(No Model.)

L. ELLIOTT.

ROLL FOR MAKING INDIA RUBBER SOLING.

No. 315,262. Patented Apr. 7, 1885.

Fig. 2.

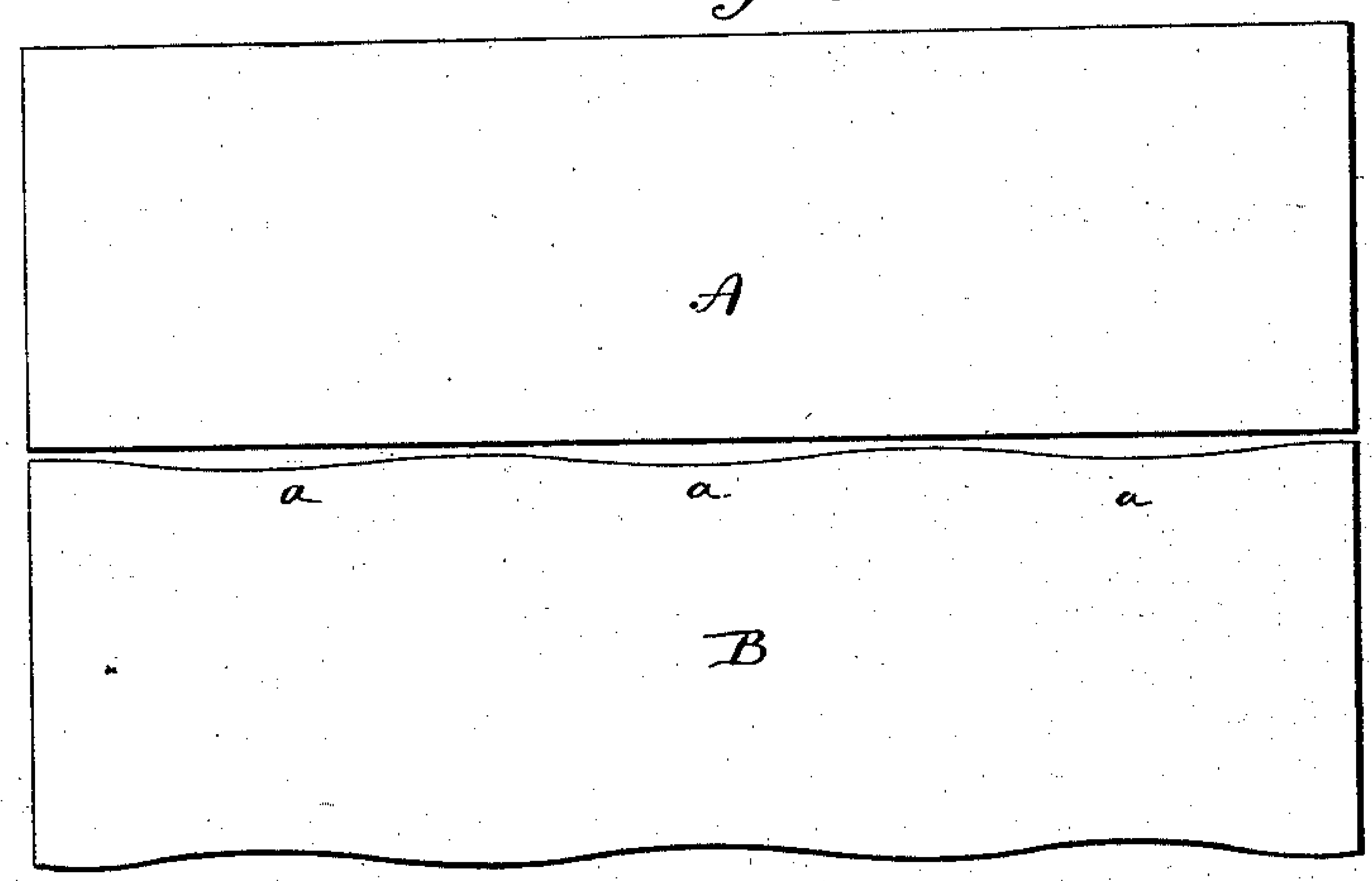


Fig. 1

Fig. 3.

