(No Model.) 3 Sheets—Sheet 1.

# T. BALCOM & W. H. ALLEN, Jr.

## MACHINE FOR MAKING SEAMLESS SHOE UPPERS.

No. 362,699. Patented May 10, 1887.

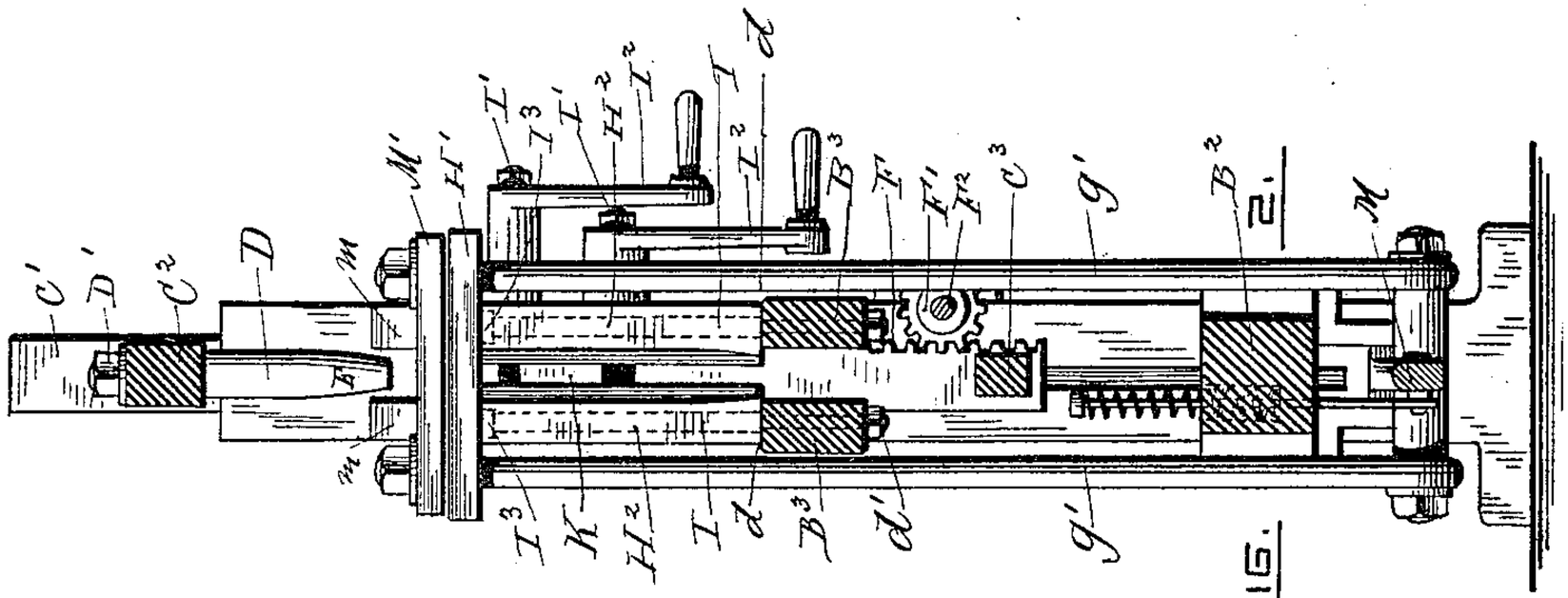

FIG. 2.

