

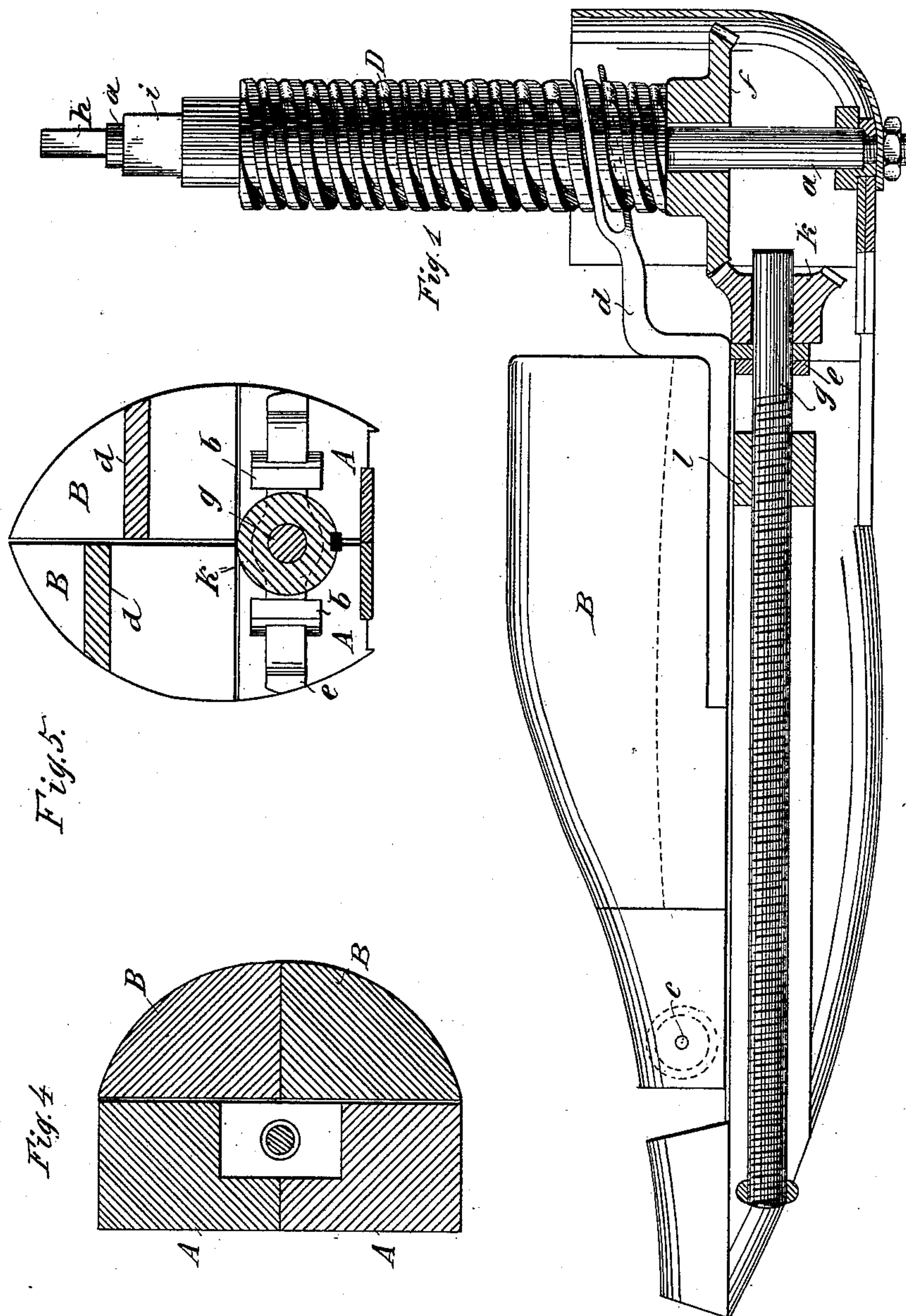
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5 Sheets—Sheet 1.

