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PATENTED JAN. 31, 1905.

G. D. MOORE.

METHOD OF WEAVING MULTIPLE TUBULAR FABRICS AND HOSE COVERING
PRODUCED THEREBY.

SPECIMENS.

APPLICATION FILED MAY 23, 1904.

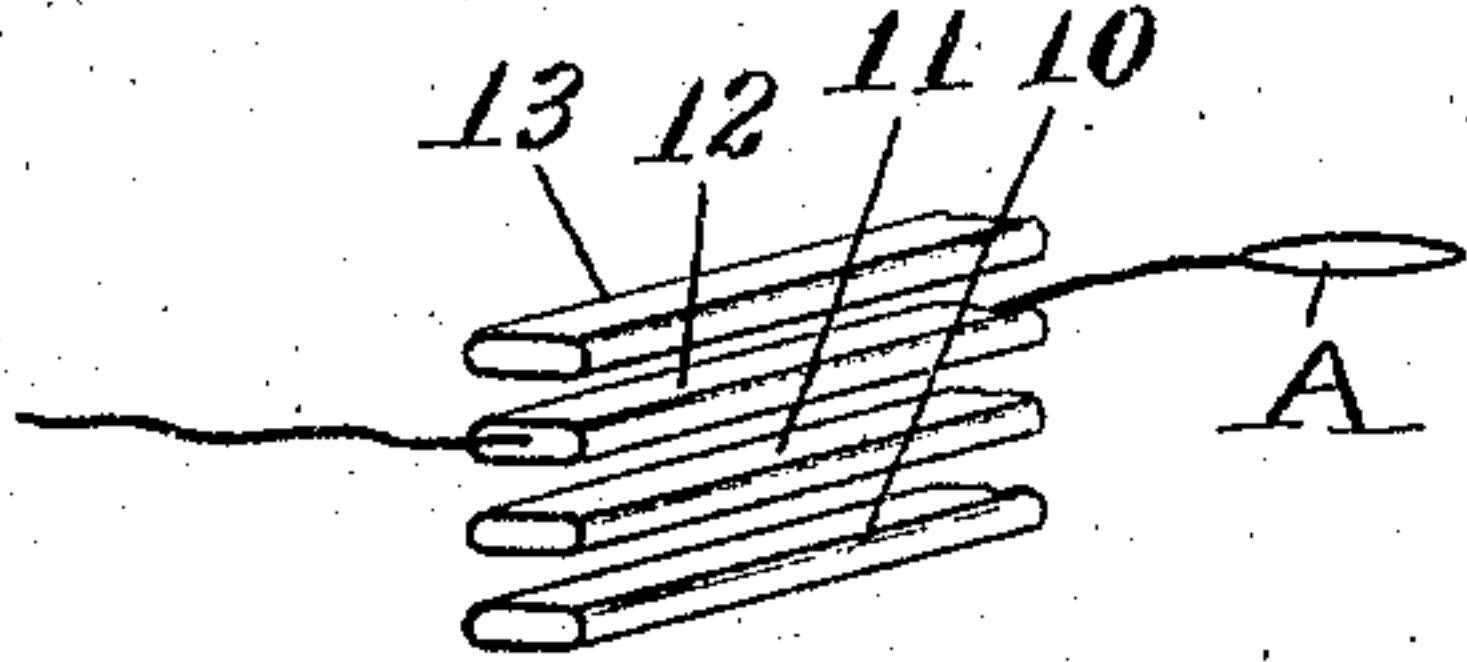


Fig. 1.