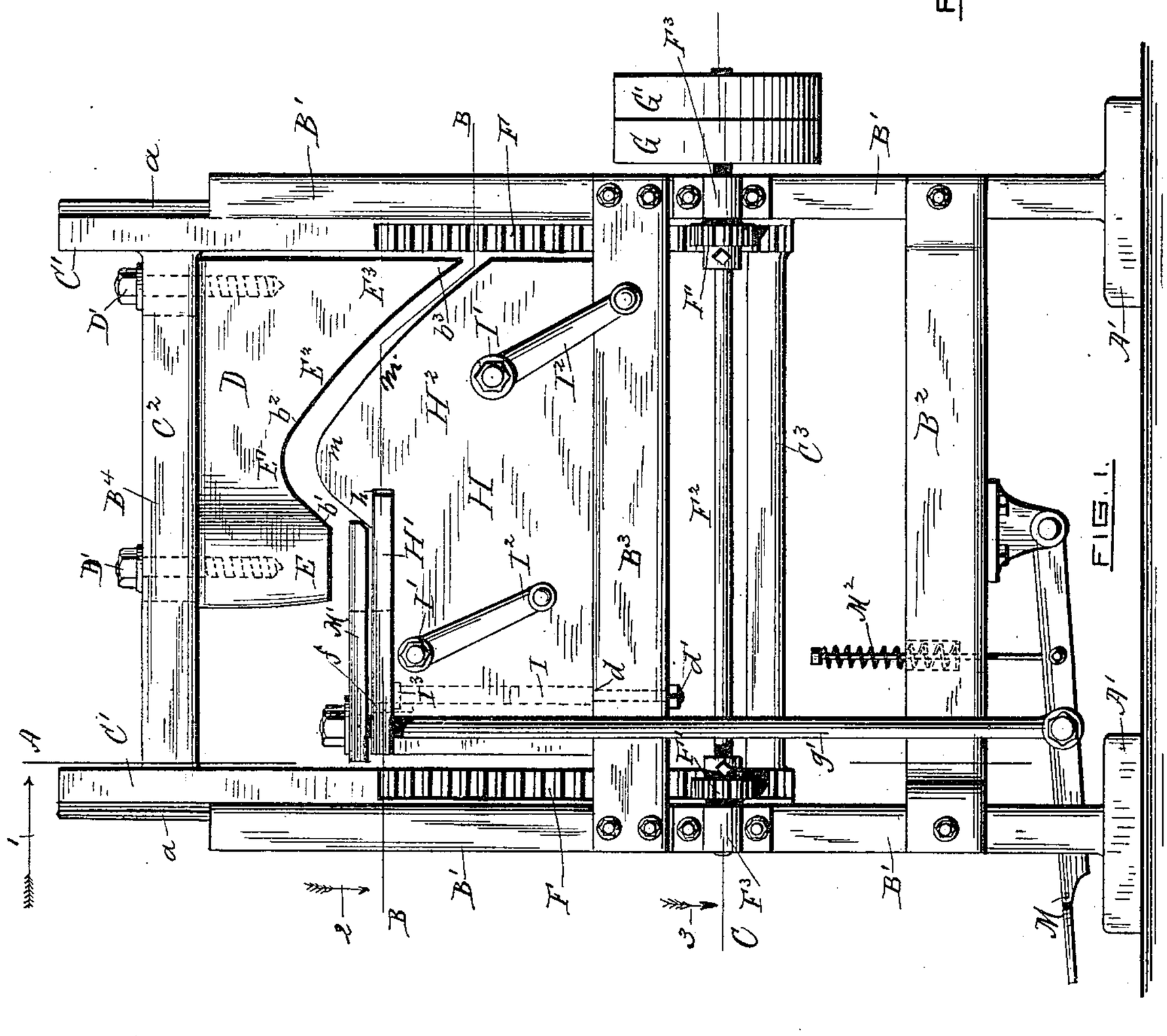

FIG. 1.

WITNESSES:

William C. Curtis,

Timothy Duggan

INVENTORS:

Timothy Balcom

William H. Allen, Jr.

by Thos. W. Dodge,

their Attorney.

(No Model.) 3 Sheets—Sheet 2.

