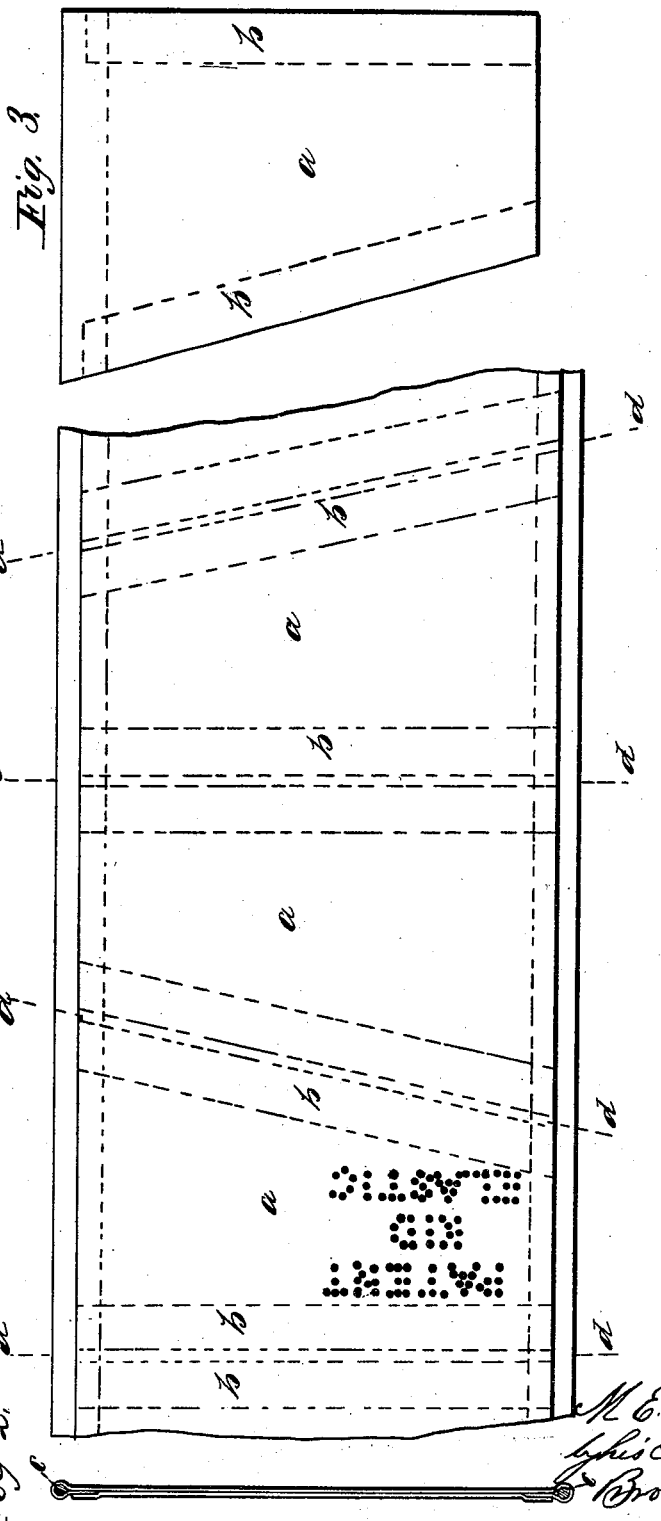
M. E. BOWRA.

Manufacture of Elastic Fabric.

No. 196,871. Patented Nov. 6, 1877.



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IMPROVEMENT IN THE MANUFACTURE OF ELASTIC FABRICS.

Specification forming part of Letters Patent No. **196,871**, dated November 6, 1877; application filed March 16, 1877.

To all whom it may concern:

Be it known that I, MATTHIAS EDWARD BOWRA, of Upper Norwood, in the county of Surrey, England, have invented a new and useful Improvement in the Manufacture of Elastic Fabrics; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

The object of this invention is to produce an elastic fabric which, for its strength, will have far more elasticity than fabrics of the like class heretofore manufactured, and which will admit of being attached by sewing to other fabrics, without the liability of its breaking away, as is the case with the elastic webbing at present employed to give elasticity to boots, shoes, stays, waistcoat-backs, and parts of other garments. To effect this latter object I provide a selvage for the elastic pieces—say, for those which are intended to be used as side springs to boots, and for equivalent purposes.

The manufacture which I propose to improve is that in which a loose fabric, such as is produced in the warp-lace machine or a woven fabric cut on the bias, is united with a sheet of india-rubber or other elastic compounds.

