

L. A. SUBERS.
 LAMINATED COHESIVE INTERWOUND FABRIC BAND.
 APPLICATION FILED DEC. 31, 1910.

1,017,271.

Patented Feb. 13, 1912.

2 SHEETS—SHEET 1.

FIG. 6

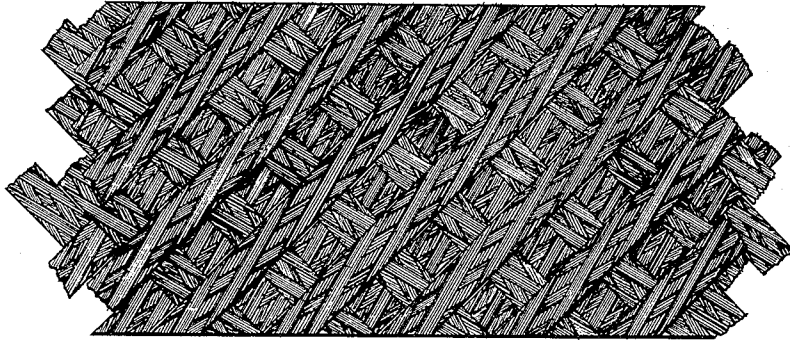


Fig 1a



FIG. 1

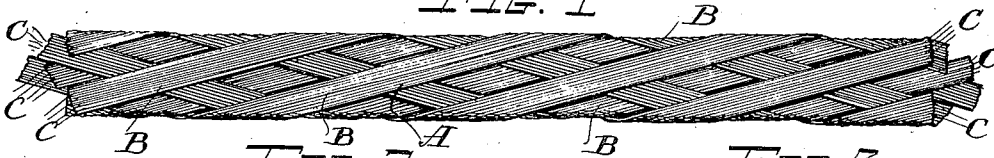


FIG. 2



FIG. 3



FIG. 4

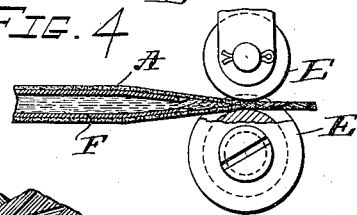
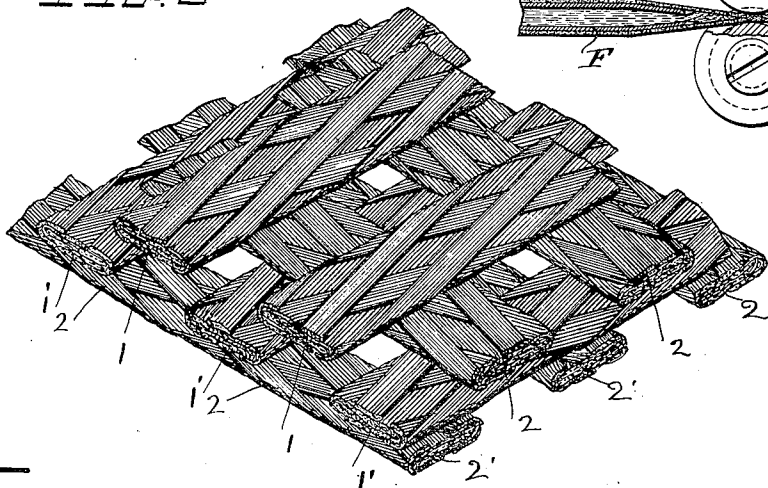


FIG. 5



Witnesses:

Ernest Mosman.
 J. H. Townsend

Inventor

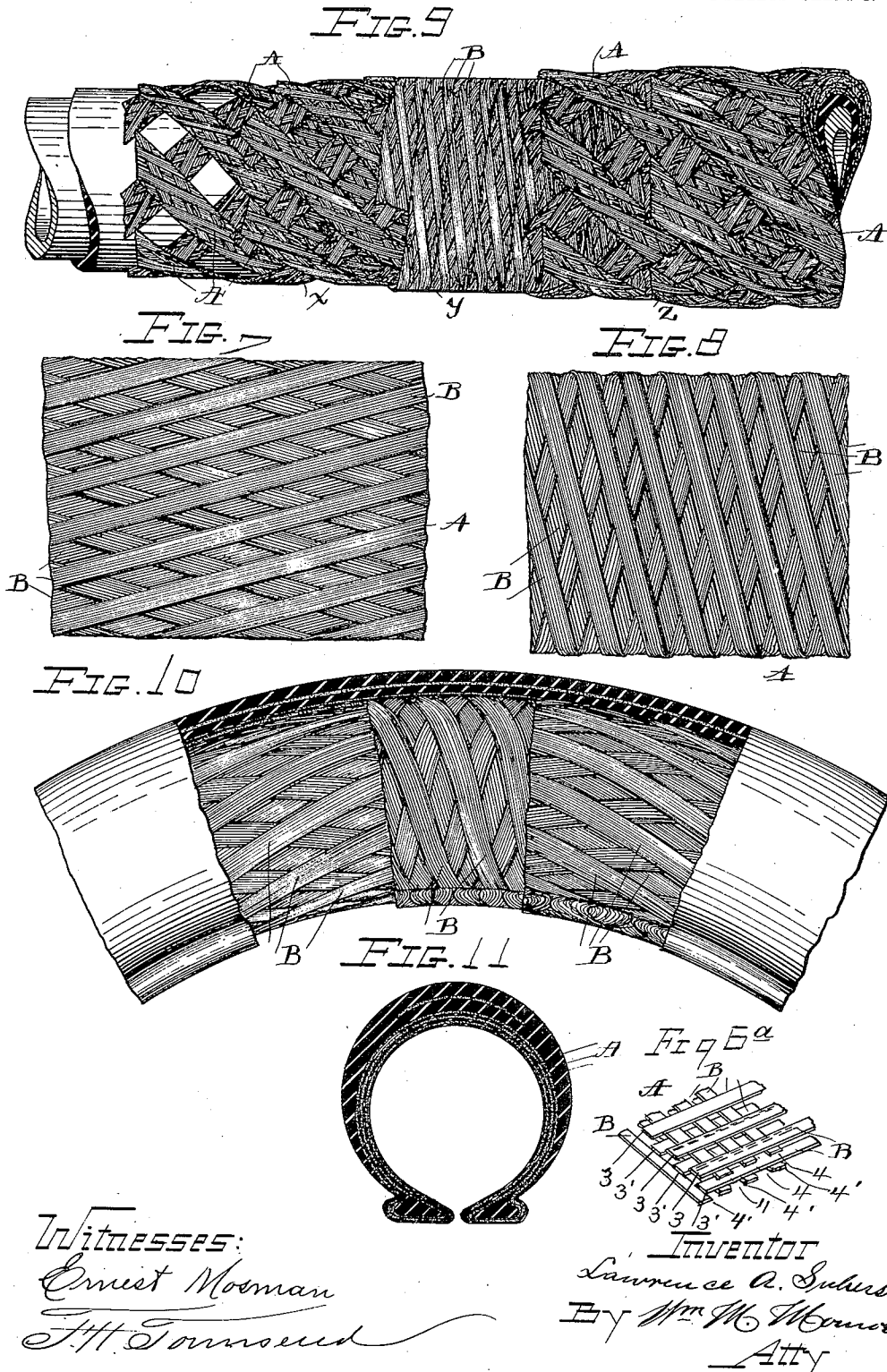
Lawrence A. Subers
 By Wm M. Morris.
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2 SHEETS—SHEET 2.



UNITED STATES PATENT OFFICE.

LAWRENCE A. SUBERS, OF CLEVELAND, OHIO.

LAMINATED COHESIVE INTERWOUND FABRIC BAND.

1,017,271.

Specification of Letters Patent.

Patented Feb. 13, 1912.

Application filed December 31, 1910. Serial No. 600,313.

To all whom it may concern:

Be it known that I, LAWRENCE A. SUBERS, a citizen of the United States, and resident of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in a Laminated Cohesive Interwound Fabric Band, of which I hereby declare the following to be a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

The objects of the invention are to provide an improved element or constituent member from a number of which an unwoven laminated-cohesive interwound fabric can be constructed such as described in my former application Ser. No. 540,982 filed January 31, 1910.

The essential features of novelty contained in this invention are a flattened band originally of cylindrical form, said band composed of groups of loose lying parallel yarns or threads cohering together, this band being coated on the exterior surface and also thoroughly saturated throughout the interior with preferably vulcanizable liquid rubber cement or any other suitable adhesive material. These loose lying parallel yarns or threads are wound as a unit on spools or tubes without being twisted together and the yarns may be used in any predetermined number in each band, and the tubular band made therefrom will be of correspondingly predetermined diameter before flattening. This collapsed band has therefore selvage edges, is strong and flexible and when incorporated in a fabric or when used as a fabric in itself will not ravel or permit of the separate threads being unwound or separated in any manner under rough usage and hence assists greatly in prolonging the life of the fabric and increasing its utility and efficiency in daily use. The band can be made of any desired width for incorporation in a laminated, unwoven fabric composed of such bands interwound and cohering together.

The invention is illustrated in the accompanying drawings, hereinafter further described, and specifically pointed out in the claims.

In the accompanying drawings Figure 1 is a plan view of one side of the completed band showing the coating removed; Fig. 1^a is a view of a group of loose lying parallel yarns or threads; Fig. 2 is a side elevation

of Fig. 1 showing the coating stripped from a portion thereof; Fig. 3 is a transverse section thereof enlarged; Fig. 4 is a transverse section of a forming tube and pressure rolls, illustrating the manner of flattening the tubular form of the fabric band and of saturating the fabric band with fluid rubber; Fig. 5 is an isometric perspective view and illustrates the manner of forming a laminated unwoven fabric from interwound bands of this character; Fig. 6 is a plan view of a portion of the same fabric after completion; Fig. 6^a is a perspective view of the threads of a fabric band showing manner of formation; Figs. 7 and 8 represent plan views of portions of the band enlarged showing the threads running at various angles for reasons hereinafter described. Fig. 9 is a broken side elevation of a portion of hose pipe formed of the improved bands, illustrating the strength and durability of exposed parts; Fig. 10 is a side elevation of a pneumatic tire showing fabric formed in the same manner as the band; Fig. 11 is a transverse section thereof.