B. THORNER.
SHOE LAST.

No. 432,454.

Patented July 15, 1890.



Witnesses.
C. Sedgwick
J. M. Patton

Inventor
B. Thorner
by Munn & Co.
Attorneys

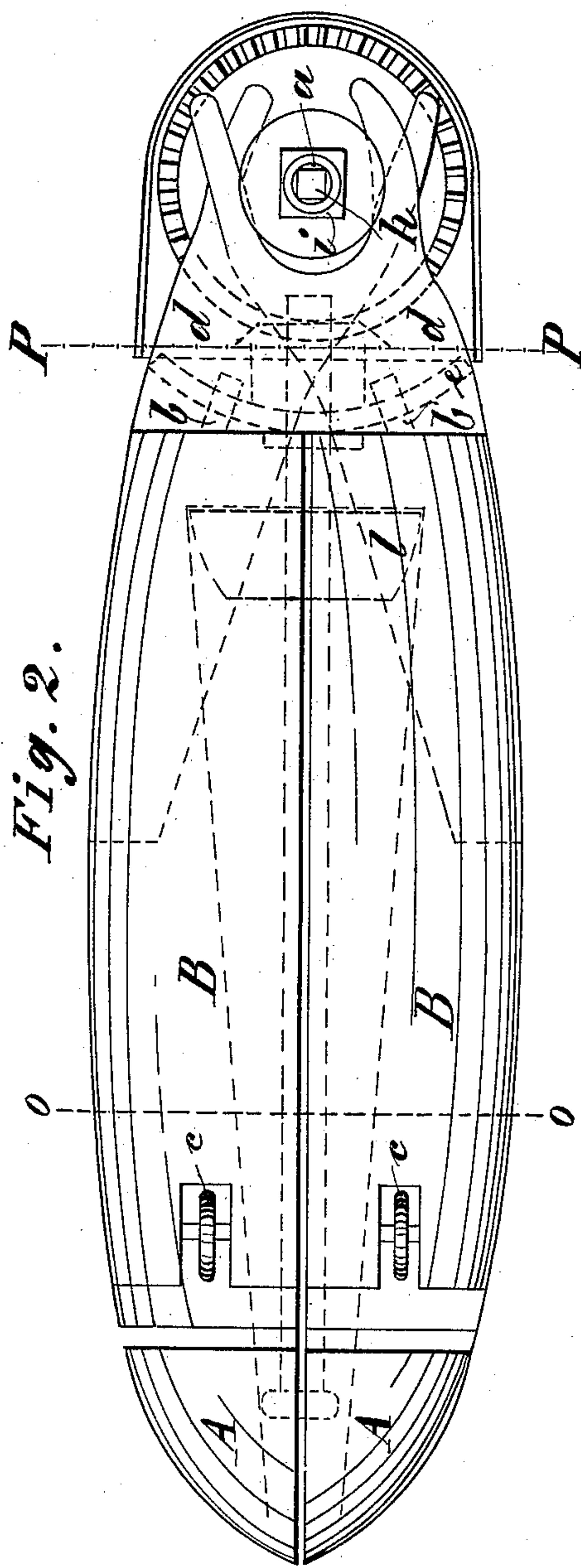
