

W. E. JEFFERSON.  
Elastic-Fabric.

No. 216,328.

Patented June 10, 1879.

Fig: 3.

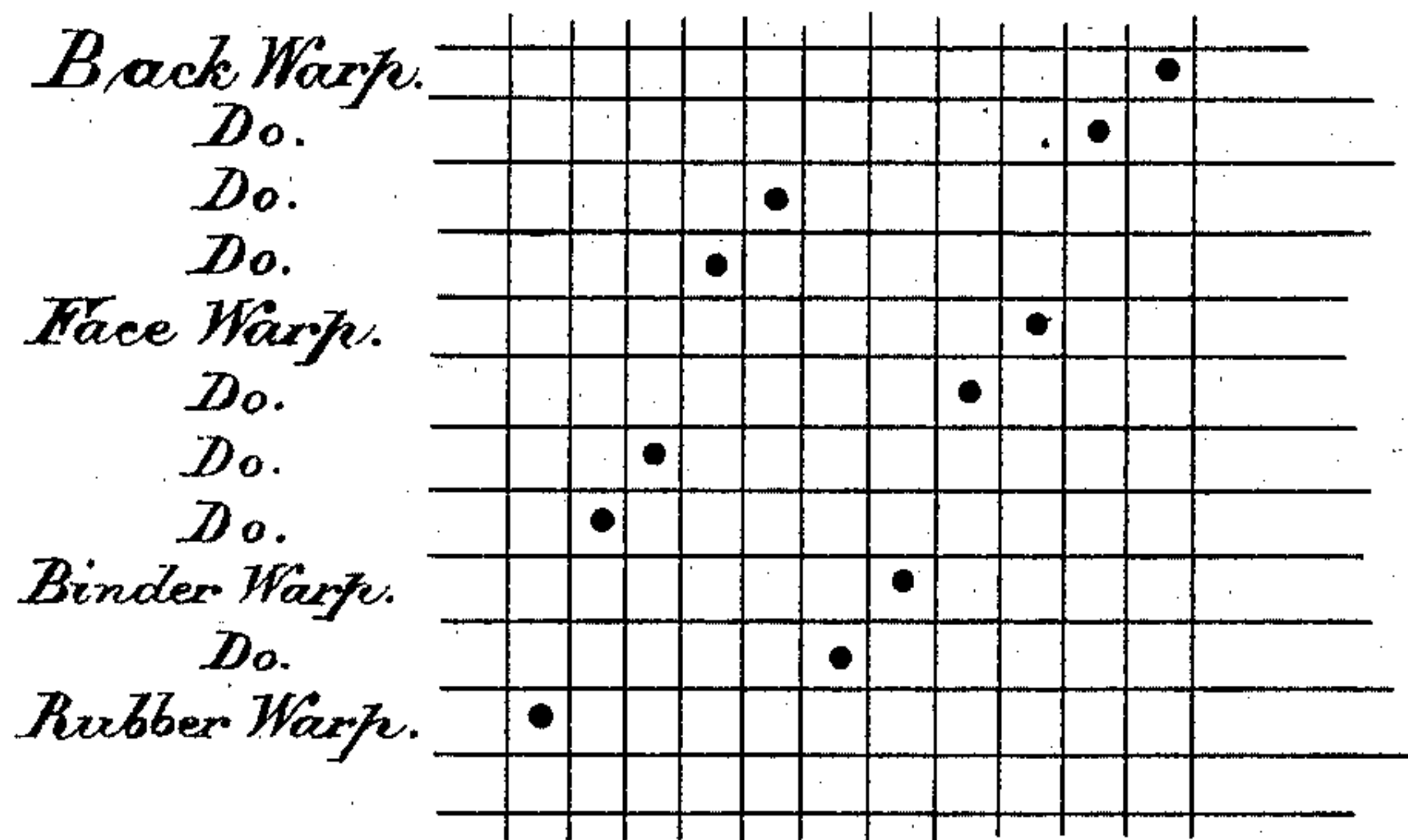


Fig: 1.