# T. BALCOM & W. H. ALLEN, Jr.

## MACHINE FOR MAKING SEAMLESS SHOE UPPERS.

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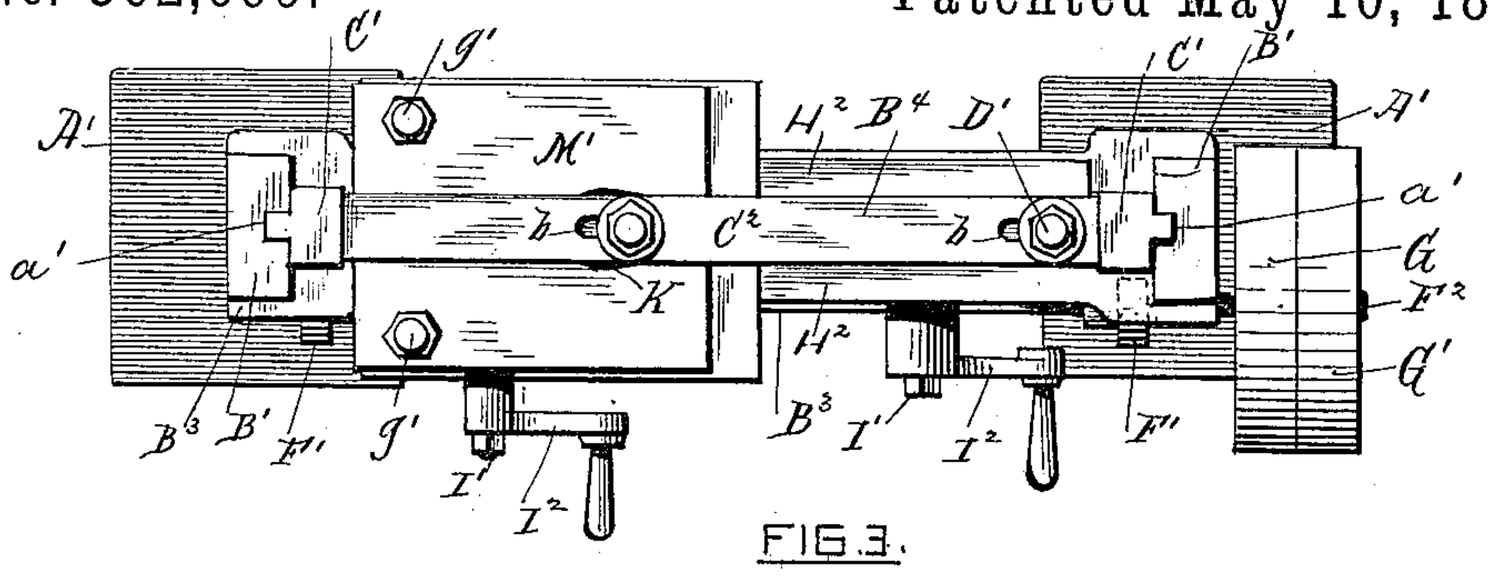


FIG. 3.

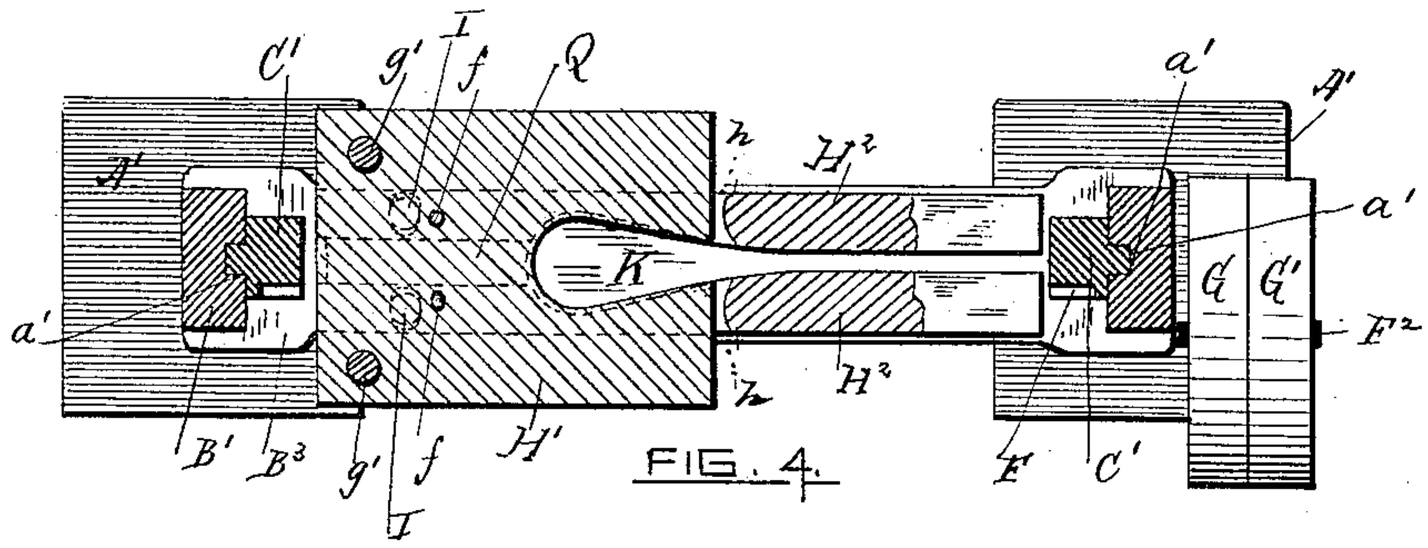


FIG. 4.

