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E. D. C. BAYNE & L. A. SUBERS.

FABRIC.

APPLICATION FILED APR. 25, 1907.

Fig. 1

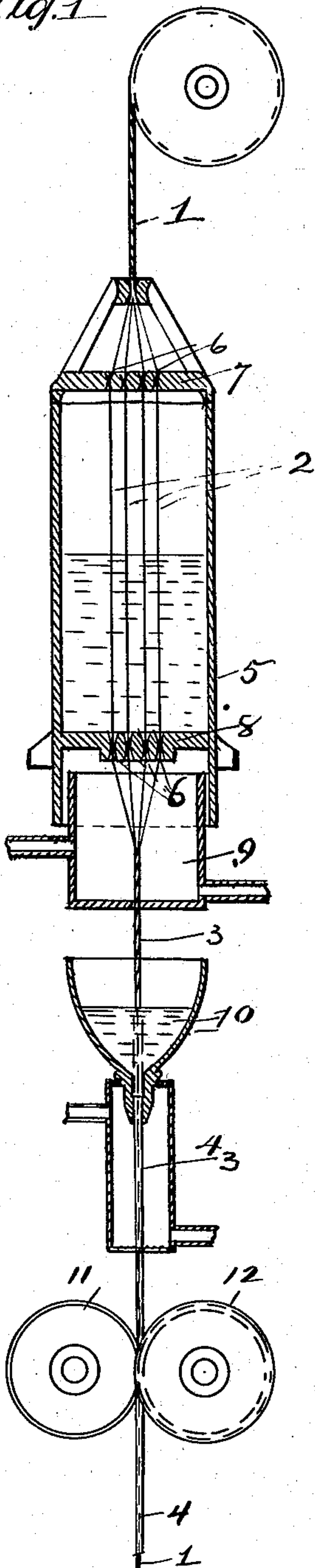


Fig. 2

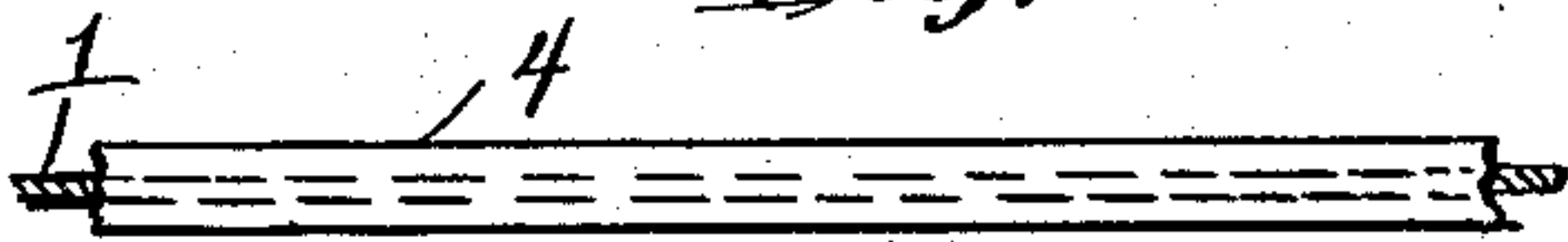