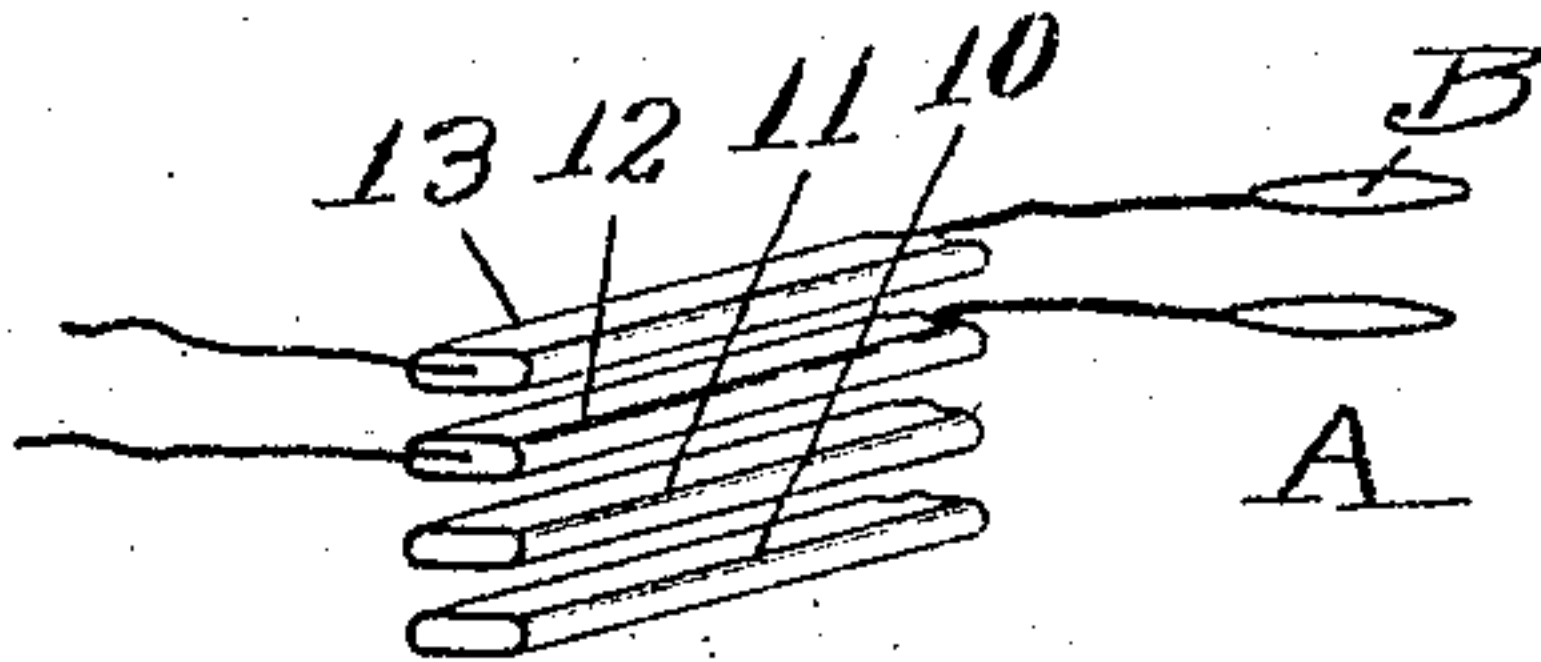


Fig. 2.

