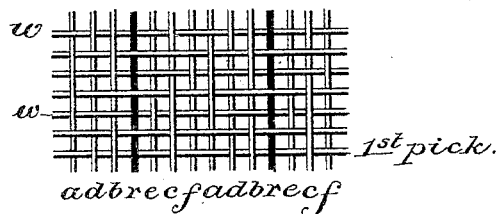


W. LAPWORTH.  
WOVEN ELASTIC OR CORDED FABRIC.

No. 454,366.

Patented June 16, 1891.

*Fig. 1.**Fig. 2.*  $w \begin{array}{cccc} \overset{\circ}{d} \overset{\circ}{b} \overset{\circ}{r} & \overset{\circ}{c} & \overset{\circ}{d} \overset{\circ}{b} \overset{\circ}{r} & \overset{\circ}{c} \\ \overset{\circ}{a} & \overset{\circ}{e} & \overset{\circ}{f} \overset{\circ}{a} & \overset{\circ}{e} \overset{\circ}{f} \end{array} \rightarrow$  *Pick N<sup>o</sup> 1.**Fig. 3.*  $w \begin{array}{cccc} \overset{\circ}{b} & \overset{\circ}{c} & \overset{\circ}{b} & \overset{\circ}{c} \\ \overset{\circ}{a} \overset{\circ}{a} & \overset{\circ}{r} \overset{\circ}{e} & \overset{\circ}{f} \overset{\circ}{a} & \overset{\circ}{r} \overset{\circ}{e} \overset{\circ}{f} \\ \overset{\circ}{a} & \overset{\circ}{r} \overset{\circ}{e} \overset{\circ}{c} & \overset{\circ}{a} & \overset{\circ}{r} \overset{\circ}{e} \overset{\circ}{c} \end{array}$  *Pick N<sup>o</sup> 2.**Fig. 4.*  $w \begin{array}{cccc} \overset{\circ}{d} \overset{\circ}{b} & \overset{\circ}{f} & \overset{\circ}{d} \overset{\circ}{b} & \overset{\circ}{f} \\ \overset{\circ}{a} & \overset{\circ}{c} & \overset{\circ}{a} & \overset{\circ}{c} \end{array}$  *Pick N<sup>o</sup> 3.**Fig. 5.*  $w \begin{array}{cccc} \overset{\circ}{d} \overset{\circ}{b} \overset{\circ}{r} \overset{\circ}{e} & \overset{\circ}{f} & \overset{\circ}{d} \overset{\circ}{b} \overset{\circ}{r} \overset{\circ}{e} & \overset{\circ}{f} \\ \overset{\circ}{a} & \overset{\circ}{b} \overset{\circ}{r} & \overset{\circ}{f} \overset{\circ}{a} & \overset{\circ}{b} \overset{\circ}{r} \overset{\circ}{f} \\ \overset{\circ}{a} & \overset{\circ}{e} \overset{\circ}{c} & \overset{\circ}{a} & \overset{\circ}{e} \overset{\circ}{c} \end{array}$  *Pick N<sup>o</sup> 4.**Fig. 6.*  $w \begin{array}{cccc} \overset{\circ}{a} & \overset{\circ}{b} \overset{\circ}{r} & \overset{\circ}{f} \overset{\circ}{a} & \overset{\circ}{b} \overset{\circ}{r} \overset{\circ}{f} \\ \overset{\circ}{a} & \overset{\circ}{e} \overset{\circ}{c} & \overset{\circ}{a} & \overset{\circ}{e} \overset{\circ}{c} \end{array}$  *Pick N<sup>o</sup> 5.**Fig. 7.*  $w \begin{array}{cccc} \overset{\circ}{a} & \overset{\circ}{b} & \overset{\circ}{a} & \overset{\circ}{b} \\ \overset{\circ}{d} & \overset{\circ}{r} \overset{\circ}{e} \overset{\circ}{c} \overset{\circ}{f} & \overset{\circ}{d} & \overset{\circ}{r} \overset{\circ}{e} \overset{\circ}{c} \overset{\circ}{f} \\ \overset{\circ}{d} \overset{\circ}{b} \overset{\circ}{r} & \overset{\circ}{c} & \overset{\circ}{d} \overset{\circ}{b} \overset{\circ}{r} & \overset{\circ}{c} \end{array}$  *Pick N<sup>o</sup> 6.**Fig. 8.*  $w \begin{array}{cccc} \overset{\circ}{a} & \overset{\circ}{e} & \overset{\circ}{f} \overset{\circ}{a} & \overset{\circ}{e} \overset{\circ}{f} \end{array}$  *Pick N<sup>o</sup> 1 of the repeat*

Witnesses:

Howard A. Eaton.

J. M. L. Emery.

Inventor:

William Lapworth.

by Lester Gregory  
attys.

(No Model.)

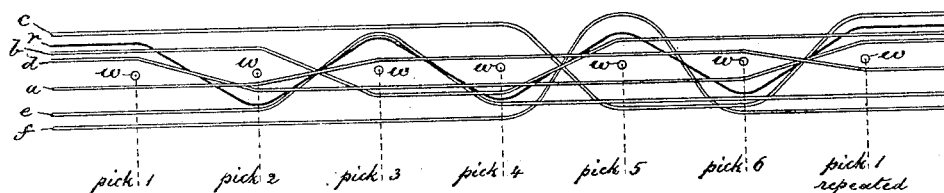
2 Sheets—Sheet 2.