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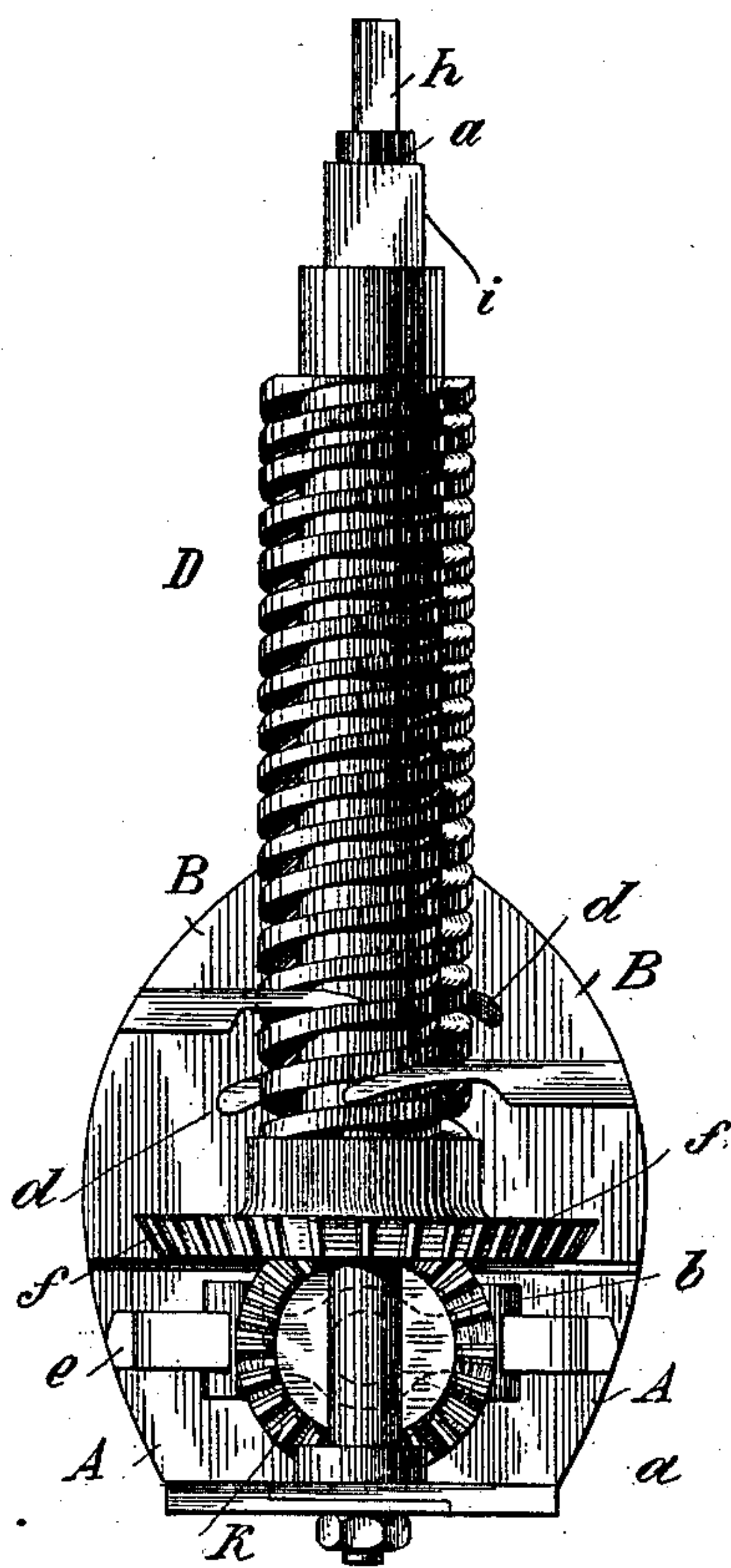
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Fig. 3.