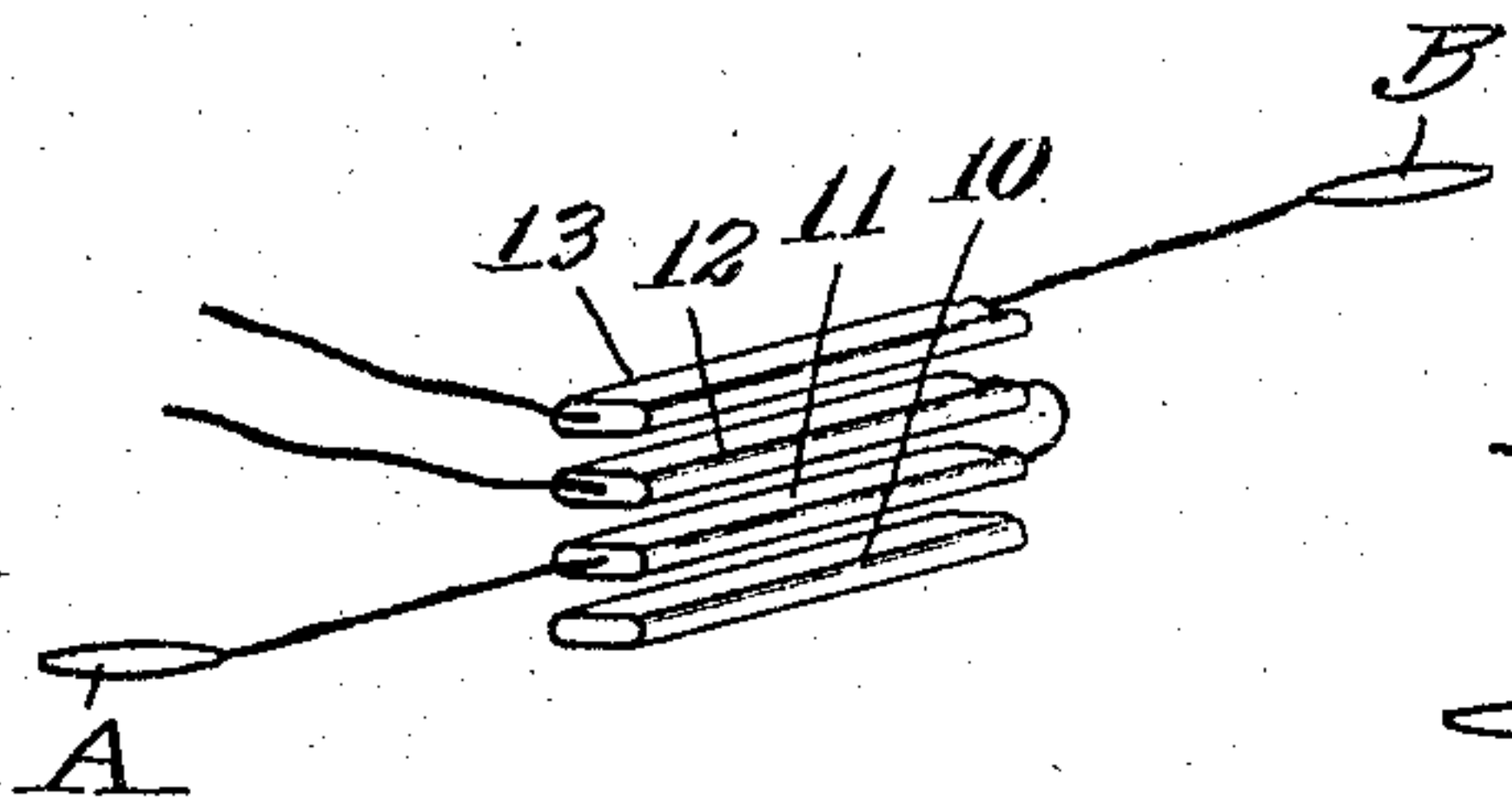


Fig. 3.

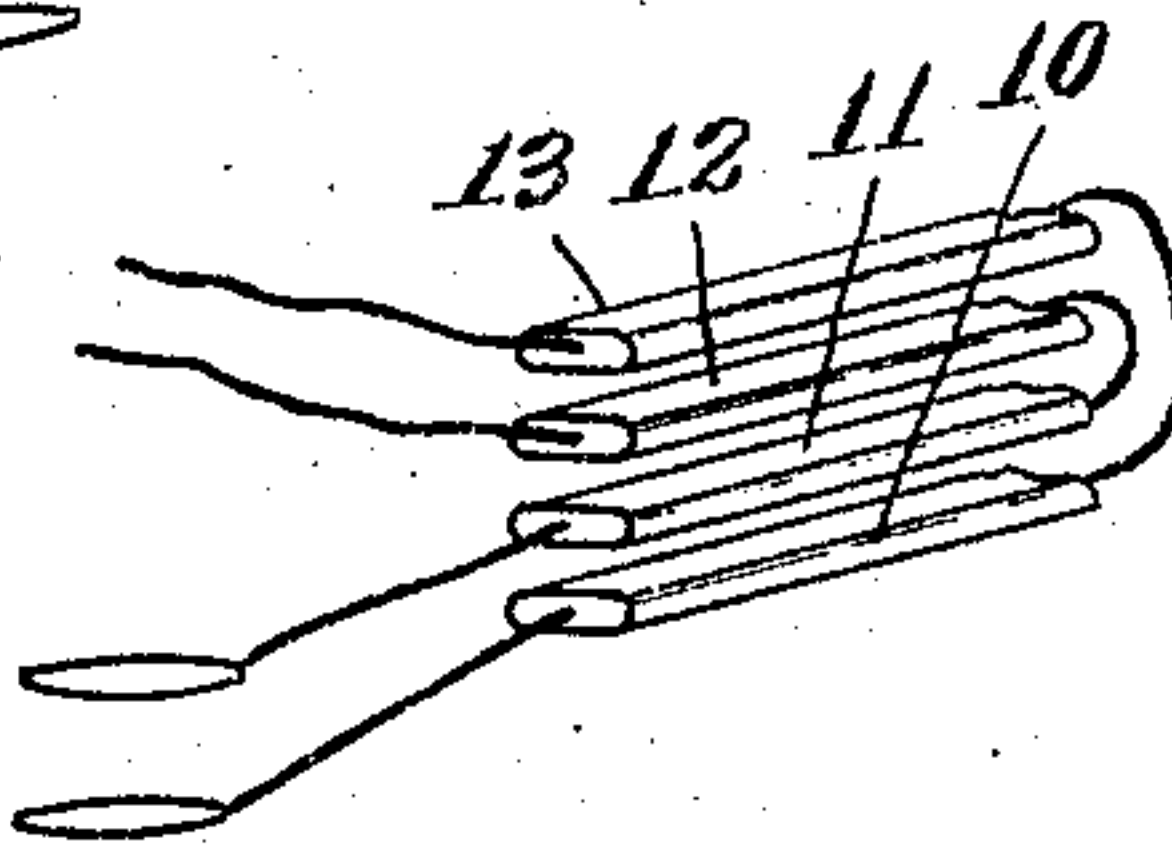


Fig. 4.