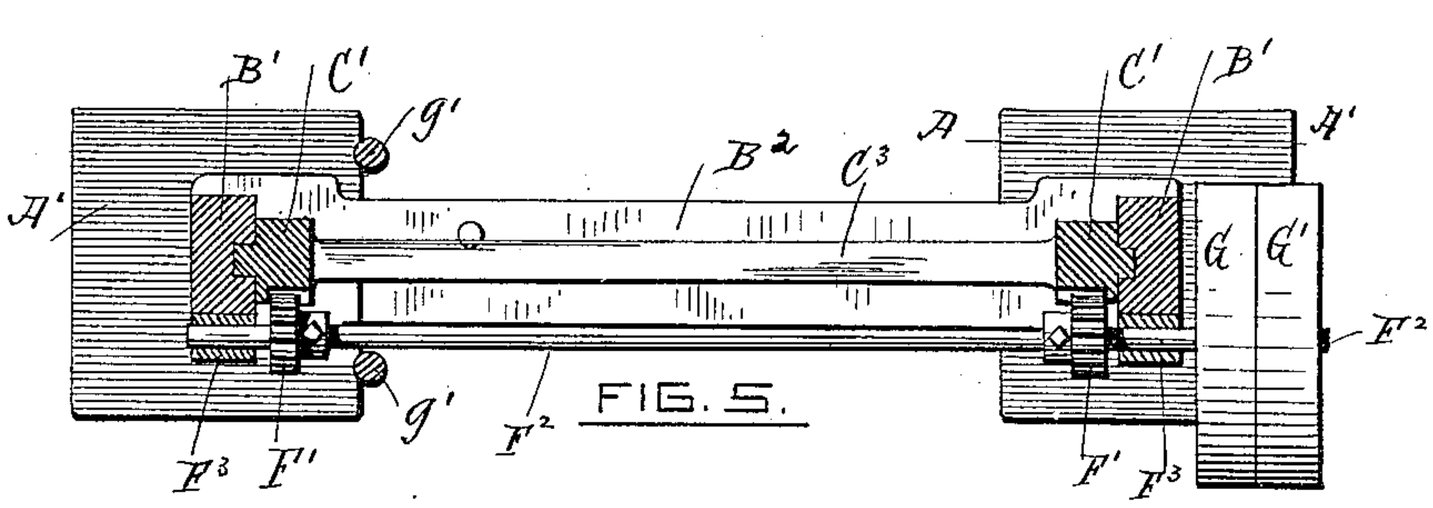


FIG. 5.

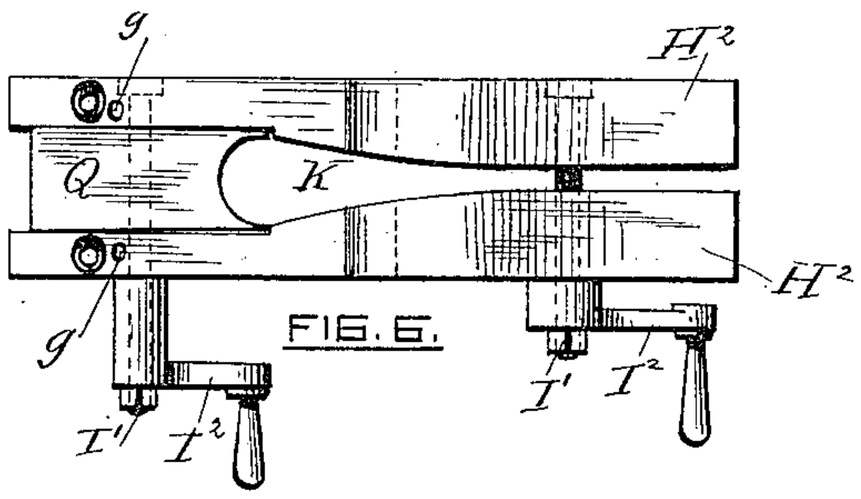


FIG. 6.

WITNESSES:

William E. Curtis

Timothy Duggan.

INVENTORS:

Timothy Balcom

William H. Allen, Jr.

by Thos. H. Dodge,

their Attorney.