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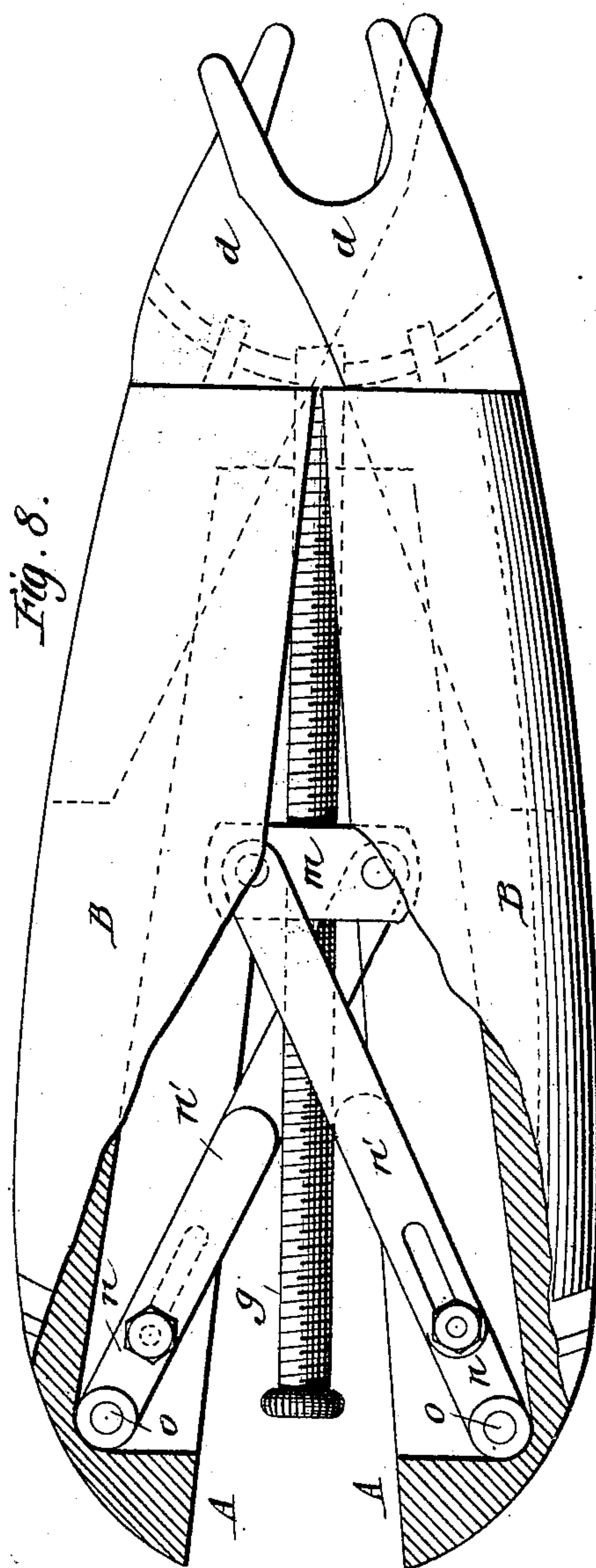
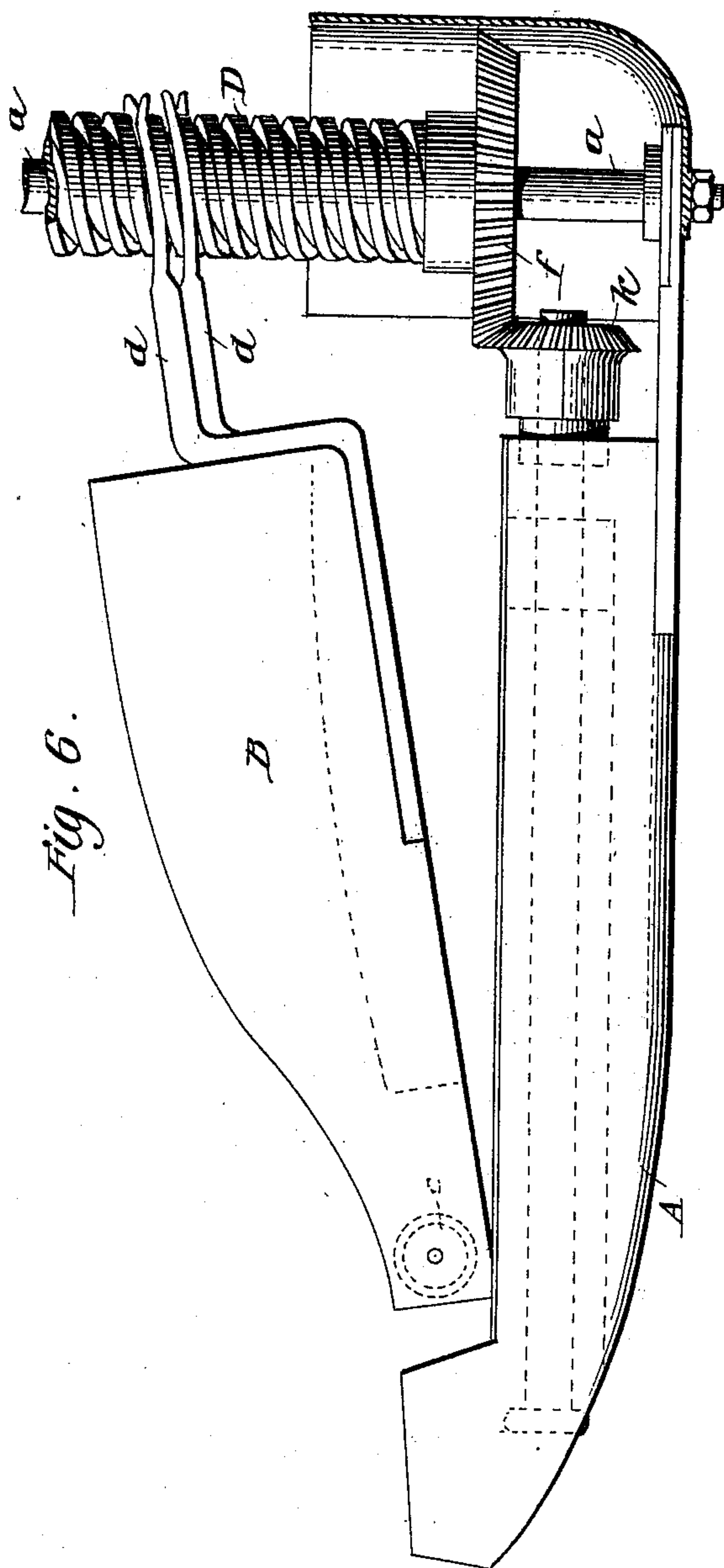
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(No Model.)