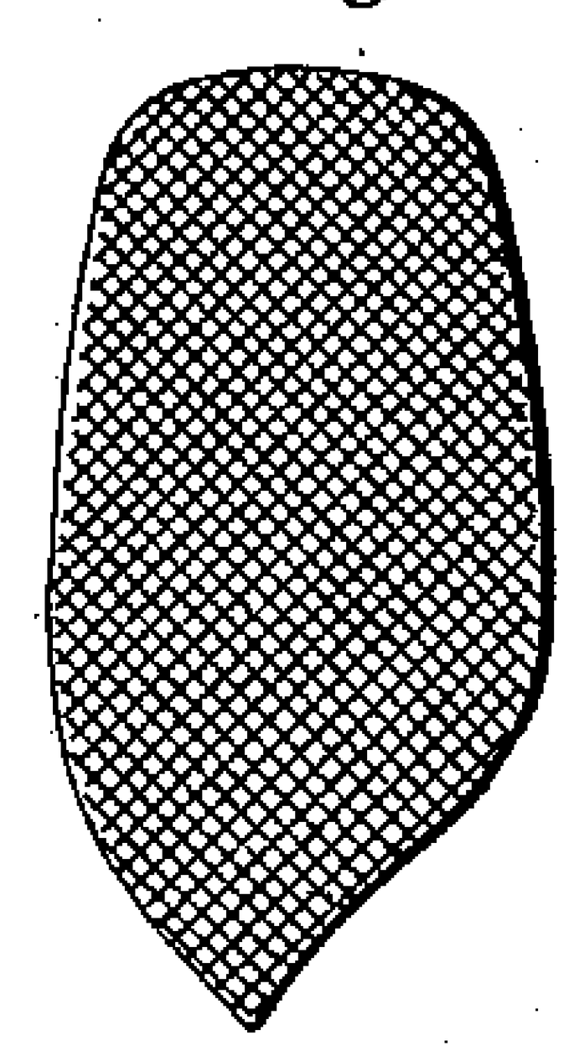


Fig. 4

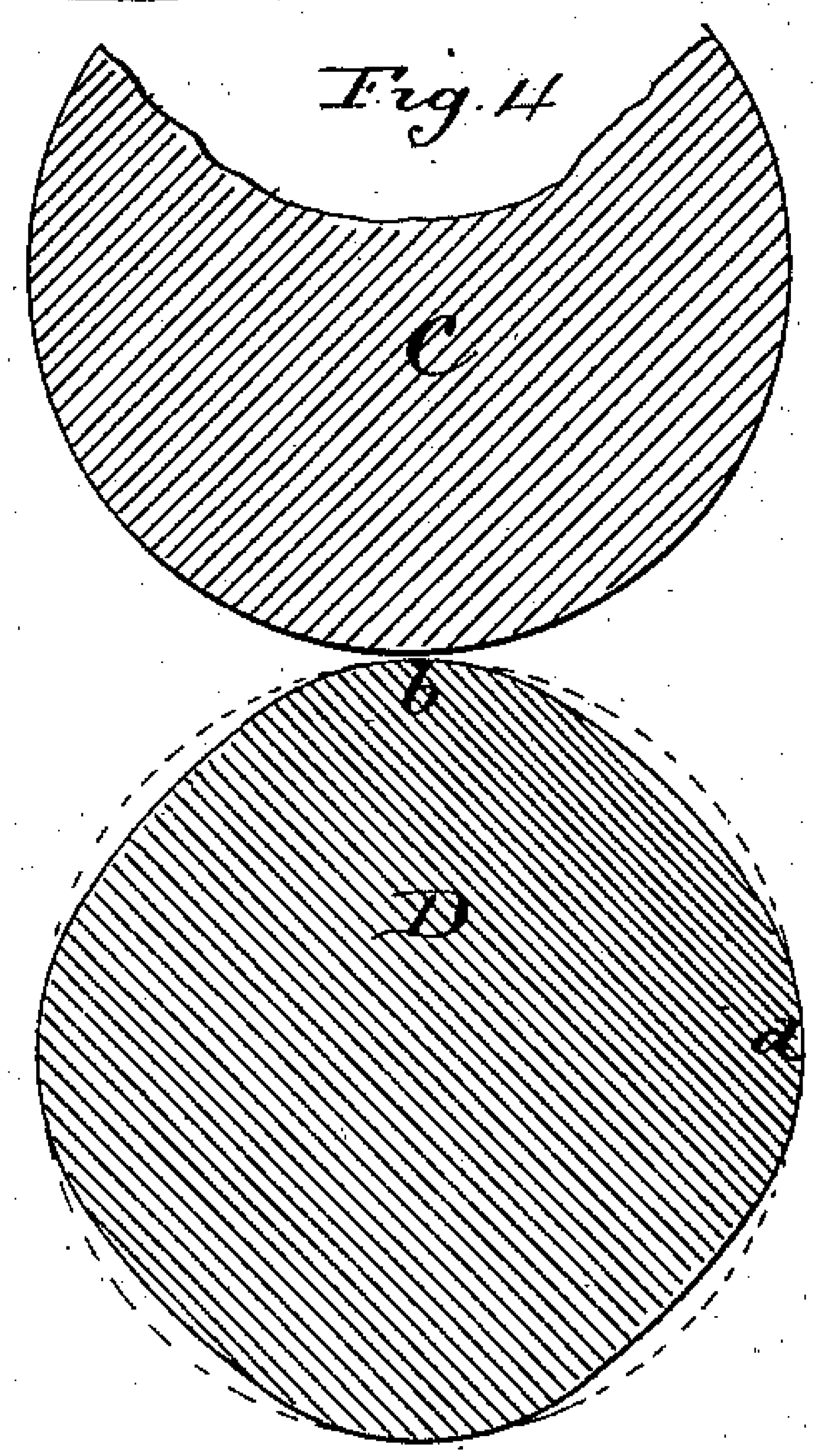


Fig. 5