Fig. 3

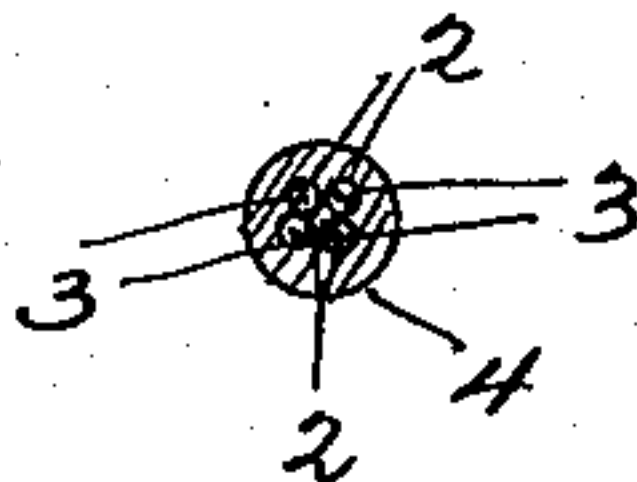


Fig. 5

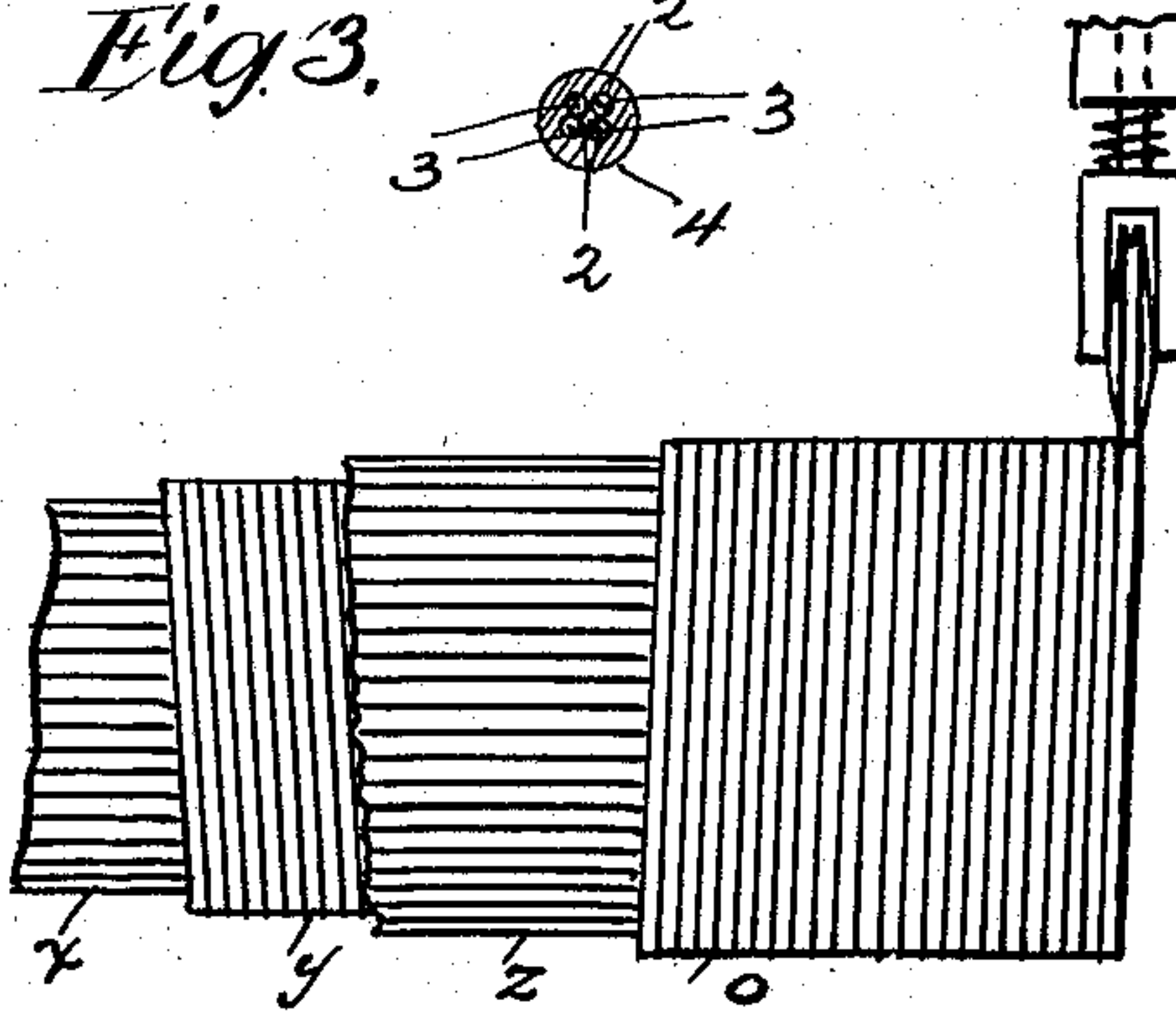