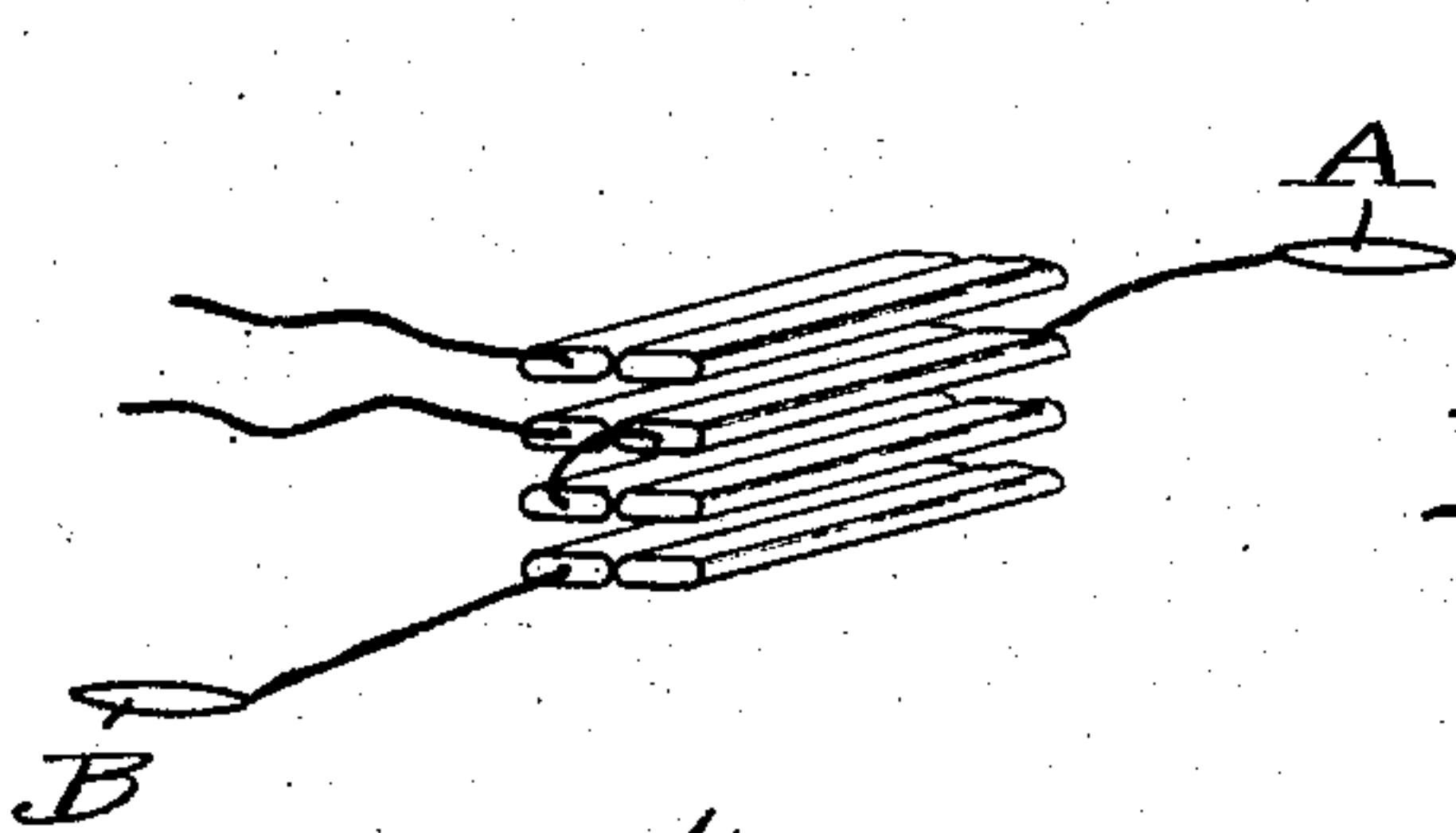


Fig. 5.