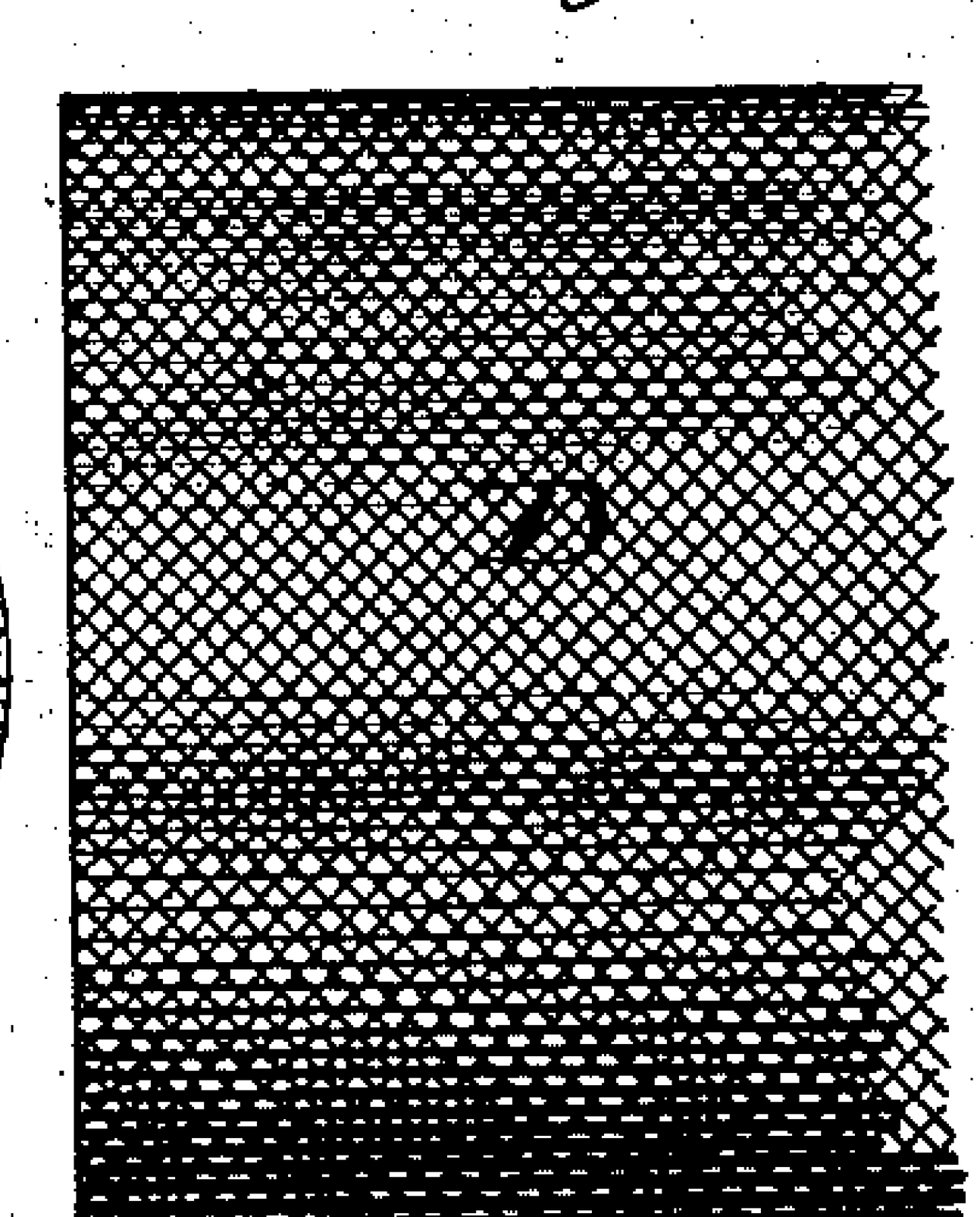


Fig. 6

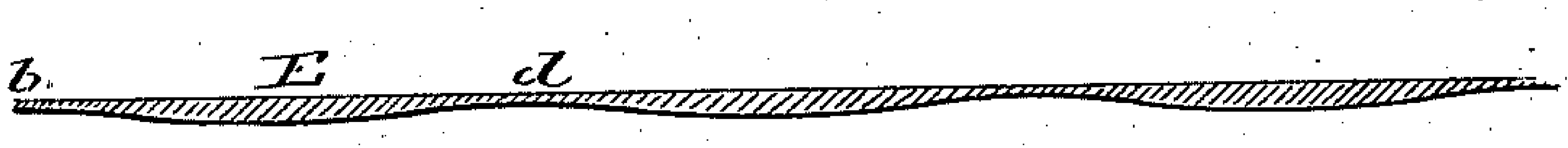
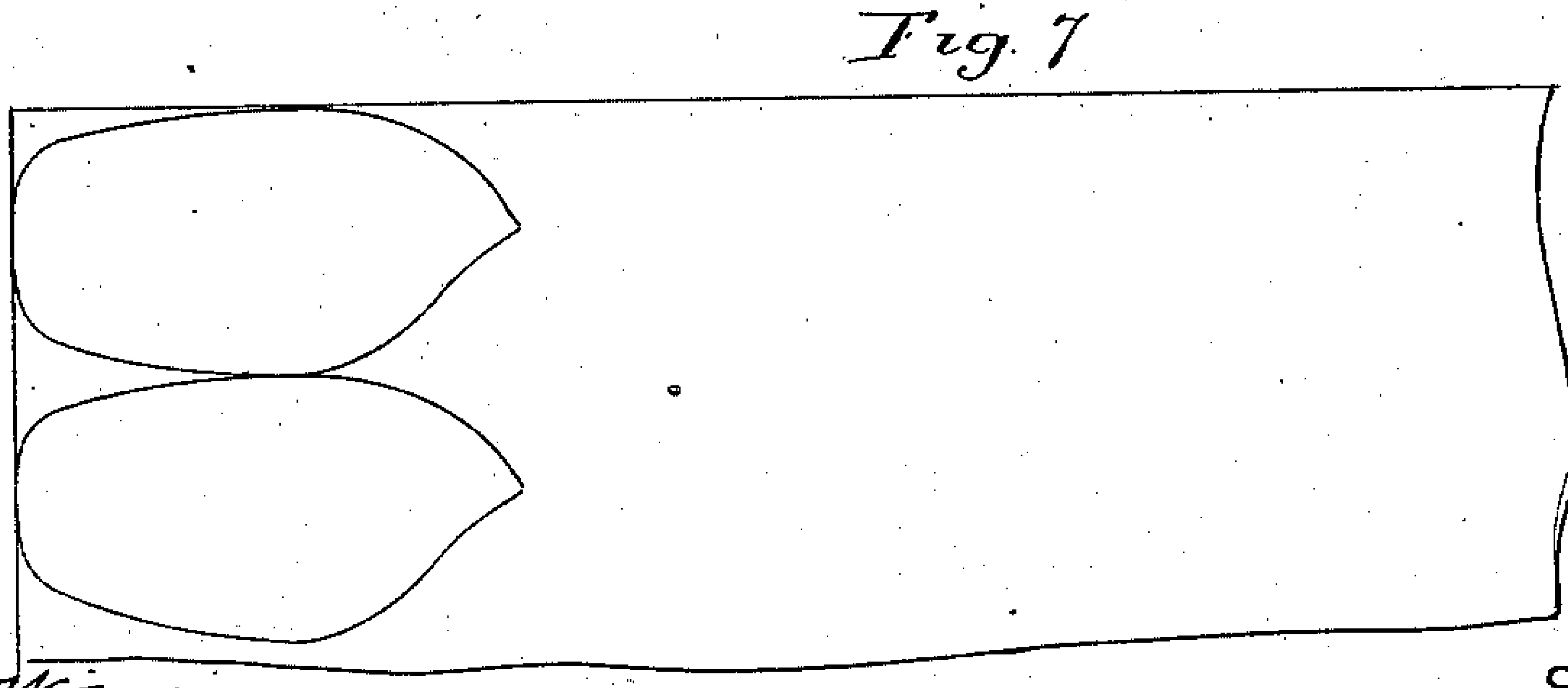


Fig. 7



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UNITED STATES PATENT OFFICE.