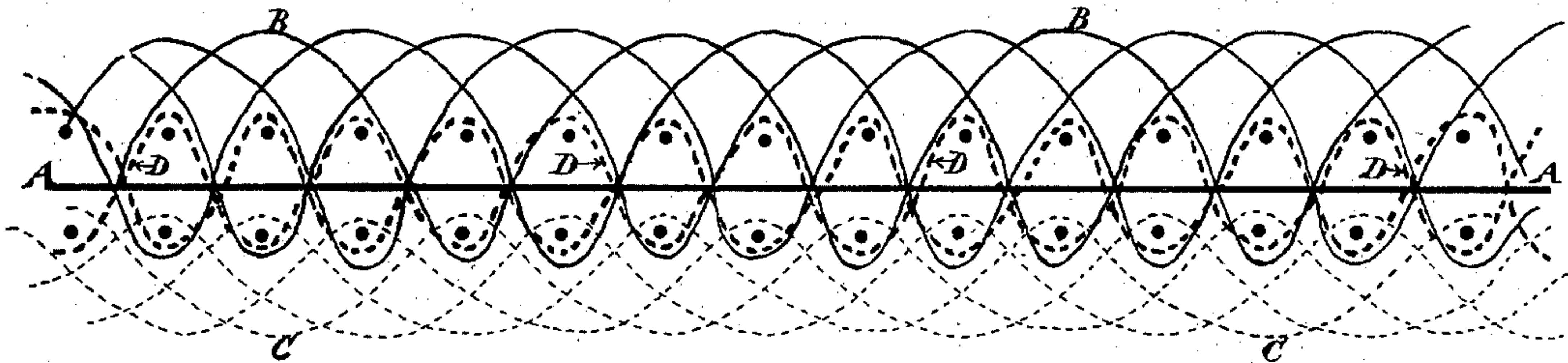
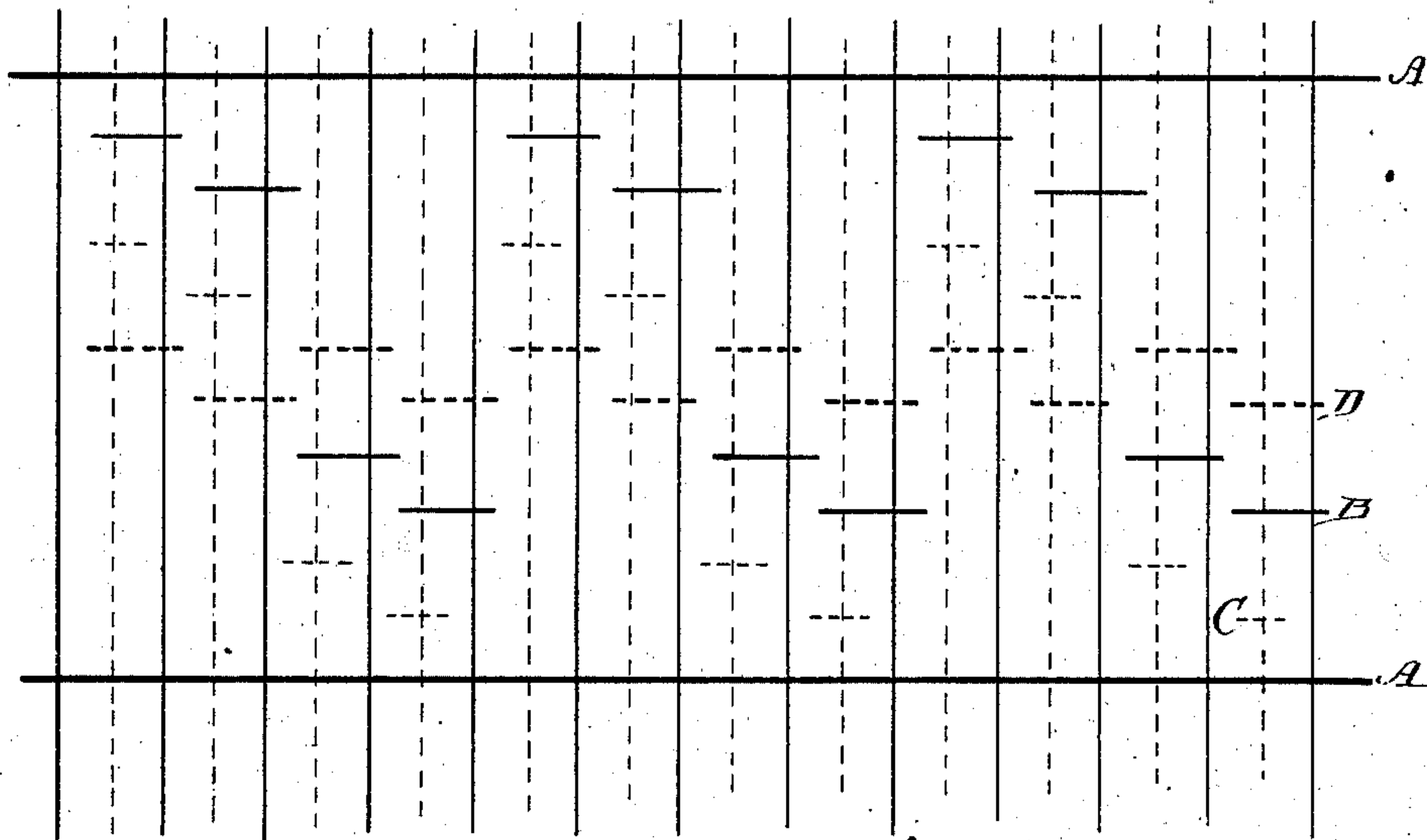


Fig: 2.



Witnesses  
John F. Paret  
J. H. Maynader.

Inventor  
William E. Jefferson  
By attys  
Palmer, Hopkins & Heywood.