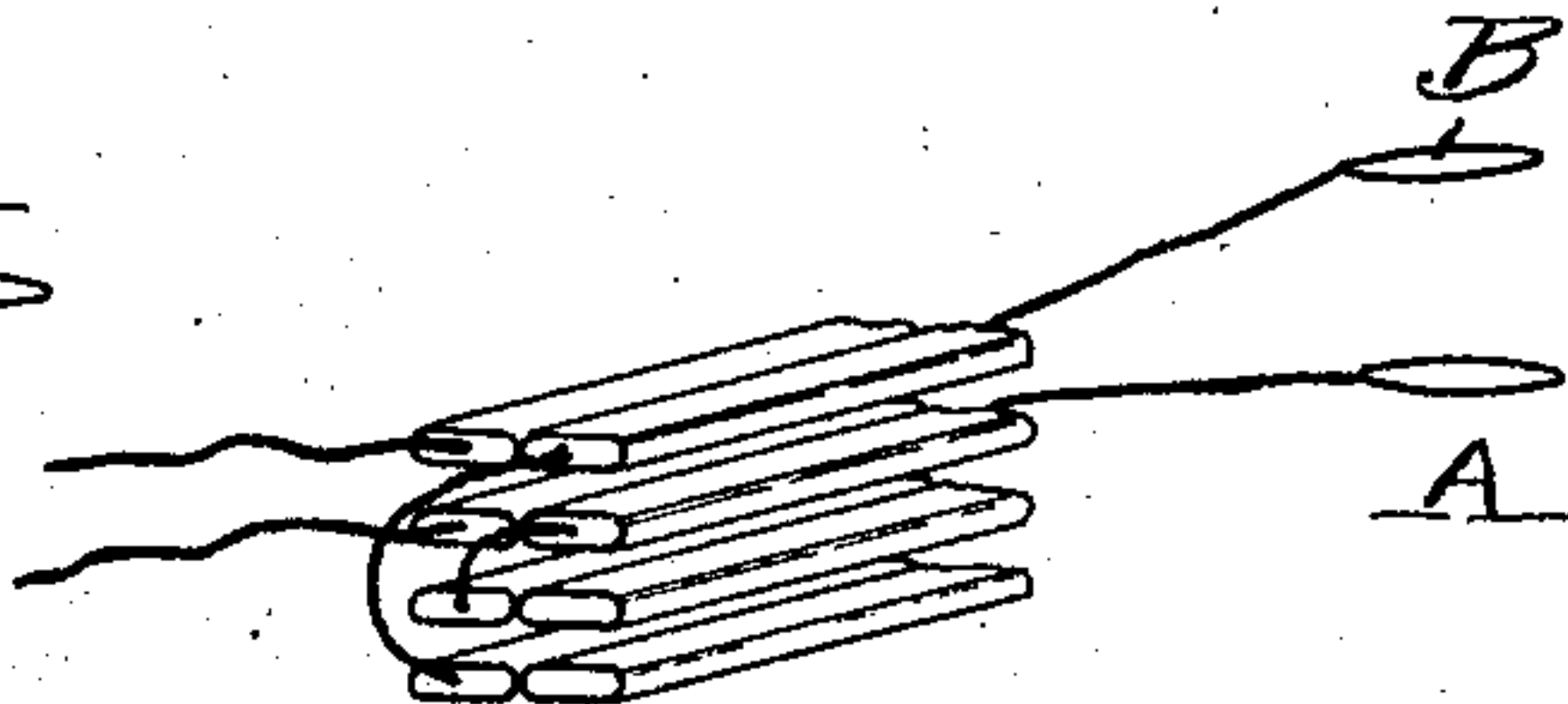


Fig. 6.