(No Model.) 3 Sheets—Sheet 3.

# T. BALCOM & W. H. ALLEN, Jr.

## MACHINE FOR MAKING SEAMLESS SHOE UPPERS.

No. 362,699. Patented May 10, 1887.

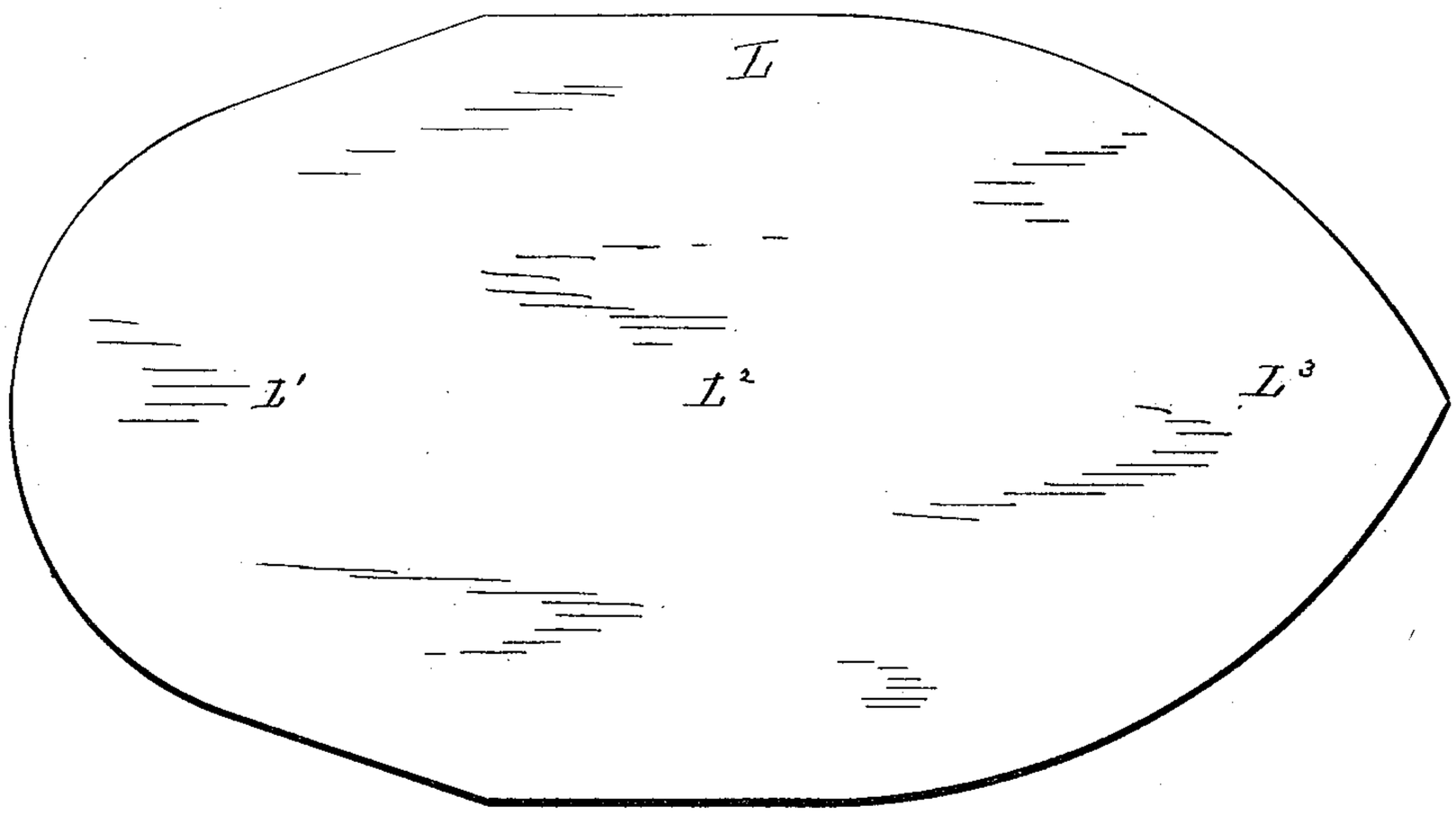


FIG. 7.

