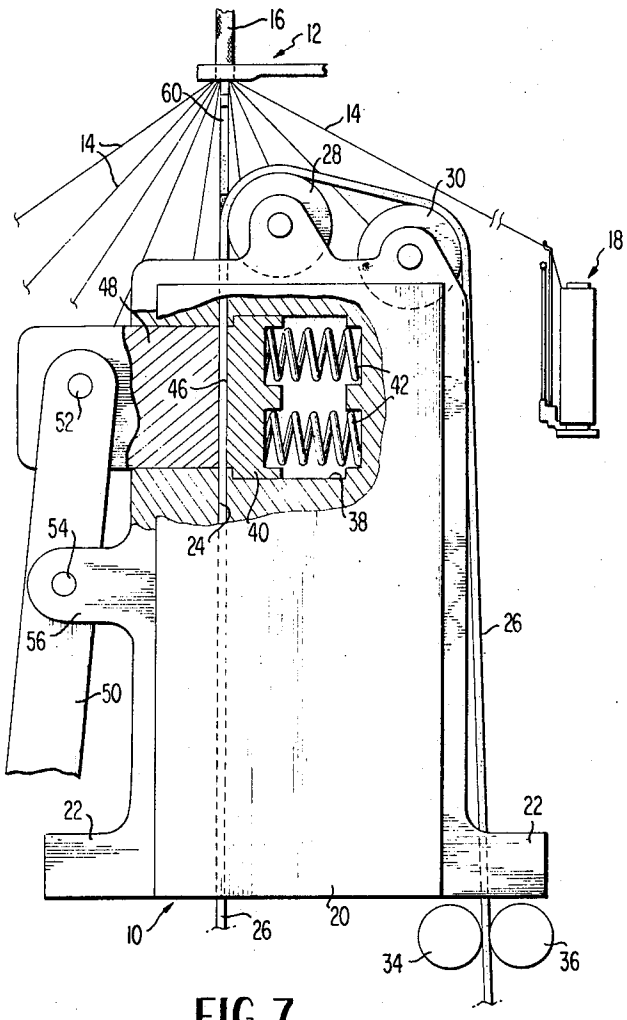

FIG. 7

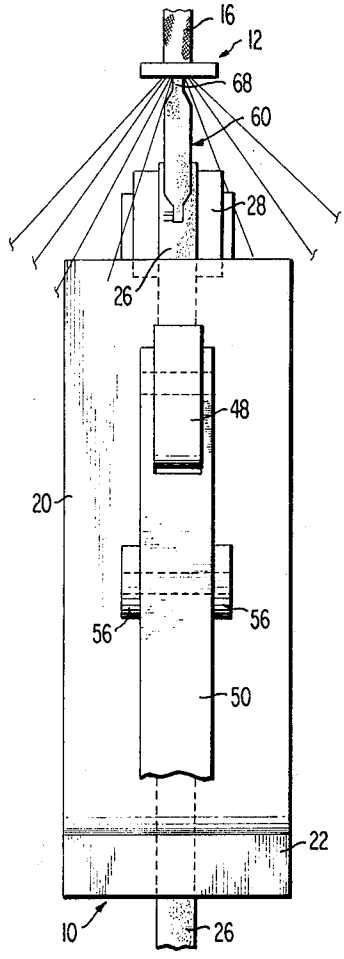

FIG. 8

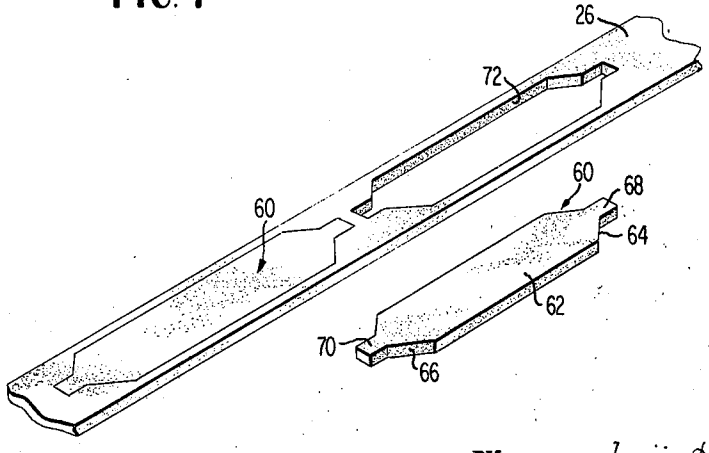

FIG. 9

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TUBULAR BRAIDED ARTICLE

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Int. Cl. D04c 1/12
U.S. Cl. 87—6 4 Claims

ABSTRACT OF THE DISCLOSURE

A length of tubular braid having an insert in its interior to provide a locally enlarged portion in the braid. The enlargement may be used as a centering device, as in a shoelace, or as a gripping means, as in a rope.

BRIEF SUMMARY OF THE INVENTION

This invention relates to braided articles of the round or tubular type and is concerned in particular with such articles provided with inserts disposed within the hollow interior of the braid for the purposes of providing a locally enlarged portion in the article. The enlarged portion of the article may serve various purposes for example, a round braided shoelace having an insert provided immediate its ends allowing for easy centering of the shoelace in the associated shoe structure and also lending a pleasing aesthetic appearance. As another example, a round braided rope provided with inserts at longitudinally spaced points along the length of the rope conveniently provide hand grip portions whereby the rope is made more efficient climbing purposes.

Another aspect of the present invention relates to an attachment for round braiding machines whereby inserts of the type described hereinabove are presented to the machine automatically to be incorporated in the round braided article.

BRIEF DESCRIPTION OF THE FIGURES OF THE DRAWING

FIG. 1 is a plan view showing a portion of a shoe having a shoelace constructed in accord with the present invention;

FIG. 2 is a plan view on enlarged scale showing the central portion of the shoelace shown in FIG. 1;

FIG. 3 is a view similar to FIG. 2 but showing the central portion of the braided article in section to illustrate the disposition of the insert therewithin;

FIG. 4 is an enlarged transverse section taken substantially along line 4—4 in FIG. 3;