As shown in Figs. 1, 2, 3, and 4 the band A is composed of series of groups of close lying parallel yarns or threads. These groups of threads are applied upon a former D (shown in Fig. 4) in such a manner that they are laid in parallel spaced rows, first in rows running in one direction and then in rows running at an angle thereto, followed by rows parallel to the first and second laid rows. The spaced threads of the outer rows are compressed to fill the spaces between the parallel rows beneath, the result being an unwoven laminated band of tubular form, in two layers. The fabric formed therefrom is similarly constructed as shown in Fig. 5, which will serve also as an illustration of the structure of the band but not of the mode of flattening or of applying rubber thereto.

In Fig. 5, 1, 1 and 1', 1', are parallel bands, running in one direction, and 2, 2, 2, and 2', 2', 2', are parallel bands running in another direction. When compressed the parallel bands 1 will come to the same level between the other bands 1' and the bands 2 between the bands 2' and a practically two ply fabric will result.

The bands are formed of threads B laid in precisely the same manner as the fabric, and this construction is shown in Fig. 6^a 3, 3, 3, being parallel threads in the upper row 3', 3', 3' the lower rows parallel there-

with. 4, 4, 4, are the rows of threads crossing the first named rows and 4', 4', 4' are the rows parallel therewith. The bands having been completed in a former F in a dry state in a tubular form are then pulled from the former, and flattened between rollers such as E, E in Fig. 4.

The band is simultaneously saturated with rubber. This is accomplished in the most thorough manner by injecting the rubber through the former where the pressure of the flattening rollers forces it into the band until it permeates every part thereof between the yarns, and coats the yarns and threads in a thorough manner.

The flattening of the tubular band results in the formation of a band such as shown in Fig. 3 of great flexibility and strength and an outer rubber coating G is then applied in any convenient manner or it may be coated while being constructed into a fabric if desired.

It will be seen by reference to Figs. 7 and 8 that the band can be made in a similar manner of any desired width and one set or rows of the component threads in one band may be laid at an angle relative to the other set or rows making it possible to make bands which vary in elasticity, which will be controlled by the angle of the threads. On this account a fabric can be made as shown in Fig. 9 having one layer X formed of such bands of a given degree of elasticity and having other layers Y and Z of different degrees of elasticity and hence the difference in expansibility due to difference in diameter of the several layers can be overcome and a hose can be formed of several layers which will have the same ratio of bursting limit; and a stronger fabric will be constructed thereby.

The advantages of a flat band of this character and its adaptability for use in the construction of fabrics for various uses is therefore very great.

It is obvious that these bands can be made multiple by adding successive layers of this fabric over one another and that an inner lining may be incorporated within this fabric band the whole retained in a cylindrical or collapsed form as may be desired without departing from the spirit of invention or scope of the claims.

It is also obvious that this fabric band may be formed of any predetermined width and of any predetermined thickness from groups of close lying parallel yarns or threads and may be used as fabric of itself if so desired without departing from the

spirit of the invention or the scope of the claims.

It is also obvious that any suitable material fabric or otherwise may be formed or laid partially around the mandrel and thereby be incorporated within this fabric band during the formation of the same.

Having described the invention what I claim as new and desire to secure by Letters Patent is:

1. As an article of manufacture, a band for incorporation in a fabric, comprising, a flattened tube composed of unwoven interwound groups of close lying parallel yarns or threads, arranged in parallel rows, and the sides of the tube compressed together to form selvage edges, the said band saturated with fluid rubber or other adhesive material.

2. A band for incorporation in a fabric, comprising, a tubular structure composed of threads formed from groups of close lying parallel yarns or threads, said groups of threads laid in spaced parallel rows at predetermined angles crossed by spaced groups of threads laid at predetermined angles thereto, a row of said spaced groups of threads filling the spaces between the rows of groups of threads parallel therewith, the sides of said tube being flattened together and saturated with fluid rubber or other adhesive material and an exterior coating on said band.

3. In a constituent element for an interwound fabric, in which the elements cohere together and are interlaid, a flattened tube composed of unwoven flattened threads interwound and interlaid with each other, each thread composed of a parallel series of yarns, the finished product saturated with fluid adhesive material, and provided with an external coating of the same.

4. As an article of manufacture, an element from which a fabric can be constructed, said element comprising a flattened tube composed of unwoven interwound and interlaid flattened threads, compressed together, each thread composed of a series of parallel yarns loosely associated together, said flattened band saturated throughout and between the yarns with fluid rubber, or other adhesive material.

In testimony whereof, I hereunto set my hand this 29th day of December 1910.

LAWRENCE A. SUBERS.

In presence of—

ERNEST MOSMAN,
F. H. TOWNSEND.