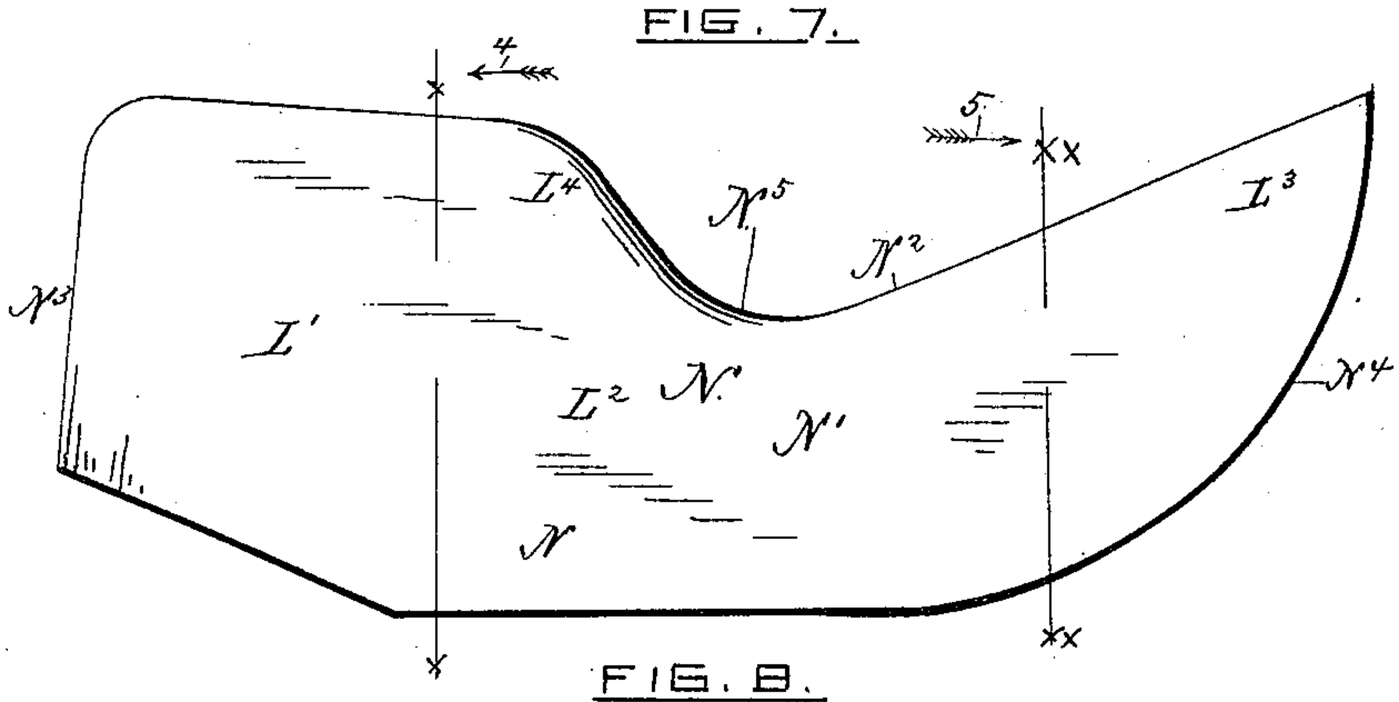


FIG. 8.

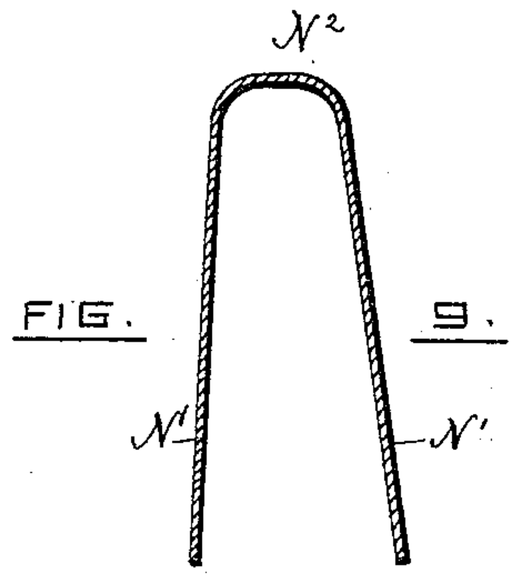


FIG. 9.