Fig. 4

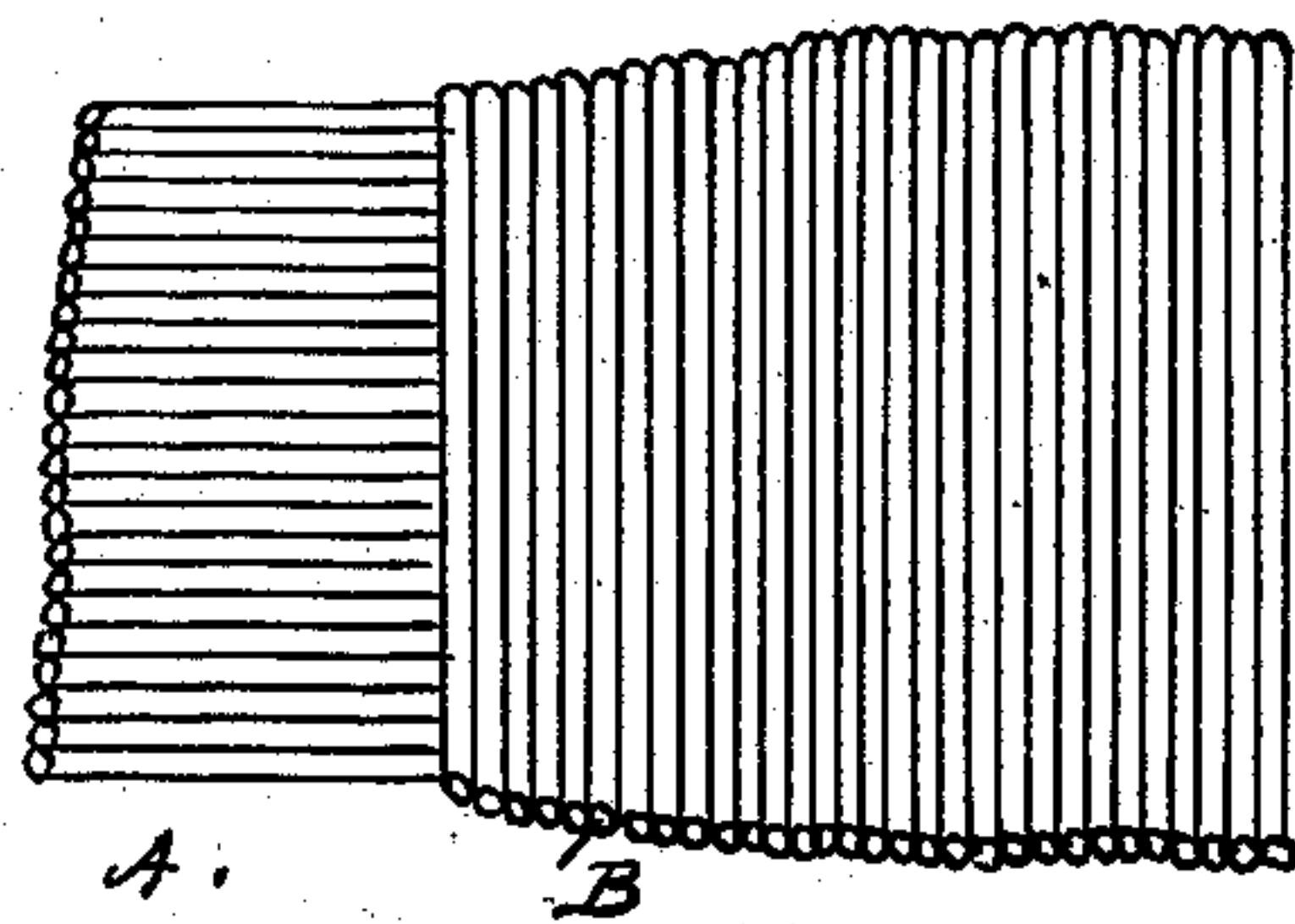
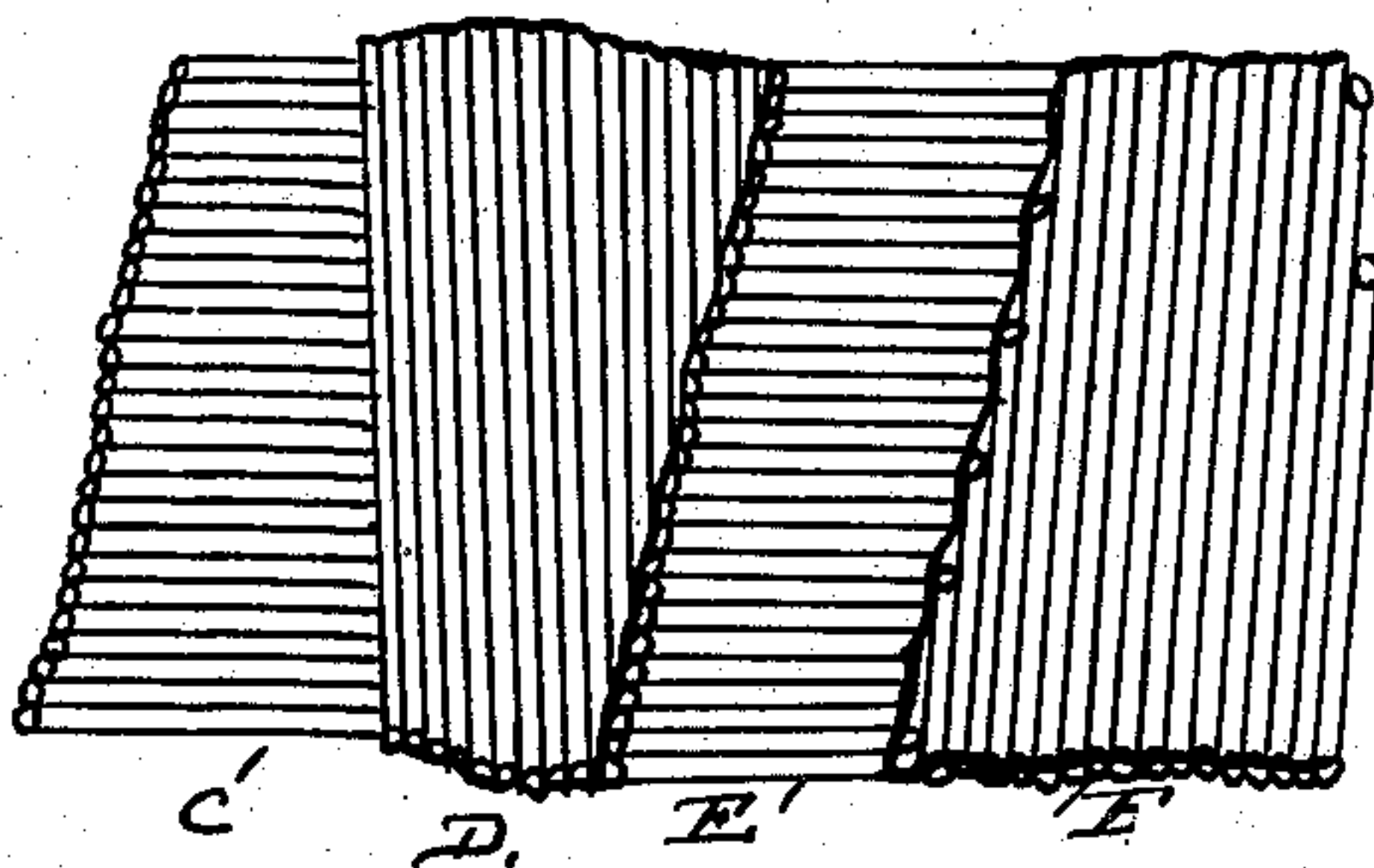