In manufacturing according to my invention, I take a loose woven or knitted fabric, by preference that produced in the warp-lace machine, whether composed of silk, cotton, or other fibrous material, and I stretch it until it is reduced in width to about one-third (more or less) of its original measurement. The fabric thus elongated I coat, while still at tension, with an india-rubber solution, for the purpose of affixing the fabric in its elongated form, and of enabling sheet india-rubber compound to be attached thereto. Suppose, for example, that it is desired to make side springs for boots, I cut the cemented knitted or woven fabric transversely into strips of a breadth somewhat less than the depth of a side spring required. I also cut from a sheet of india-rubber compound (properly vulcanized) strips of some four or five inches in width. These strips I extend lengthwise until their breadth is reduced to somewhat less than the breadth of the knitted-fabric strips. I then apply to the india-rubber strips lengths of tape, which are laid across them at suitable distances apart, dividing the strips up into tapering wedge-shaped pieces, as indicated in the accompanying drawings at Figure 1, where *a a* are the wedge-shaped pieces, with tapes *b b* at their sides. These tapes I secure in place by india-rubber cement. By thus arranging the tapes on the india-rubber strips, they will, when the compound fabric is cut up into pieces suitable for side springs, as hereinafter explained, form selvages to the side springs or elastic pieces. When the tapes are in place I turn over the longitudinal edges of the india-rubber strips and secure them by cement, so as to form a double thickness of elastic material at such parts as shown in the edge view, Fig. 2; and I may in some cases with advantage insert a cord of india-rubber in such laps, as shown at *c*, Fig. 2, in order to increase the strength while maintaining the elasticity of the fabric at that part; or, in place of turning over the edges of the sheet-rubber, I obtain a double thickness at their edges by cementing narrow strips of sheet-rubber to the inner face thereof.

While the india-rubber strips are still extended lengthwise, I apply to the surface on which the tapes are laid a coating of india-rubber cement, in order to attach thereto the cemented knitted fabric before mentioned. In effecting this attachment I first moisten the cemented surface of the fabric by an india-rubber solvent, and, having brought the moistened surfaces together, I strain the edges of the india-rubber strips to bring them even with the edges of the knitted fabric, taking care, by the interposition of a thin metal plate and some other non-absorbent material, to prevent the fabric and india-rubber from coming in contact except at their edges. As the edges are united I shift this plate forward along the strip, and by lateral extension of the india-rubber, as before, cause the india-rubber to unite with the edges of the knitted fabric, when the strips are thus united for the whole of their length, the interposed plate being shifted forward as the operation proceeds. I then, by rolling pressure, effect the complete adhesion of the two strips. The india-rubber strip is now to be released from tension, and allowed to contract lengthwise and regain its

original width. By this means an additional strain is put on the knitted fabric in the direction of its selvage, and the compound fabric will thus receive a great capacity to yield to a lateral strain. To give closeness and compactness to this compound fabric I next place it on a metal plate heated to about 130°, and by this means I still further contract it and give the knitted fabric an appearance of close texture.

The compound fabric having been shrunk, as above explained, I next cut it up into pieces, severing it, by means of cutting-dies, at the lines *d d*, between the parallel tapes, and I thus obtain side springs for boots possessing great elasticity and strength, with little tendency to wear, and with a selvage that will admit of stitches being used to secure the springs in place in the boot without the liability of the springs to tear away from the stitches. Fig. 3 shows one of these side springs detached.

By reference to Fig. 1 it will be seen that the opposite edges of the strip form for the side springs alternately a top and bottom edge. This is the consequence of the arrangement adopted for economizing the material. There is, however, no necessity for the elastic bottom edge; on the contrary, an increased thickness of the material at that part would be detrimental to the appearance of the finished boot. The bottom edge should therefore be cut away before the springs are used, as shown at Fig. 3.

From the foregoing it will be understood that, whatever the elastic article manufactured according to my invention, the same plan will be adopted for strengthening the side edges—that is to say, tapes or strengthening-strips will be applied to the sheet-rubber. These may be used of sufficient width, when employed in the manufacture of elastic sheets, to receive metal eyelets of a capacity that will allow of a lacing-cord being passed through them. The side springs for boots, and also the springs for corsets, may, if desired, be perforated to permit of ventilation through the fabric. This perforation may be in the form of an ornamental device, or of a trade-mark, as indicated by dots in Fig. 1, and it may be performed by suitable dies or punches at the time of the cutting up or severing of the strips to form the side springs.

Having now explained the nature of my invention and the manner of carrying it into effect, I would remark that I am aware that it has been proposed to strengthen sheet-rubber at the edges by inserting between two thicknesses of the same tapes or equivalent material. I do not, therefore, claim the combination of strengthening-strips with sheet india-rubber, except when used in the production of an elastic fabric, as above described.

What I claim as my invention is—

The manufacture of compound elastic fabrics by combining strips of cloth obtained from attenuated knitted or woven fabrics with strips of sheet india-rubber, prepared as above described, and while the latter are held at tension, and shrinking the same on heated plate, as explained.

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