5 Sheets—Sheet 5.

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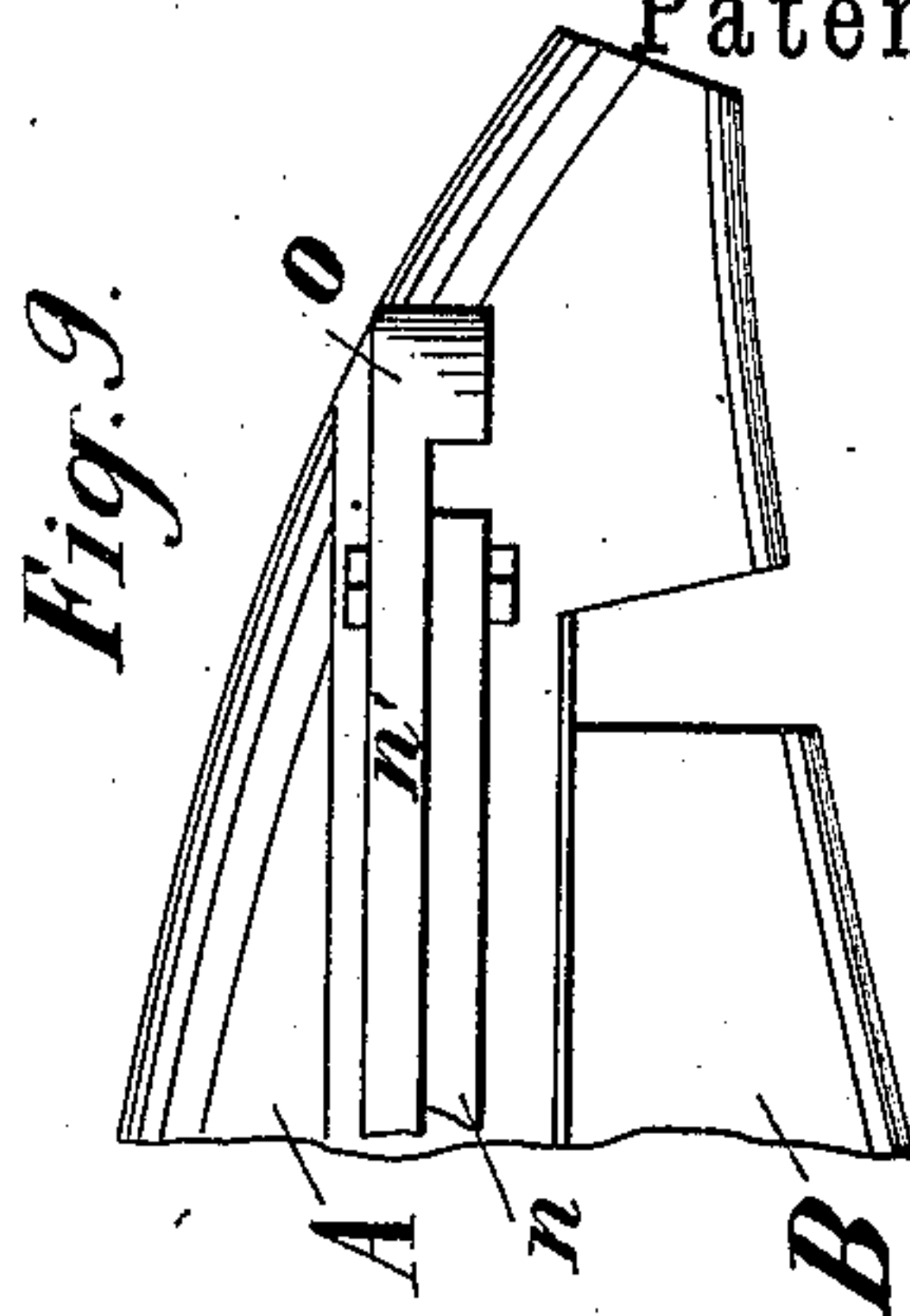
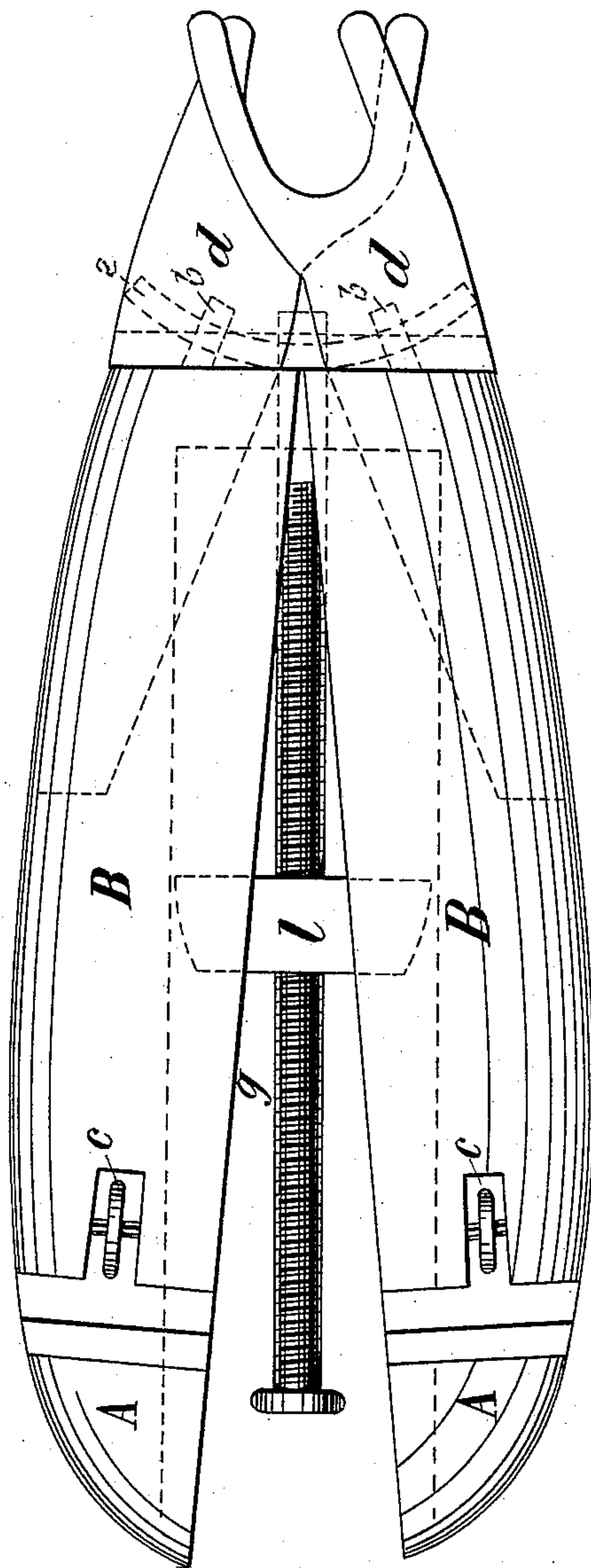