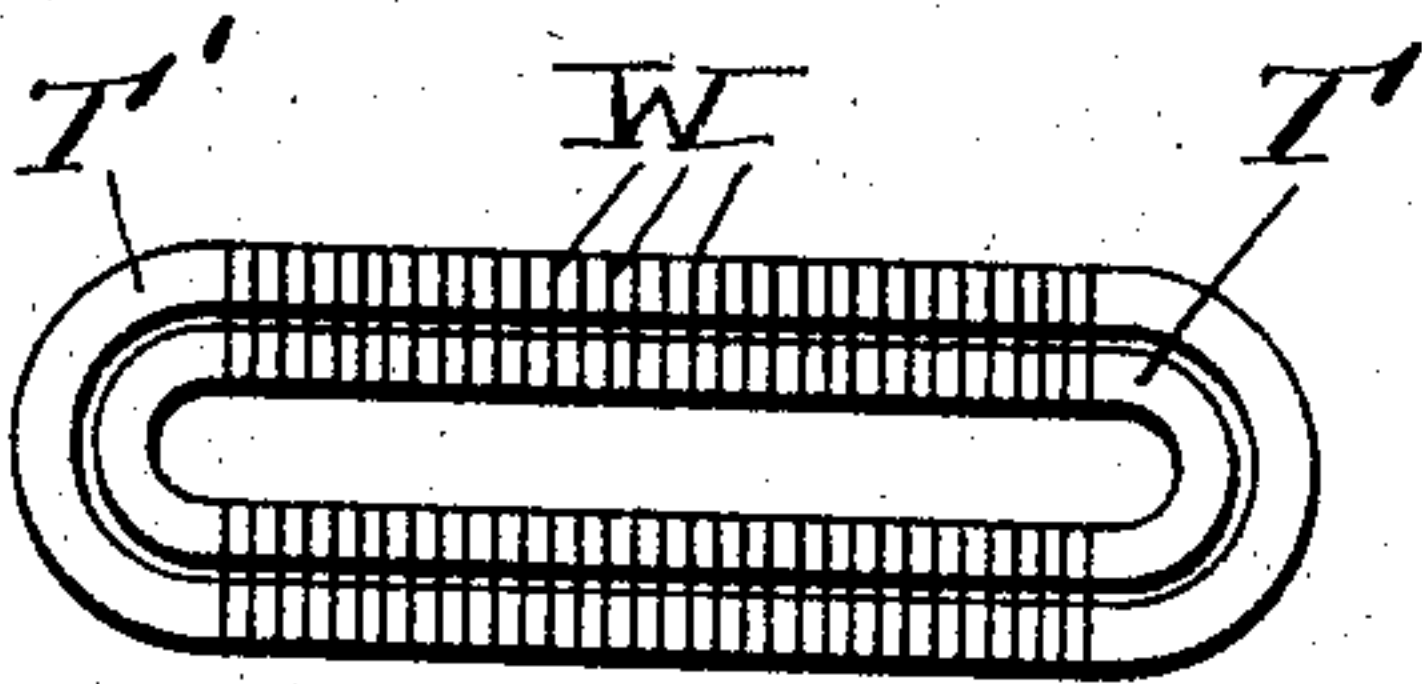


Fig. 7.