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ROLL FOR MAKING INDIA-RUBBER SOLING.

SPECIFICATION forming part of Letters Patent No. 315,262, dated April 7, 1885.

Application filed March 9, 1885. (No model.)

To all whom it may concern:

Be it known that I, LEWIS ELLIOTT, of New Haven, in the county of New Haven and State of Connecticut, have invented a new Improvement in Rolls for Making India-Rubber Soling; and I do hereby declare the following, when taken in connection with accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a longitudinal section of a sole to the making of which this invention particularly relates; Fig. 2, a face view of the rolls as heretofore constructed for making this soling; Fig. 3, an under side or face view of a single sole; Fig. 4, a transverse section through the two rolls, the one D showing my improvement; Fig. 5, a side view of the roll D; Fig. 6, a longitudinal section through the sheet as produced by my improved rolls; Fig. 7, a face view of the sheet, showing the method of cutting the soles from the sheet.

This invention relates to an improvement in rolls for rolling sheets of india-rubber preparatory to cutting soling for boots and shoes therefrom, and with special reference to the soling for which Letters Patent were granted to Geo. Watkinson, July 31, 1883, No. 282,423.

That invention consists in making the sole thicker at the ball than at the toe and shank portions, whereby the principal wearing part of the sole will be made considerably heavier than that portion where the wear is less. Fig. 1 shows a longitudinal section of that soling.

Heretofore in preparing the sheet of rubber for soling it has been rolled so that the longitudinal line of the sole was transversely across the sheet. In such rolling the one roll has annular cavities formed in its periphery corresponding to the outer surface of the sole, the other roll flat, such rolls being seen in Fig. 2. A represents the flat roll, and B the second roll, in which, as here represented, are three annular cavities, *a a*. The space longitudinally between the rolls corresponds to the longitudinal section through the sole which is to be cut from the sheet. The cavities give to the material the increased thickness required for the sole. As the outer surface of the sole is required to be roughened, as seen in Fig. 3, the surface of the cavities in the roll B must be correspondingly cut. This cutting is an expensive operation, and special machinery is necessary to work through the cavities in the roll. Again, the rolling of the sheet lays the grain in the direction of the length of the sheet—that is, at substantially right angles to the axis of the roll. This brings the grain of the rubber transversely across the sole, rendering it liable to break, as the bend of the sole is from shank to toe. The strain of bending always comes across the grain of the rubber.

The object of my invention is to obviate a considerable portion of the expense in the manufacture of the rolls, as well as to turn the grain of the rubber in the direction of the length of the sole.

To this end my invention consists in a pair of rolls, one of which is constructed with depressions longitudinally, or in the direction of its length, corresponding to the variation in the thickness of the sole, as more fully hereinafter described.

C represents one roll, which is cylindrica D, the other roll. The surface of the roll D is constructed with a cavity longitudinally across it, varying from a cylindrical shape to the extent of variation in the thickness of the sole from toe to heel, *b* indicating the toe and *d* the shank points. The surface of these longitudinal cavities is readily cut to give the required figure or design of roughness on the bottom of the sole, and the sheets run through between the rolls will present the thickened portions parallel with each other, but across the sheet, and at right angles to the movement of the sheet through the rolls, and so that the direction of the grain of the rubber is from the thin portion through the thicker portion—that is, in the direction of the length of the shoe.

In Fig. 6 I show a longitudinal section of this soling, *b* representing the toe-point and *d* the shank-point of the first section, E, succeeding sections being the same. From the sheet thus rolled the soling is cut, as seen in Fig. 7, the length of the sole being in the di-

rection of the length of the sheet, instead of across the sheet, as in the sheet as heretofore rolled. The result of the employment of these rolls is, that the sole is much stronger than when rolled so that the cut is transversely across the sheet, and the cost of finishing the rolls is very greatly reduced.

The roughening for the outer surface of the sole may be made upon the cylindrical roll, the other roll in which the depressions are formed longitudinally on the roll being smooth. In this case the inner surface of the sheet will be produced by the irregular roll, and the outer surface by the cylindrical roll; but I prefer to make the roughened surface on the irregular roll.

I claim—

The herein-described improvement in rolls for making india-rubber soling, consisting in constructing one of the rolls with depressions longitudinally on the roll, corresponding to the variation in the thickness of the sole, substantially as described, and whereby the line of the sole to be cut will be in the direction of the length of the sheet rolled, substantially as described.

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