Fig. 6



Witnesses
A. B. Brown
J. B. Sanyer

Inventors
Engene D. C. Bayne and
Lawrence A. Subers by
Wm. M. Monroe
Attorney

UNITED STATES PATENT OFFICE.

EUGENE D. C. BAYNE AND LAWRENCE A. SUBERS, OF CLEVELAND, OHIO.

FABRIC.

No. 885,219.

Specification of Letters Patent.

Patented April 21, 1908.

Application filed April 25, 1907. Serial No. 370,139.

To all whom it may concern:

Be it known that we, EUGENE D. C. BAYNE and LAWRENCE A. SUBERS, citizens of the United States, and residents of Cleveland, county of Cuyahoga, State of Ohio, have invented certain new and useful Improvements in Fabrics, of which we 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 a fabric composed of fibrous strands from which threads of any desired diameter and weight can be constructed and in which the same strands are first coated with a flexible, tenacious and vulcanizable material and are then united in a suitable manner to form the thread of which the fabric is composed. To provide strands of this character they must be first coated exteriorly with a coating of non-fibrous and tenacious vulcanizable and flexible and preferably elastic material, and also before uniting in a fabric the completed threads must be coated with a perfect cylindrical coating so that not only the several strands composing the threads will be coated and rendered wholly out of contact with each other in the finished fabric, but also the several threads composing the fabric will be coated and separated out of contact with each other and therefore incapable of frictional contact with each other, and of frictional action upon each other. To prepare a thread having these capabilities and qualities, it is first essential that the fibrous strands thereof if already twisted together should first be momentarily separated and immersed within the vulcanizable coating material and as soon as the material has been dried or partially dried thereon the strands may be retwisted to form the complete thread; or strands which are separate may be first coated and then twisted together. This thread is then exteriorly coated with the same non-fibrous compound to as great a thickness as the character of the particular fabric for which it is to be used may require, and the final coating after being dried is passed between grooved rollers to compress and solidify, as well as to give a perfect cylindrical shape to the coating. The coating is then also applied in such a manner as to locate the thread in the exact center thereof, so that the coating will be evenly applied, over the surface of the thread.

The coating is preferably formed of india rubber so that it can be vulcanized when it is incorporated within the fabric, and is also possessed of great flexibility. The india rubber coating retains a sticky surface until vulcanized, and hence the threads are adapted to be severally laid in their exact positions, and with their cylindrical surfaces in accurate relation to each other and to adhere together, and pressure is also provided at the time of laying the threads to produce a perfectly regular, smooth surface without inequalities of any kind. The perfect cylindrical surface is also conducive to that effect.

The manner of construction of the fabric is described in an accompanying application, Ser. No. 370,139.

A fabric composed of threads consisting of two or more strands treated as described is not woven but is composed of alternate layers of closely approximated coated threads, one layer being laid upon the other and at right angles thereto and the several threads and layers are pressed into intimate contact with each other over a suitable support, and the superimposed layers of threads are similarly pressed into contact with the inner layers. The effect of such construction is finally to provide a fabric composed of layers of parallel and flexible threads running at angles to each other, each thread and its component strands being coated, so as to place all threads and component strands entirely out of frictional contact with each other, and when vulcanized a unitary fabric is obtained having the flexible qualities described, perfectly smooth and of even thickness throughout.

The fabric is applicable to so many uses that it is not necessary to enumerate any of them.

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

In the accompanying drawings, Figure 1 is an elevation of the thread in course of treatment showing the fibrous strands momentarily untwisted and separated and immersed in the coating compound, or india rubber dissolved in a solvent fluid to a semi-fluid condition and also showing means for drying the coatings thereon. In this figure the strands are shown to be retwisted together and passed through a second coating bath, and compressing rollers are also shown which

form the surface of the exterior coating into a perfect cylindrical form; Fig. 2 is a view of a portion of a completed thread; Fig. 3 is an enlarged transverse section thereof; Fig. 4 shows a flat fabric composed of two layers of parallel coated threads extended at right angles to each other; Fig. 5 shows a tubular arrangement of the threads, one layer being longitudinal the next transversely spiral, the third longitudinal and the fourth a reversed spiral to the first transverse layer. This slight angular variation in fabrics having more than two layers of threads can be carried out when greater strength of fabric is required, as for fire hose or as shown in Fig. 6 in a flat fabric.

The threads of one transverse layer cross the threads of the other transverse layer at an angle.

In these views, 1 is the thread, 2 the separated fibrous strands thereof, 3 the coating thereon, 4 the outer coating upon the retwisted thread.

In Fig. 1 is shown a bath 5 for momentarily separated fibrous strands, a series of openings 6 in plates 7 and 8, which by rotating momentarily untwist and retwist the strands, 9 is an air blast by means of which the coatings are dried upon the fibrous strands before they are rewound into a thread, 10 is a bath of the coating compound in which the thread is passed and 11 and 12 are the compressing and forming rollers to consolidate and shape the coating into perfect cylindrical form.