FIG. 5 is transverse section similar to that of FIG. 4 but illustrating a modification of the braided article in the form of a rope according to the invention;

FIG. 6 is an elevational view illustrating use of the rope shown in FIG. 5;

FIG. 7 is an elevational view partly in section illustrating the attachment for braiding machine to apply the insert of this invention to braided articles;

FIG. 8 is a further elevational view of the assembly shown in FIG. 7; and,

FIG. 9 is a perspective view illustrating the insert strip.

DETAILED DESCRIPTION OF THE INVENTION

Referring first to FIGS. 7 and 8 of the drawings, an attachment assembly **10** is associated with an overhead arrangement **12**, the latter being conventional in tubular braiding machines. As is well known in the braiding art, the individual yarns **14**, which are braided together to form a tubular braided article **16**, are carried by bobbin assemblies **18**, which, in turn, are carried by flanges or horns of a train of gears disposed between the top and

bottom plates of the braiding machine. The top plate is formed with a serpentine path which guides the bobbin carriers, all as is conventional and well known in the art. The overhead arrangement **12** may take any suitable conventional form and any conventional form of take-up arrangement for the finished braid **16** may also be provided.

The attachment assembly **10** comprises a main body portion **20** having mounting flange portions **22** whereby the attachment may be secured in fixed position immediately below the overhead **12**. The main body portion is provided with a vertical channel **24** receiving a tape **26** which issues from the upper end thereof to pass over a pair of idler rollers **28** and **30**, whereupon the tape then issues downwardly to pass between driven pinch rolls **34**, **36** to waste. Tape **26** issues from a suitable supply roll, not shown, and in the course of progressing through the vertical channel **24** in the main body portion **20** is subjected to a die punching operation to provide the individual insert portions thereof which are incorporated into the hollow interior of the braided article **16**.