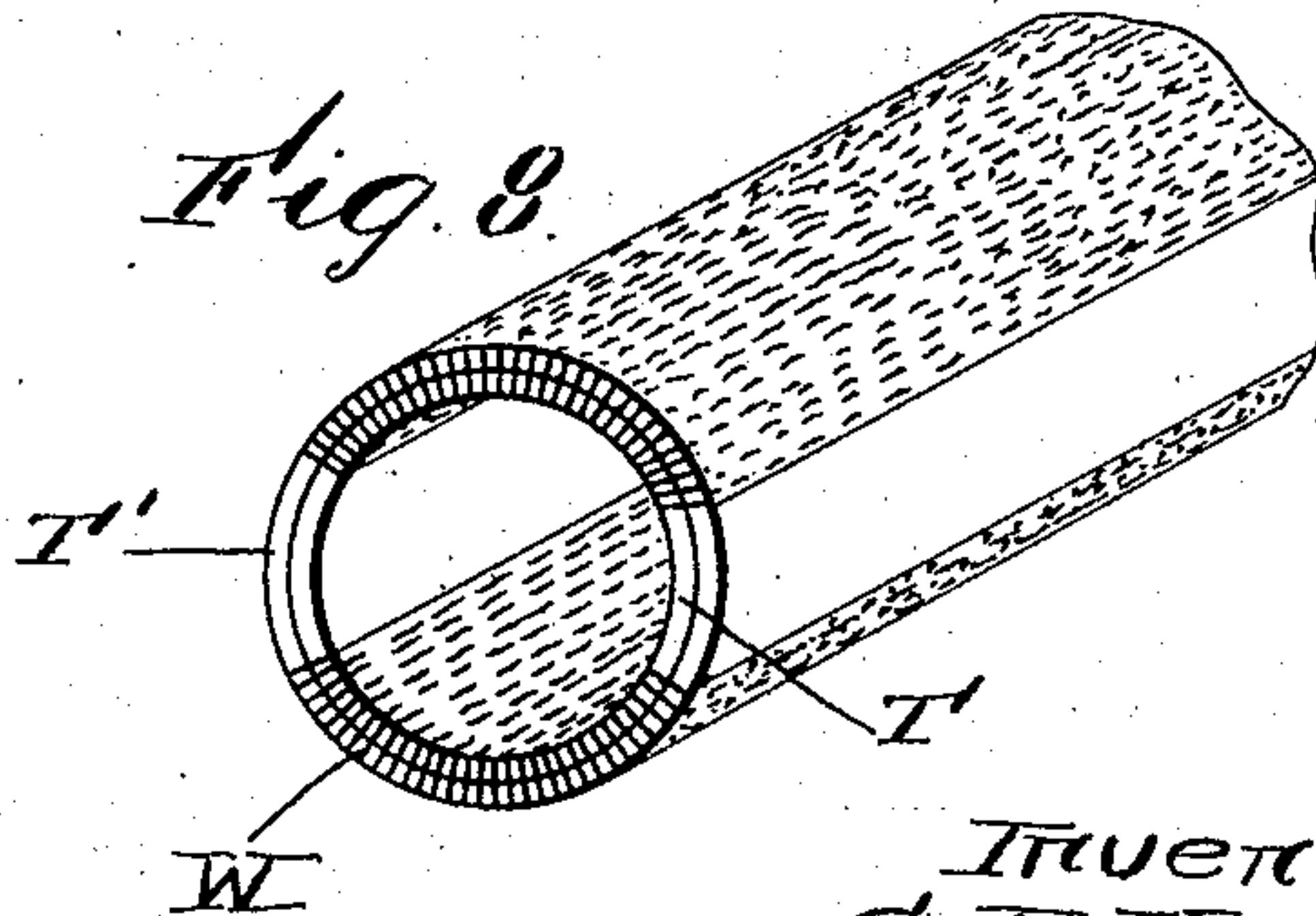


Fig. 8.

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UNITED STATES PATENT OFFICE.

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METHOD OF WEAVING MULTIPLE TUBULAR FABRICS AND HOSE-COVERINGS PRODUCED THEREBY.

SPECIFICATION forming part of Letters Patent No. 781,349, dated January 31, 1905.

Application filed May 23, 1904. Serial No. 209,244. (Specimens.)

To all whom it may concern:

Be it known that I, GEORGE D. MOORE, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Method of Weaving Multiple Tubular Fabrics and a Hose-Covering Produced Thereby, of which the following is a specification.

This invention relates to a method of weaving flattened concentric tubular fabrics.

The object of this invention is to employ flat weaving for the production of certain special fabrics the production of which has heretofore been accomplished only on circular looms or by circular weaving.

A further object of this invention is to provide a new fabric designed for use as a hose-covering which will be more durable than ordinary hose-coverings by reason of the fact that it can be more readily flattened and flexed.

To these ends this invention consists of the method of weaving and of the special fabric produced thereby, as hereinafter described, and more particularly pointed out in the claims at the end of this specification.

In the accompanying drawings, Figures 1 to 6 are diagrammatic views illustrating successive steps in weaving a fabric according to this invention. Fig. 1 illustrates the travel in one direction of the shuttle which forms the inner tube. Fig. 2 illustrates the travel in one direction of the shuttle which forms the outside tube. Fig. 3 illustrates the return travel of the shuttle which forms the inner tube. Fig. 4 illustrates the return travel of the shuttle which forms the outside tube. Fig. 5 illustrates an operation similar to that shown in Fig. 1 taking place in connection with a subsequently-formed shed, and Fig. 6 illustrates an operation similar to that shown in Fig. 2 taking place in connection with a subsequently-formed shed. Fig. 7 is a diagrammatic sectional view of the completed fabric,

showing the arrangement of binder-warps employed to form a special fabric for hose-coverings; and Fig. 8 is a perspective view of a piece of the completed fabric.

In weaving certain classes of fabrics, particularly in weaving multiply hose-coverings employed for the better grades of fire-hose, it has heretofore been deemed necessary to use circular looms and to employ the circular process of weaving. A circular loom is a comparatively expensive piece of apparatus, and the operation of a circular loom is considerably slower than the ordinary flat-weaving operations which are performed in the ordinary looms. By practicing my invention I have been enabled to produce a superior quality of this class of fabrics upon a flat loom and at a comparatively high speed. In addition to this my method may also be employed for weaving fabrics for other purposes—such, for example, as the fabrics required for belting or for other purposes.

Referring to the accompanying drawings for a detail description of the way my invention is carried out, as shown diagrammatically in Figs. 1 to 6, the warp-threads are divided to open a number of sheds.

In the present drawings I have illustrated my invention as applied to the production of a two-ply tubular fabric—that is to say, to the production of two simultaneously-woven flattened concentric tubes. It is to be understood, however, that my invention is also applicable to the production of fabrics comprising a greater number of concentric flattened tubes.