It is obvious that a finished thread consisting of two or more fibrous strands can be momentarily untwisted and fed to the bath and retwisted into a thread, or a thread consisting of a number of fibrous strands can be fed to the bath before they are twisted into a thread.

We believe ourselves to be the first to take fibrous strands and to first coat them with a flexible, tenacious and vulcanizable material and to unite them by adhesion to form a thread of any desired weight and diameter, to then coat the thread with a similar material, and form a fabric from such threads, wholly by the adhesion of such coatings thereon and in this manner to provide a thread of greatly increased flexibility and with its component strands entirely out of frictional contact with each other, and therefore being itself also coated, to provide a fabric, of greatly increased flexibility, in which there is no friction between the component strands or between the threads composed of such strands, and hence the fabric is made more durable under all kinds of flexure.

The thickness of the flexible and elastic coating upon each strand and thread should be more than enough to merely cause the strands and threads to adhere to each other and to avoid danger of making contact with each other, each strand and each thread be-

ing isolated from every other strand and thread by an elastic and adhesive medium.

Having described the invention, what we claim as new and desire to secure by Letters Patent is;

1. A fabric made of a layer of parallel threads, and a superimposed layer of parallel transversely arranged threads; the threads of each layer being composed of united fibrous strands, each strand having a coating thereon of elastic non-fibrous material before uniting the strands together and each thread having compressed thereon a cylindrical coating of elastic non-fibrous material, said coatings being adhesive to join the strands together, and to join the threads together at the time the fabric is made, and of sufficient thickness to maintain them out of contact with each other.

2. A fabric made of alternating layers of parallel twisted threads, each thread comprising a group of united strands and arranged longitudinally and transversely therein, the threads in one transverse layer crossing the threads of the alternating transverse layers at an angle, each strand being coated with a flexible non-fibrous material and each thread having compressed thereon a cylindrical coating of compressible non-fibrous material, said coating being adhesive to join the strands to one another and to join the threads and layers together and of sufficient thickness to maintain them out of contact with each other at the time the fabric is made.

3. A fabric made of a layer of longitudinally extending threads, and superimposed layers of alternately transversely and longitudinally extending threads, the threads of each layer comprising united fibrous strands, each strand having a coating thereon of non-fibrous material, and the united strands forming a thread having compressed thereon a cylindrical coating of non-fibrous material, said coating being adhesive to join the said strands together and to join the threads together at the time the fabric is made, the said threads being applied together under pressure, said strands and threads being maintained out of contact by said coatings.

4. A cylindrical fabric, comprising a layer made of a series of spirally disposed threads, and a layer of longitudinally disposed threads, the alternate spiral layers crossing each other at an angle, the threads of each layer comprising strands of fibrous material united together, each strand having a coating of non-fibrous material thereon, and each thread having compressed thereon a cylindrical coating of compressible non-fibrous material, said coatings being adhesive to join the strands together and to join the threads together at the time the fabric is made, the said coatings being of sufficient thickness to isolate said strands, threads and layers.

5. A fabric comprising fibrous strands

grouped together to form threads, said threads being grouped together in parallel rows to form layers, and said layers of threads arranged longitudinally and transversely in
5 said fabric, each fibrous strand being coated with a flexible non-fibrous and vulcanizable and adhesive material prior to uniting in groups, and said threads coated with a similar material before being united to form lay-
10 ers, and each layer adhering to the adjacent layer without contact of strands or threads in the completed fabric.

6. A fabric composed of fibrous strands grouped together to form threads, the said
15 strands being each coated with non-fibrous and flexible material, and the said threads

also coated with non-fibrous flexible material, the said coatings upon said strands and threads being adhesive and vulcanizable whereby said strands are attached together
20 to form threads and said threads are attached together to form the fabric, said coatings being of sufficient thickness to isolate said strands, threads, and layers.

In testimony whereof we hereunto set our
25 hands this 22nd day of April, 1907, at Cleveland, Ohio.

EUGENE D. C. BAYNE.
LAWRENCE A. SUBERS.

In presence of—

A. T. OSBORN,
ED. O. PEET.