

A. TURNER.
ELASTIC-FABRIC.

No. 170,606.

Patented Nov. 30, 1875.

Fig: 1.

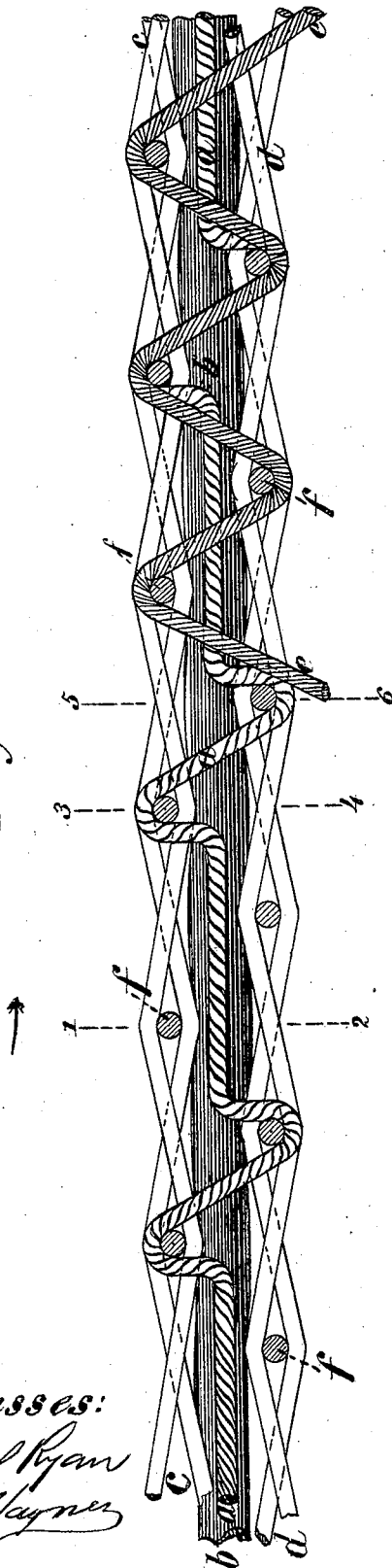
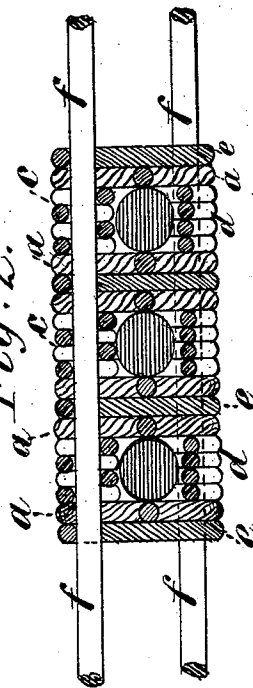


Fig: 2.



Witnesses:
Michael Ryan
Fred Wagner

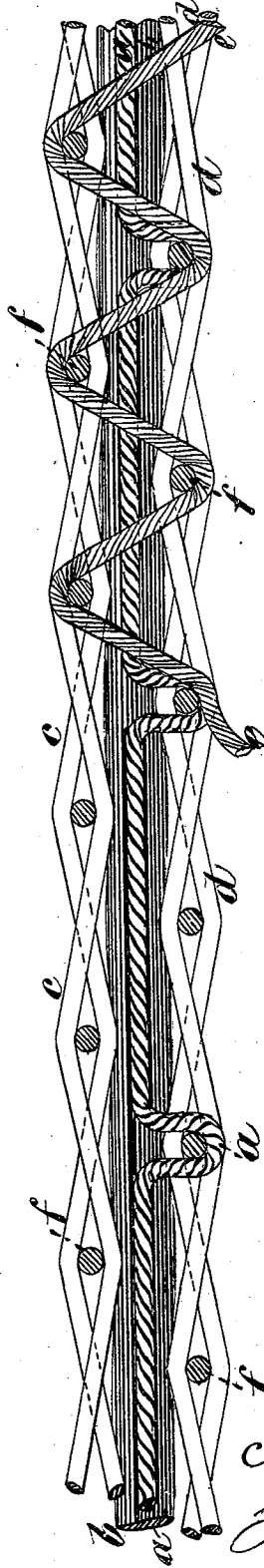
Archibald Turner
by his Attorneys
Brown & Allen

A. TURNER.
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Fig. 1^a.



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UNITED STATES PATENT OFFICE

ARCHIBALD TURNER, OF LEICESTER, ENGLAND.

