

(No Model.)

2 Sheets—Sheet 1.

W. MARTIN.
ELASTIC FABRIC.

No. 246,024.

Patented Aug. 23, 1881.

1 2 α 3 4 5 6 α 7 8 9 10 α 11 12 13 14 α 15 16 17 18 α 19 20 Fig. 1.

1 α 4 5 α 8 9 α 12 13 α 16 17 α 20 b1 Fig. 2.
2 3 6 7 10 11 14 15 18 19

1 4 5 8 9 12 13 16 17 20 b2 Fig. 3.
2 α 3 6 α 7 10 α 11 14 α 15 18 α 19

1 2 α 5 6 α 9 10 α 13 14 α 17 18 α b3 Fig. 4.
3 4 7 8 11 12 15 16 19 20

1 2 5 6 9 10 13 14 17 18 b4 Fig. 5.
α 3 4 α 7 8 α 11 12 α 15 16 α 19 20

2 α 3 6 α 7 10 α 11 14 α 15 18 α 19 b5 Fig. 6.
1 4 5 8 9 12 13 16 17 20

2 3 6 7 10 11 14 15 18 19 b6 Fig. 7.
1 α 4 5 α 8 9 α 12 13 α 16 17 α 20

α 3 4 α 7 8 α 11 12 α 15 16 α 19 20 b7 Fig. 8.
1 2 5 6 9 10 13 14 17 18

3 4 7 8 11 12 15 16 19 20 b8 Fig. 9.
1 2 α 5 6 α 9 10 α 13 14 α 17 18 α

1 α 4 5 α 8 9 α 12 13 α 16 17 α 20 b9 Fig. 10.
2 3 6 7 10 11 14 15 18 19

Witnesses;

H. I. Dudley.
John R. Coffey

Inventor;
William Martin
By Porter & Hutchinson Atty

(No Model.)

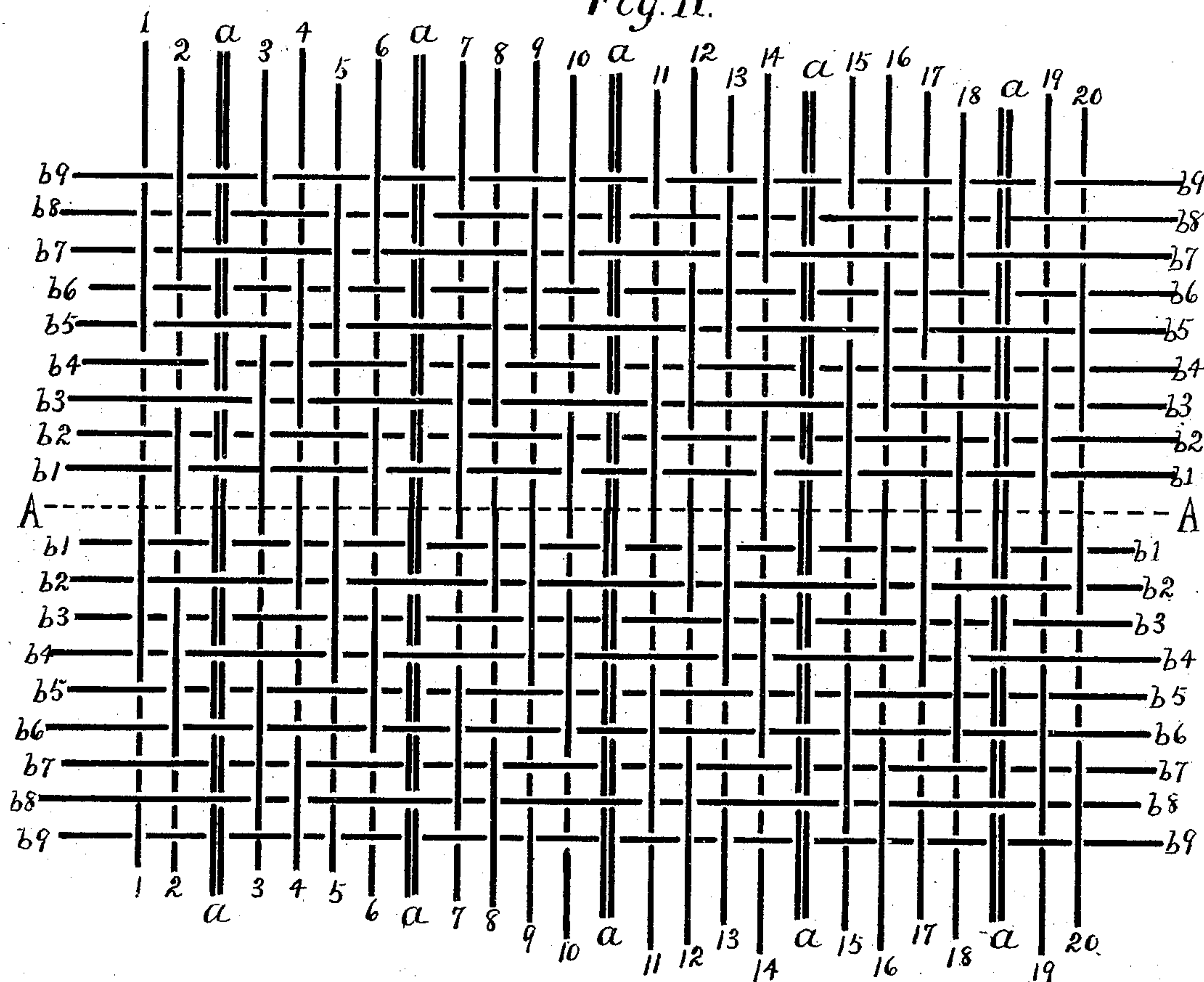
2 Sheets—Sheet 2.