# UNITED STATES PATENT OFFICE.

WILLIAM E. JEFFERSON, OF LEICESTER, ENGLAND.

## IMPROVEMENT IN ELASTIC FABRICS.

Specification forming part of Letters Patent No. **216,328**, dated June 10, 1879; application filed September 18, 1878; patented in England, May 28, 1878.

*To all whom it may concern:*

Be it known that I, WILLIAM ELLIS JEFFERSON, of the firm of Messrs. Henry Turner & Son, of Leicester, England, have invented a new and useful Improvement in Elastic Fabrics, which is fully set forth in the following specification, reference being had to the accompanying drawings.

By this invention it is proposed to improve those elastic terry-webs technically known as "trails." In these webs there are two weft-threads, which pass through the sheds at the same time in opposite directions, as in ordinary double-weft webs made in double-shuttle looms. In these trail-webs the warp-threads which form the terry-face each time they move to form a shed do so to the same extent as the warp-thread, which is technically known as the "binder," and are consequently secured in their position by both the weft-threads, and assist the binder in securing the rubber threads in the web, and to a very considerable extent prevent one of the worst evils elastic fabrics are subject to—viz., the slipping of the rubber thread out of its proper place in the web. But while ordinary trail-webs possess the great advantage of having their face warps and rubber threads more securely bound in their respective positions, they are subject to one great drawback as respects the reverse side or back of the web. This, in consequence of the face warps passing through to the back of the web, presents the appearance of alternate black and white zigzag lines, if those are the colors employed, instead of what is desired—a uniformly white or same-colored surface.

The object or purpose of this invention or arrangement is to produce a web which, while it possesses the appearance and security of a trail-web, also possesses the advantage of a uniformly white or colored back. For this purpose I employ, in addition to the face warps and binder-threads, another set of warps, forming the back. These have given to them the same motions as the face warps, but reversed; and, in addition, the back warps are not carried through to the face of the fabric, but are held with the binder-threads by one shuttle-thread only, while the face warps are carried through to the back and held by both

shuttle-threads. By this means there is no possibility of the back warps being seen in the face of the fabric even when the fabric is stretched.

In order that my invention may be fully understood and readily carried into effect, I have shown in the drawings hereunto annexed diagram views of an elastic fabric formed in the manner above described.

Figure 1 shows, on an enlarged scale, a longitudinal section of the fabric; Fig. 2, a diagram plan view; and Fig. 3 shows the order in which the different warps are drawn through the harness-shafts. The spaces between the horizontal lines represent the harness-shafts. The dots show the order in which the different warps are drawn through them.

In Figs. 1 and 2 the elastic threads of india-rubber are shown by the thick lines A. The face warps are shown by the thinner full lines B, the back warps by the fine dotted lines C, and the binder-warps by the coarse dotted lines D. The spots in Fig. 1 represent the back and face wefts. In Fig. 2 the front weft is shown by a vertical coarse line, and the back weft by a fine dotted line.

It must be understood that the back and front wefts in this diagram are underneath one another, as in the diagram of the fabric at Fig. 1. The various warps are shown where they are tied in by the wefts, and are represented by the same kinds of lines as in Fig. 1. Also, for each shoot of back and front wefts, one of the face warps is lowered to be caught by both wefts, while one of the back warps is raised to be caught by the back weft only. To effect this the heddles through which the face warps are threaded are connected to the longer arms of levers, the shorter arms having connected to them the heddles through which the back warps are threaded. Thus, when the face warps are lowered they descend a greater distance than the back warps rise.

In the fabric shown by the diagrams there are for each rubber warp four pairs of back and front warps and one pair of binder-warps, and for each shoot of back and front weft one of the binder-warps is lowered for both wefts to pass over it, while the other is raised to keep it above the wefts.



The elastic warps are, as is usual, stretched while the fabric is being woven. When the fabric has been woven and allowed to contract, the long floats of warp both on the back and face of the fabric gather up and form, as it were, terry-loops on the back and face of the fabric, while the binder-warps, which are weighted to a greater extent than the other warps and are crossed at each pair of shoots of weft, remain in the center of the fabric, and do not appear on the surface.

Thus it will be seen that the back of my new elastic fabric is formed by back warps in terry-loops.

Having thus described the nature of my invention and the manner of performing the same, I would remark that I do not confine myself to the exact number of back warps and front warps interposed between the elastic

threads, as this may be varied, as may also the order in which the warps are raised and lowered; but

What I claim is—

An improved elastic fabric containing, as heretofore, elastic warps and binder-warps, having the face formed by terry-loops of face warp, and the back by terry-loops of back warp, and with the face warps tied in by both the front and back wefts, while the back warps are tied in by the back weft only, substantially as hereinbefore described.

WILLIAM E. JEFFERSON.

Witnesses:

S. S. PARTRIDGE,  
*Solicitor, Leicester.*

GEO. M. HIND,  
*Whetstone Grange, Leicester.*