IMPROVEMENT IN ELASTIC FABRICS.

Specification forming part of Letters Patent No. **170,606**, dated November 30, 1875; application filed August 30, 1875.

To all whom it may concern:

Be it known that I, ARCHIBALD TURNER, of Leicester, in the county of Leicester, England, have invented certain Improvements in the Manufacture of Elastic Fabrics, of which the following is a specification:

In the manufacture of what are known in the trade as "terry" elastic fabrics (in which strands of india-rubber are worked into the fabric for the purpose of imparting elasticity thereto) the non-elastic strands which form the face and back of the fabric have usually been woven in such a manner that by the combination of the face-warps, by means of binding-threads, with the warps which form the back of the fabric, the rubber strands are inclosed in separate tubes, in which they are, to a certain extent, free to extend or contract according to the thickness of the rubber, the size of the tubes, and the variation of the tension to which the fabric is subjected. This freedom of motion of the elastic strands in their tubes gives rise to no inconvenience so long as the elastic strands are held securely at both ends by sewing or otherwise, and while they remain unbroken; but should any of these strands be broken or cut, or be loosened at their ends, while they are in tension or stretched out in the fabric, they will immediately contract and run up in the tubes, and thereby destroy the elasticity of the fabric. If, however, these strands be tied or locked in the fabric throughout their length, they will be effectually prevented from running up in their tubes should they become accidentally broken, and yet their elasticity will not be materially interfered with. The object, therefore, of my invention is, by the introduction into the fabric of what I call locking-threads, to securely hold or lock the rubber strand at numerous points throughout their whole length. By this means the inconvenience resulting from the accidental breaking of the elastic strands will be avoided, as, should any elastic strand become accidentally broken, at even three or four places, all the other parts will be securely held, and therefore such parts will still retain their elasticity.

In carrying out my invention I take a loom, just as it is prepared with six or seven shafts for weaving elastic terry-fabrics in the ordinary

manner, and I add thereto another shaft for the purpose of introducing warp locking-threads. These threads are so woven into the fabric as to "lock" the rubber strands two shoots out of every four—that is to say, when the rubber strands are up the warp-locking threads are down, and when the latter are up the rubber strands are down. These threads, during the succeeding two shoots, rise and fall with the rubber strands, and, therefore, by filling the tubes they act as locking-threads, and they will secure the rubber strands, and prevent them from running up in the fabric, should any of them become broken.

Gut-threads, laid in the tubes parallel with the rubber strands throughout the fabric, have already been used for the purpose of filling the tubes, but these gut-threads have not heretofore been woven into the face or back warps, and therefore they do not lock the rubber strands, but have simply acted as filling or gut threads. Moreover, they could easily be drawn out of the fabric by taking hold of one end, provided the opposite end were loose. Moreover, these gut-threads are apt to produce an uneven surface on the fabric, whereas by weaving the additional warp-threads into the face and back warps at every third or fourth shoot these additional threads will be so combined and secured with the other parts of the fabric that they not only cannot be drawn out, but they can never produce any roughness or irregularity on the surface. This mode of weaving, moreover, improves the elasticity of the fabric. The locking-threads, during two shoots out of the four, fill in the tubes which inclose the rubber strands, and act as locking-threads, as they lock the rubber strands in the fabric. During the two other shoots the locking-threads, by being carried up and down into the face and back warps alternately, are not only so secured that they cannot be drawn out, but they leave more room in the tubes for the rubber strands, and consequently increase the elasticity of the fabric.