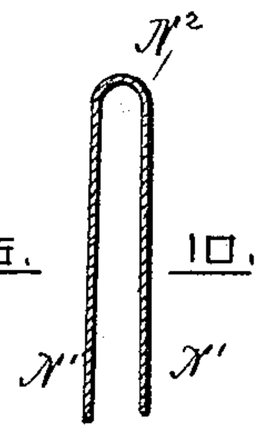


FIG. 10.

WITNESSES:

William C. Curtis,

Timothy Driggers

INVENTORS:

Timothy Balcom

William H. Allen, Jr.

by Thos. W. Dadye

their Attorney.

# UNITED STATES PATENT OFFICE.

TIMOTHY BALCOM, OF WORCESTER, AND WILLIAM H. ALLEN, JR., OF WEST BROOKFIELD, MASSACHUSETTS.

## MACHINE FOR MAKING SEAMLESS SHOE-UPPERS.

SPECIFICATION forming part of Letters Patent No. 362,699, dated May 10, 1887.

Application filed February 28, 1887. Serial No. 229,148. (No model.)

*To all whom it may concern:*

Be it known that we, TIMOTHY BALCOM, of the city and county of Worcester, and State of Massachusetts, and WILLIAM H. ALLEN, Jr., of West Brookfield, in said county and State, have invented new and useful Improvements in Machines for Making Seamless Uppers for Boots or Shoes; and we do hereby declare that the following is a full and clear description thereof, reference being had to the accompanying drawings and letters of reference marked thereon, forming a part of this specification, and in which—

Figure 1 represents a side view of our said machine. Fig. 2 represents a vertical section on line A, Fig. 1, looking in the direction of arrow 1, same figure. Fig. 3 represents a top or plan view of the machine shown in Fig. 1. Fig. 4 represents a horizontal section on line B, Fig. 1, looking in the direction of arrow 2, same figure, as will be hereinafter described. Fig. 5 represents a horizontal section on line C, Fig. 1, looking in the direction of arrow 3, same figure, as will be hereinafter described. Fig. 6 represents a plan or top view of some of the parts detached and slightly modified, as will be hereinafter more fully described. Fig. 7 represents a piece of leather cut preparatory to being stretched and molded into a shoe or boot upper blank by our improved machine. Fig. 8 represents a side view of a seamless shoe or boot blank formed by our said improved machine. Fig. 9 represents a cross-section on line *x*, Fig. 8, looking in the direction of arrow 4; and Fig. 10 represents a cross-section on line *x x*, Fig. 8, looking in the direction of arrow 5, Fig. 8.

To inform those skilled in the art to which our improvements belong, we will proceed to describe the same more in detail.

In the drawings, the parts marked A′ A′ are base-pieces, to which are attached the upright standards B′ B′, which are firmly connected together and supported by cross-pieces $B^2$ and $B^3$, and between the cross-pieces $B^3$ $B^3$ is fitted to work the frame $B^4$, consisting of two upright end pieces, C′ C′, provided on their outer sides with tongues *a a*, which work in corresponding grooves, *a′ a′*, in the insides of the end standards, B′ B′. Upright pieces C′ C′ are securely connected and braced by cross-pieces $C^2$ and $C^3$, the latter connecting their lower ends and the former their upper ends, and also serving the further purpose and function of a support for the stretching and forming or molding die D, which is fastened to its under side by means of the screw-bolts D′ D′, which pass through slots *b b* in cross-pieces $C^2$, whereby said die D can be adjusted back and forth under cross-piece $C^2$, as desired, and then clamped in position by turning bolts D′ D′.

The form of the lower edge of die D is shown in outline, Fig. 1, the heel part E being horizontal, or nearly so, the instep part E′ being curved up and forward from *b′* to $b^2$, while the forward foot and toe parts, $E^2$ and $E^3$, extend forward and downward in slightly-curved form from $b^2$ to the point $b^3$, and which point $b^3$ is designed to catch the toe part of the blank upper and stretch it laterally, while pulling the shank-leather forward at the same time.

Upon the sides of the upright pieces C′ C′ are secured racks F F, which mesh into cogs F′ F′ on shaft $F^2$, fitted to turn in proper bearings, $F^3$, fastened to the sides of standards B′ B′, and is also provided with a tight pulley, G, and loose pulley G′, by means of which frame $B^4$ and its die D can be run up or down at pleasure.

Below the die D is arranged a table, H, of peculiar construction, and within which is a matrix, into which the stretching and forming die enters when frame $B^4$ is depressed.