Fig. 2.



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UNITED STATES PATENT OFFICE.

BERNHARD THORNER, OF LEIPSI, SAXONY, GERMANY, ASSIGNOR OF ONE-HALF TO MÜLLER & HOLZWEISSIG, OF SAME PLACE.

SHOE-LAST.

SPECIFICATION forming part of Letters Patent No. 432,454, dated July 15, 1890.

Application filed October 9, 1889. Serial No. 326,536. (No model.)

To all whom it may concern:

Be it known that I, BERNHARD THORNER, of Leipsic, in the Kingdom of Saxony and German Empire, have invented certain new and useful Improvements in Boot and Shoe Lasts, of which the following is a full, clear, and exact description.

This invention relates to the construction of a boot and shoe last which will admit of the stretching of a boot or shoe upper in all desired directions by the use of the same last.

The adjustable lasts hitherto in use have the objection that a special last is required for the stretching of the instep and another one for the stretching of the front or toe part of the boot or shoe, by which boot or shoe stretching corresponding to the true requirements of stretching is rendered impossible, as it is a well-known fact to all shoemakers that when the leather has been stretched in one direction it does not admit of a further stretching in another. It is therefore evident that to stretch a boot or shoe efficiently a last must be used which admits of a simultaneous stretching of the boot at the instep and at the front or toe part—namely, in the height and in the breadth of the boot or shoe—and this is effected by the mechanical last forming the subject-matter of this application, and which is represented in the accompanying drawings, in which—

Figure 1 is a side elevation, partly in section, of the last in its normal position. Figs. 2 and 3 are respectively a plan view and an end elevation of the same. Figs. 4 and 5 are transverse sections of the same, taken, respectively, on the lines O O and P P in Fig. 2. Fig. 6 is a side elevation of the same, showing the instep-stretcher partially raised. Fig. 7 is a plan view of the same, showing the toe-part stretcher partially opened. Figs. 8 and 9 are respectively an inverted plan view, partly broken away and in section, and a partial side elevation of a modified construction of the toe-part stretcher.

The last consists, mainly, of four principal parts A A and B B, which, in pairs, form the upper and lower portions of same. The parts B are connected with those A by means of hinges c c, Figs. 1, 2, 6, and 7, thus providing

for an opening motion in a vertical direction. Further, each separate part A A, which travel on a segmental guide e, and B B turns one from the other in a horizontal direction, for which purpose joint-pieces b are appended to the lower parts A A and a wedge l is provided on the screw-shaft g. The parts A A turn upon the vertical operating-shaft a, which is journaled at the bottom of the last, and which carries the bevel-wheel f, and is provided on its upper end with a square head h for the reception of a key. The shaft a carries the hollow screw-spindle D, which is free to turn thereon, and which is also provided with a square head i, and whose threads serve to operate the fork or forks d d of the parts B B. Fig. 1 shows but one fork connected to said parts, while Figs. 2, 3, 5, 6, 7, and 8 show two forks. The bevel-wheel f on the shaft a gears with the bevel-wheel k provided on the screw-spindle g, which serves to displace the said wedge, the wedge l being provided with a thread corresponding with that of the spindle g. The mode of operation of the above-described mechanism is as follows:

If a displacement of the last in width is required for the purpose of stretching the boot or shoe in its width, a key is applied to the square head h of the shaft a, and by revolving the screw-spindle g by means of the bevel-wheels f and k the wedge l is displaced and the two pairs of parts A B and A B of the last are driven horizontally asunder. (See Fig. 7.)