In order, however, that my invention may be more clearly understood, I have shown in the accompanying drawing diagrams drawn upon an enlarged scale, illustrating the improved mode of weaving or combining the additional or locking threads in the fabric.

Figure 1 is a diagram illustrating, upon an enlarged scale, the longitudinal arrangements of the several threads and strands of which the fabric is composed. Fig. 2 is a transverse section of the fabric, taken in the line 1 2 of Fig. 1, looking in the direction indicated by the arrow.

The straight longitudinal rubber strands *b* are shaded with horizontal lines. The warp-threads which form the face of the fabric are marked *c c*, while those which form the back of the fabric are marked *d d*, both sets of warp-threads being left plain. The binder-threads *e e*, which are carried alternately up and down from the face to the back warp, and vice versa, to form the tubes for the rubber strands, are shaded with diagonal lines, and the locking-threads *a a* are shaded with lines like a twisted cord. The transverse weft-threads *f f*, which are thrown across the fabric alternately above and below the rubber strands *b*, are indicated by circles at Fig. 1.

It should now be understood that when the locking-threads *a* have acted as locking-threads by running parallel with the rubber strands *b b* during two shoots, as shown in Fig. 1 at 1 2, then at the succeeding shoot they are lifted out of the tubes and woven into the face-warp, as indicated at 3 4 in Fig. 1. Then at the next shoot the locking-threads *a* are carried down into the back-warp, as indicated at 5 6 in Fig. 1. It will be seen that at the succeeding shoot they are left dead in the tubes, alongside of the rubber strands *b*, so as to act as locking-threads during the next two shoots.

From the above explanation it will be evident that, by this mode of weaving, the rubber strands *b* will be locked in the tubes which inclose them, and which are formed by the binder-threads *e e*, in combination with the face and back warps. The rubber strands will therefore be prevented from running up in the fabric should any of them become broken.

If desired, the locking-threads may, when a fabric with a silk face is to be produced, be made of cotton plaited or covered with silk, instead of a plain cotton thread.

As a modification of the mode just described of locking the rubber strands in the fabric the locking-threads may be carried down into the back of the fabric at every fourth shoot, in-

stead of alternately up to the face and down to the back at every fourth shoot. This modification will be best understood by referring to the longitudinal diagram, Fig. 1^a, in which the locking, binder, and other warp-threads are indicated by the same kind of shading and letters of reference as in Fig. 1.

The plan of locking shown at Fig. 1^a possesses certain advantages, inasmuch as, when locking-threads composed wholly of cotton are drawn up into the face-warp, as shown in the diagram, Fig. 1, they will appear through the face of the fabric as well as the back. Now, when locking-threads are introduced into a terry-fabric that has a silk face, locking-threads made wholly of cotton will, if introduced in the manner shown at Fig. 1, be liable to impart to the face of the silk web a mixed appearance of cotton and silk. This will be prevented by weaving the locking-threads into the back of the fabric alone, as shown at Fig. 1^a. The locking the rubber strands in the fabric is as effectually secured by the plan shown at Fig. 1^a as in that shown at Fig. 1.

It will be evident that in making a cotton fabric the method of locking shown in Fig. 1 will be most suitable for such a fabric, as, when the locking-threads composed wholly of cotton are carried up to the face of the fabric, it produces a more solid and firmer web. I do not, however, wish to confine myself to the plan shown at Fig. 1 for making cotton fabrics, as the method of locking shown at Fig. 1^a is equally applicable to cotton fabrics.

Having now described my invention of improvements in the manufacture of elastic fabrics, I wish it to be understood that I claim—

The combination of locking-threads with the binder warp-threads, the face or back warp weft-threads, and rubber strands, as herein set forth, for the purpose of locking the rubber strands in their tubes, and preventing them from running up in the fabric when broken, as above described.

Dated the 16th day of July, 1875.

A. TURNER.

Witnesses:

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