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Fig. 11.



Witnesses:

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John R. Moffitt

Inventor:

William Martin
By Porter & Hutchinson Atty.

UNITED STATES PATENT OFFICE.

WILLIAM MARTIN, OF CHELSEA, MASSACHUSETTS, ASSIGNOR TO HIMSELF,
THOMAS MARTIN, AND ALFRED HOPKINS, BOTH OF SAME PLACE.

ELASTIC FABRIC.

SPECIFICATION forming part of Letters Patent No. 246,024, dated August 23, 1881.

Application filed March 5, 1881. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM MARTIN, of the city of Chelsea, State of Massachusetts, have invented an Improvement in Elastic Fabrics, of which the following is a specification.

This invention relates to that class of fabrics in which are interposed, at certain intervals among the fibrous non-elastic warp-threads, gum-elastic warp-threads, which, while the weaving is in process, are kept at a proper degree of tension, so that when the web is released from the loom said elastic threads will contract the length thereof, thereby habitually holding such non-elastic warp-threads in a condition of contraction, so that when the requisite force is applied the fabric may be stretched to the limit of such non-elastic threads, thus rendering such fabric elastic or expansible beyond its length when in a condition of quiescence; and my invention consists in the arrangement, in the woven fabric, of the elastic and non-elastic warp-threads relatively to the filling-threads, whereby such elastic warp-threads are securely bound in the fabric without the binding-warp which is usually employed for that purpose, while the same warp makes both faces of the fabric.

The order of arranging the elastic and non-elastic warp-threads, and the order of forming the different sheds for the introduction of the filling-threads, for the purpose of producing said results, is shown in the accompanying drawings, which, with due reference to the serial numbers, will be hereinafter fully described in connection with the description of my said invention, which at the conclusion hereof will be specifically claimed.

Figure 1 is an end elevation of the warp-threads as I arrange them for the production of my improved fabrics. In said figure there are shown five elastic threads and twenty non-elastic threads, the several elastic threads being marked *a* in all the figures, and being, for purpose of ready identification, shown in Figs. 1 to 10 as a small circle. There are two non-elastic warp-threads arranged outside of each outer elastic thread, and between each two elastic threads there are arranged four non-elastic threads, as shown.

In practicing my invention any desired number of elastic threads may be employed, according to the desired width of the fabric, and the requisite number of non-elastic threads will, of course, be in due proportion to the number of elastic threads; but I prefer the order and ratio above shown in usual widths of fabrics; but such ratio may be raised as desired.