If it is desired to stretch the boot or shoe upper in a vertical direction after stretching in the width, the pairs of parts A B A B of the last while remaining in the open position, as shown in Fig. 6, also open vertically, which movement is accomplished in the following manner: The hollow spindle D, carried upon the shaft a, is turned by means of a key applied to the square head i, and the forks d d of the parts B B are thereby raised by the thread of the spindle D. Thus the parts B B are caused to turn vertically upon their hinges c c, thereby stretching the instep of the boot or shoe being operated upon. In this manner an increase in width and height

is effected in the boot or shoe upper without the necessity of taking the last out of the boot and replacing it by another. It is also possible to produce a simultaneous increase both in height and width by simultaneously operating the shaft *a* and the hollow screw-spindle *D*. It will thus be evident that by the use of the above-described adjustable last a boot or shoe may be stretched in different directions without redrawing the stretched leather—that is, from the height to the width, or vice versa—as the tension of the leather is maintained in one direction until the tension in the other is effected.

15 To concentrate the pressure on the spindle *g* more at the points *A A* of the last there is provided the arrangement represented in Figs. 8 and 9. This wedge *l* in the case is replaced by a matrix-block *m* on the spindle *g*, on the sides of which connecting-rods *n* are coupled, which are connected at the other end by the pins *o* with the parts *A A* of the last. If the matrix-block *m* is now screwed forward, the rods *n* push the parts *A A* of the last asunder, by which action a direct pressure is attained. The rods *n* can be made of two adjustable parts *n* and *n'*, and by this means a widely-extended breadth of span can be obtained.

30 The last can be used for any size of boot or shoe, is of easy manipulation, and of simple action.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

35 1. A last divided vertically and horizontally into four parts, the two lower parts being hinged at their heel ends to swing horizontally apart at the toes and the upper parts or instep members being hinged at their forward ends to the respective lower members to swing vertically thereon, and an operating mechanism, substantially as set forth.

2. The combination, with the last divided

horizontally and vertically into four longitudinally-extending parts, the two lower parts being hinged together at their heel ends to swing horizontally apart and the two upper or instep sections being hinged at their forward ends to the respective lower sections, of a longitudinally-extending screw-shaft between the two lower sections provided with a traveling wedge or block for separating said sections horizontally, a vertical shaft geared at its lower end to the said longitudinal shaft, a vertical screw, and connections between the rear ends of said two upper sections and the said screw, whereby when the vertical shaft is rotated the last will be parted horizontally and when the vertical screw is rotated the last will be parted vertically, substantially as set forth.

3. The combination, with the last divided horizontally and vertically in the direction of its length into four parts, the two lower parts being hinged at their rear ends to swing horizontally apart and the upper sections being hinged at their forward ends to the respective lower sections to swing vertically thereon, of a longitudinally-extending screw-shaft between the two lower parts and provided with a traveling wedge or block to swing said two parts horizontally, a vertical shaft geared at its lower end to the rear end of said screw-shaft, a tubular screw-shaft inclosing and rotating upon said vertical shaft, and forks projecting from the rear ends of the two upper parts and engaging the threads of said tubular shaft, the said vertical and tubular shafts being constructed at their upper ends for separate or simultaneous rotation, substantially as set forth.

In witness whereof I have hereunto set my hand in presence of two witnesses.

BERNHARD THORNER.

Witnesses:

ISWALD HUGO THUNER,
CARL BORNGRAEBER.