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*Fig. 9.*



Witnesses.  
*John F. Le. Pringle*  
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Inventor.  
*William Lapworth.*  
*by Lewis & Gregory attys.*

# UNITED STATES PATENT OFFICE.

WILLIAM LAPWORTH, OF HOPEDALE, MASSACHUSETTS, ASSIGNOR TO THE  
HOPEDALE ELASTIC FABRIC COMPANY, OF SAME PLACE.

## WOVEN ELASTIC OR CORDED FABRIC.

SPECIFICATION forming part of Letters Patent No. 454,366, dated June 16, 1891.

Application filed May 25, 1889. Serial No. 312,080. (No specimens.)

*To all whom it may concern:*

Be it known that I, WILLIAM LAPWORTH, of Hopedale, county of Worcester, State of Massachusetts, have invented an Improvement in  
5 Woven Elastic or Corded Fabrics, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

10 This invention has for its object the production of an elastic or corded fabric having back and face of different colors without binder-warps.

Heretofore elastic fabrics without binders  
15 have been woven and of distinct and different colors at the back and face, as in United States Patent No. 283,100. The fabric described in that patent contains face and back warps and the pattern is completed in eight  
20 picks, each face warp standing up for six picks and down for two picks, the back warps being down for six picks and up for two picks.

In my improved fabric the pattern is completed in six picks. The face warp-threads  
25 in turn are each up for four picks and down for two picks, the back warps being down for five picks and up for one pick, such order of moving the warp-threads at the back and face of the fabric affording such crossings as to  
30 bind the rubber into the fabric more firmly than can be done in an eight-time motion. When non-elastic cords or heavy warps are substituted for the rubber warps, a corded fabric will be produced.

35 Figure 1 shows on an enlarged scale the warp and weft of a fabric made in accordance with this invention. Figs. 2 to 7, inclusive, show the positions of the warp and weft for each pick of the pattern; and Fig. 8 shows  
40 the first pick of the repeat of the pattern. Fig. 9 is a longitudinal sectional diagram illustrative of my improved fabric.

Referring to Fig. 1, the warp-threads *a b c*  
45 are face threads, and those marked *d e f* are back threads and of a different color from the face threads.

The threads marked *r* are supposed to be of india-rubber.

The weft-threads are designated by the let-  
50 ter *w*.

All the warp-threads *a* are held in the heddles of one harness-frame and those *b* in another, and so on throughout for all the other threads *c, d, e, f*, and *r*, so that all the threads designated by like letters are moved in uni- 55 son.

I have herein shown enough warp-threads to fill two spaces of the reed and enable both back and face of the fabric to present a three-  
60 leaf twill, three threads for both the back and face being required in each dent to make a full twill at each side of the fabric.

Fig. 2 shows the position of the warp for the first pick, and Figs. 3 to 7 the succeeding  
65 picks to complete the pattern, Fig. 8 being like Fig. 2, or showing the first pick of the repeat.

Referring to Fig. 2, showing the first pick, the face thread *a* is down and it remains down for the second pick, as shown at Fig. 3, 70 but is raised in Figs. 4 to 7, which show the third to the sixth pick, it being down again in Fig. 8. The back thread *d* is up in Fig. 2, down in Figs. 3 to 7, being raised in Fig. 8. The face thread *b* is up in Figs. 2 and 3 and  
75 down in Figs. 4 and 5, and up again in Figs. 6 and 7 and in Fig. 8, which is the commencement of the repeat. The rubber *r*, as it will be noticed, is up at one pick and down at the next pick alternately, or, in other words, on  
80 opposite sides of the weft at alternate picks. The back thread *e* (see Fig. 2) is down, as also in Fig. 3; but it is up in Fig. 4 and down in the remaining figures. The face thread *c* (see Fig. 2) is up and it remains up in Figs. 85 3, 4, and 5, being down in Figs. 6, 7 and up in Fig. 8, and the back thread *f* (see Fig. 2) is down and it remains down in Figs. 3, 4, and 5, coming up in Fig. 6, which represents  
90 the fifth pick, and being down in Figs. 7 and 8.

The fabric described may be woven in any loom usually employed to weave elastic fabrics, a single shuttle being used.

I claim—

The herein-described fabric, composed of 95 independent sets of face and back warps of different colors, rubber or cord warps and a weft, the face warps being above or on the face side of the weft for four picks and below  
100 or on the back of the weft for two picks, and

the independent back warps being below or  
on the back of the weft for five picks and  
above or on the face side of the weft for one  
pick, and the rubber or cord warps being on  
5 opposite sides of the weft at alternate picks,  
whereby the pattern is completed at every  
six picks, substantially as set forth.

In testimony whereof I have signed my  
name to this specification in the presence of  
two subscribing witnesses.

WILLIAM LAPWORTH.

Witnesses:

GEO. W. GREGORY,

A. S. WIEGAND.