For this purpose, as can be seen in FIG. 7, the main body portion **20** is provided with a guide recess **38** which receives a shoe **40** normally urged by springs **42** so that its outer face **46** is flush with the surface defining the vertical channel **24** containing the tape **26**. A cutting die **48** is guided in the main body portion and is provided with an actuating arm or lever **50** suitably attached thereto by a pivot **52** and also mounted by a pivot **54** on ears **56** of the main body portion **20** for intermittent operation of the die to stamp or press insert elements **60** from the tape **26**. As can be seen more clearly in FIG. 9, the insert elements **60** are principally shaped to define a transversely large main body portion **62** having taperered opposite end portions **64** and **66** terminating in longitudinally extending tongue **68** and **70**.

The drive rollers **34** and **36** are driven in synchronization with the braiding machine, the drive to the rollers **34** and **36**, and to the actuating arm **50** of the die **48** being intermittent. The sequence of operation is such that while the tape **26** is stopped, a die punching operation is effected which stamps an insert **60** from the tape **26** which is then returned to the opening **72** in the body of the tape (FIG. 9) by the shoe **40** whereafter the tape is advanced so that in passing over the idler roller **28**, the insert **60** is stripped therefrom and is directed to the area of convergence of the yarns **14** so that its longitudinally extending tongue portion **68**, as shown in FIG. 8, is gripped by the accumulating yarns and is thereafter automatically pulled into the center of the tubular braid **16** and the braiding continues around the insert **60**.

As a result of the embedding of the insert, the braided article **16** is provided with a localized enlarged portion **80**, FIG. 2, caused by the presence of the insert disposed within the tubular or round braid. Such an article may be cut to convenient lengths with the locally enlarged portion **80** centrally disposed therealong and provided at its opposite ends with suitable tips **82**, as shown in FIG. 1, to provide a shoe lace which, by virtue of the centrally located enlarged portion **80**, is automatically centered as is shown in FIG. 1. Since the insert **60** is of a strip or flat shape, it lends a pleasing appearance to the shoe lace and also may be of such width as will not pass through the adjacent eyelets **86** whereby the shoe lace must always remain in properly centric relation to the shoe. The enlarged portion **80** may be decorated or have a given name inscribed thereon.

A modified form of the article is shown in FIGS. 5 and 6, in which instance, the article **90** is a rope provided at longitudinally spaced points therealong with enlarged regions **92**, which provide convenient handgrips to aid in

climbing as is illustrated in FIG. 6. In this case, the inserts **96**, as shown in FIG. 5, may be of cylindrical configuration, having tapered opposite end portions and longitudinally extending tongues in a fashion generally similar to the insert **60** described hereinabove.

It will be appreciated that the insert will ordinarily be relatively flexible and may be made of suitable synthetic resinous material or the like whereas it will also be appreciated that the braided article being made of yarns being selected as desired giving the requisite strength, stiffness and the like as may be necessary or desirable for the particular article being made.

What is claimed is:

1. A limp and flexible tension member comprising a length of tubular braid having a hollow interior, an insert disposed within said hollow interior, between the ends of said tension member, said insert having a main body portion dimensioned to present a local enlargement of the braid and having tapered opposite end portions terminating adjacent said main body portion to leave major portions of said tension member on either side of said insert which are free and unencumbered by the presence of said insert therewithin.

2. The tension member according to claim **1** wherein the insert is also provided with longitudinally projecting tongue portions at its opposite ends.

3. The tension member according to claim **1** wherein said insert is flat and is provided centrally between the opposite ends of the braid, the opposite ends of the braid being provided with rigid tips.

4. The tension member according to claim **1** wherein a plurality of inserts are provided at spaced points along the braid.

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JOHN PETRAKES, Primary Examiner

U.S. Cl X.R.

87—11