As shown in Figs. 1 to 6, the warp-threads are divided to form four distinct sheds—viz., the top and bottom sheds 10 and 13, which form the outside tube, and the intermediate or central sheds 11 and 12, which form the enclosed tube. In practicing my invention the shuttle A, which operates in the formation of the inside tube is first inserted through the

shed 12. The shuttle B, which operates in the formation of the outside tube, is next inserted through the shed 13, as shown in Fig. 2. The shuttle A is then returned through the lower intermediate shed 11, as shown in Fig. 3, and the shuttle B is returned through the bottom shed 10, as shown in Fig. 4. This completes one cycle of the method of weaving the fabric, and the sheds are then shifted so that at the next operation the shuttle A is passed through the next succeeding or subsequently formed shed, as shown in Fig. 5, and the shuttle B is passed through the subsequently formed shed, as shown in Fig. 6. In the particular construction illustrated two concentric tubes T and T' will be woven flat, as illustrated diagrammatically in Fig. 7.

This method of weaving tubular fabrics can be practiced with especial advantage in looms having a number of reed-spaces, and when such a loom is employed in practicing this invention the number of shuttle-boxes may be one less than the number of fabrics produced.

The fabric woven according to this invention consisting of the two flattened concentric tubes T and T' may have its different plies or layers tied together by means of binder-warps, according to the particular use for which it is intended to employ the fabric. For example, by using binder-warps, binding all four of the plies together, and especially by using binder-warps extending from each outside ply only part way through the combined thickness of all plies, I am enabled to produce a flexible and strong belting, as shown, for example, in my companion application for patent executed by me on even date herewith, Serial No. 209,245, filed May 23, 1904.

When a fabric produced according to this invention is to be employed as a hose-covering, I use a number of binder-warps W for stitching adjacent portions of the two concentric tubes T and T' together.

The binder-warps W may be used, if desired, to unite the entire circumference of the two tubes T and T'; but in practice and as illustrated in Figs. 6 and 7 I preferably use two series of binder-warps W, leaving two unconnected strips or sections at opposite sides of the tubes. This provides a form of fabric particularly adapted for use as a fire-hose covering.

In ordinary fire-department use the greater part of hose employed is now carried in hose carts or in special hose-teams, the hose being folded into lengths to lie upon the bottoms of the carts. By leaving comparatively flexible sections at opposite sides of the hose-covering, as shown, for example, in Fig. 7, the hose may be readily flattened and can be folded to the desired length without creasing the fabric and without straining the same to such

an extent as when the layers are united around the entire circumference of the hose-covering.

This hose-covering, it is to be understood, is provided with a rubber lining in the ordinary manner.

I am aware that numerous changes may be made in practicing my invention by those who are skilled in the art and in my new fabric for hose-coverings. I do not wish, therefore, to be limited to the details of operation or construction which have been herein set forth; but

What I do claim, and desire to protect by Letters Patent of the United States, is—

1. The method of weaving flat concentric tubular fabrics which consists in arranging warp-threads to open a number of sheds, inserting one weft-thread through one of the intermediate sheds, inserting a second and distinct weft-thread through the upper shed, returning the first weft-thread through another intermediate shed to form an inclosed tube, and returning the second weft-thread through the bottom shed to form an outside tube.

2. The method of weaving two concentric flattened tubes which consists in arranging warp-threads to open four sheds, inserting one weft-thread through one of the intermediate sheds, inserting a second separate and distinct weft-thread through the upper shed, returning the first weft-thread through the other intermediate shed to form the inclosed tube, and returning the second weft-thread through the bottom shed to form the outside tube.

3. The method of weaving concentric tubular fabrics for use as a hose-covering, which consists in arranging warp-threads to open a number of sheds, inserting one weft-thread through an intermediate shed, inserting a second and distinct weft-thread through the upper shed, returning the first weft-thread through another intermediate shed to form an inclosed tube, returning the second weft-thread through the bottom shed to form an outside tube and fastening said tubes together by binder-warps.

4. The method of weaving a fabric comprising two concentric flattened tubes for use as a hose-covering which consists in arranging warp-threads to open four sheds, inserting a weft-thread through one of the intermediate sheds, inserting a second separate and distinct weft-thread through the top shed, returning the first weft-thread through the other intermediate shed to form the inclosed tube, returning the second weft-thread through the bottom shed to form the outside tube, and in fastening the said tubes together by binder-warps around part only of their circumferences.

5. As an article of manufacture a hose-
covering fabric consisting of concentric tubes
secured together by binder-warps for part
only of their circumferences, whereby said
5 fabric may be readily flattened and folded.

6. As an article of manufacture a hose-
covering fabric consisting of two concentric
tubes secured together by binder-warps on
two opposite portions of their circumferences,

leaving flexible or hinged sections at opposite 10
sides of the tubes.

In testimony whereof I have hereunto set
my hand in the presence of two subscribing
witnesses.

GEORGE D. MOORE.

Witnesses:

PHILIP W. SOUTHGATE,
J. ELMER HALL.