In Figs. 2 to 10 the filling-threads are shown by the horizontal lines therein, indicated by the numerals 1 to 9, accompanied by the letter *b*, as there shown. It will be observed, as shown in said figures, that at every "pick" all the elastic threads change positions relatively to the filling. As in Fig. 2, all said elastic threads are above the filling-thread *b'*, while in Fig. 3 all said elastic threads are below filling-thread *b''*, and the elastic threads thus alternate at every pick, by which means said threads are so bound by the filling-threads as to be incapable of slipping from between the same when subjected to expansive force or tension.

The order of opening the non-elastic warp-threads is as follows: After the two first picks each of said threads stands either up or down four times in its order, and then reverses its position, where it stands the next four picks, as will be next explained. At the first opening of the shed, as shown in Fig. 2, the first, fourth, fifth, eighth, ninth, twelfth, thirteenth, seventeenth, and twentieth non-elastic warp-threads stand up, while the second, third, sixth, seventh, tenth, eleventh, fourteenth, fifteenth, eighteenth, and nineteenth non-elastic warp-threads stand down—that is, below the filling-thread *b'*—and the elastic threads *a* all stand up—that is, above said warp-thread; and at the second opening of the shed all the non-elastic warp-threads retain the same positions as at the first opening of the shed, while said elastic threads reverse their position and stand below warp-threads *b''*; but at the third opening of the shed the non-elastic threads two, six, ten, fourteen, and eighteen change their position from below to above the filling-thread *b'''*, and the non-elastic threads four, eight, twelve, sixteen, and twenty change their position from above to below the filling-

thread b^3 . These changes of the second, fourth, sixth, eighth, tenth, twelfth, fourteenth, sixteenth, eighteenth, and twentieth non-elastic threads at the third opening of the shed is for the purpose of bringing such threads into the proper order of change—above and below the filling-threads—relatively to the other non-elastic warp-threads, which others, as shown in the drawings, stand four up and four down from the commencement, as do these even-numbered threads after said two first picks. The system of forming my fabric being this, that as each non-elastic warp-thread is to be alternately above and below the filling-threads for four successive picks, therefore at the conclusion of every eighth pick every non-elastic warp-thread will have been four times above and four times below the filling-thread, as is shown in Figs. 2 to 9, and that at the next pick after each eighth pick all the non-elastic warp-threads will have resumed the exact position relatively to the filling-thread which they occupied at the first pick, as shown in Figs. 2 and 9.

In Fig. 11 the vertical lines indicate the warp-threads corresponding to those shown in Figs. 1 to 10, and the horizontal lines indicate the filling-threads, marked to correspond with those shown in Figs. 2 to 10, the dotted line A indicating the beginning or first end of the web, and that portion shown below said line representing the top or face side of the cloth or fabric, as exhibited in said Figs. 2 to 10, while the portion shown above said line represents the under or reverse side of the fabric, the crossing of the lines or threads in both parts of said Fig. 11 corresponding with the positions of the threads, as shown in said Figs. 2 to 10.

It will of course be understood that the relative positions of the threads are exaggerated in point of distance, in order the more clearly to show such position or order in the several figures.

I do not claim, broadly, the described method or order of arranging the non-elastic warp-threads—that is, four up and then four down, for the production of the twill upon both faces of the cloth—as the same may have been heretofore practiced, my invention being confined to such arrangement of the non-elastic threads in a fabric having elastic warp-threads arranged in a different order; but

What I do claim is—

1. An elastic fabric having the elastic warp-threads a , reversed relatively to the filling at every pick, and having the non-elastic warp-threads reversed at every fourth pick, whereby said elastic threads are bound by the filling-threads, and the fabric is twilled upon both its faces, substantially as specified.

2. An elastic fabric wherein the elastic threads are bound by the filling-threads without a binding-warp, and both the faces of the fabric are twilled, substantially as specified.

3. An elastic fabric having elastic and non-elastic warp-threads, and wherein such elastic threads are reversed relatively to the filling at every pick, while the non-elastic warp-threads are reversed at every fourth pick, whereby said elastic threads are bound in place by the filling, and the same work produces a twilled surface upon each face of the fabric, substantially as specified.

WILLIAM MARTIN.

Witnesses:

T. W. PORTER,
KATE BLAZO.