Table H is formed of the horizontal piece H′ and two jaw-pieces, $H^2$ $H^2$, the latter being pivoted to their respective cross supporting-pieces $B^3$ $B^3$ by means of the bolts I I, and are furthermore connected by two adjusting-bolts, I′ I′, provided with hand-cranks $I^2$ $I^2$, said bolts and cranks being for the purpose of enabling the operator to adjust the jaw-pieces the desired distance apart for receiving the forming or molding die D and the piece of leather to form the upper.

The holes in jaw-pieces which receive the pivot-bolts I I are made oval or oblong to permit pieces $H^2$ $H^2$ to be moved toward or from each other, as desired. Pieces $H^2$ $H^2$ are not connected at their front ends except by the front adjusting-bolt, I′.

Bolts I I have shoulders *d d*, which rest on their respective supporting cross-pieces $B^3$ $B^3$,

so that when their nuts *d' d'* are turned up against the under sides of said cross-pieces said pivot-bolts will be held firm and yet leave the rear ends of the jaw-pieces $H^2$ $H^2$ free to be adjusted toward or from each other, as above stated. The heads $I^3$ $I^3$ of bolts I I fit into recesses cut in the upper rear edges of jaw-pieces $H^2$ $H^2$, thereby leaving their upper edges level for supporting the horizontal table part H', which is retained in position by means of two pins, *f f*, whose points enter cross slots or holes *g g* in the upper edges of the jaw-pieces $H^2$ $H^2$, while the clamp-rods *g' g'* pass loosely through its rear end, thereby aiding in retaining it in place. The forward end of table-piece H' projects into slots *h h* in the jaw-pieces $H^2$ $H^2$, and is by such arrangement still further held in its proper relative position. The opening or matrix K in the forward part of piece H' receives the heel and shank end of die D, and the insides of the jaw-pieces $H^2$ $H^2$ are cut out to correspond with the opening K. (See full and dotted lines, Fig. 4, of the drawings.) To give the jaws $H^2$ $H^2$ and other parts of table H rigidity, a block, Q, having its forward end concaved to correspond with the heel end of matrix K, may be placed between the rear ends of the jaws $H^2$ $H^2$ (see dotted lines, Fig. 4) and clamped in position by turning up screw-bolts I' I'. A modified form of block Q is shown in Fig. 6.

We have found in practice that the following proportions produce good results, viz: Make the lower edge of the central heel part, E, of die D about one and one-fourth inch wide, then widening it out as it extends up until it reaches a width of two inches and one-fourth. Then taper it off in width on the lower edge as it extends forward until at the point *b'* its width is about five-eighths of an inch, and at which width it remains until the point $b^2$ is reached, while from that point the width gradually narrows until at the toe-point $b^3$ it is only about one-fourth of an inch in width on the lower edge, which is slightly rounded off on each side, thereby making the edge some narrower than the parts above. By this arrangement the upper, especially all forward of the heel, is subjected to a stretching and scraping operation as the stretching and molding die D descends into the matrix K with the upper, which is carried down with it. In Fig. 6 the jaw parts $H^2$ $H^2$ are shown broader than in Fig. 4, while the block-piece clamped between their rear ends is also shown slightly modified. The operation, however, is the same. Adjusting-bolts I' I' have screw-threads cut on their ends, which enter nuts in the side of one of the jaw-pieces $H^2$, as indicated in Fig. 6.

The piece of leather L, Fig. 7, being placed on table H over the matrix K, the rear or heel part, L', of the piece is placed on the part H', while the instep part $L^2$ is placed over the elevated part *m* of the table jaw parts $H^2$ $H^2$, and the forward and toe part, $L^3$, over the downwardly-inclined part *m'* of the parts $H^2$ $H^2$. After this has been done the operator places his foot on treadle M and depresses it, thereby drawing down the clamping-rods *g' g'* and the clamp piece M', to which their upper ends are securely fastened.

When clamp-piece M' has been drawn down, as shown in Fig. 1, it presses on the heel part of the upper and holds it down with a force sufficient to keep the whole piece in position until the stretching and forming die is depressed and carries the center of the piece of leather down into the matrix K, and which operation is accomplished by the operator by means of an ordinary shipper, shipping a driving-belt from loose pulley G' to the tight pulley G. As soon as die D has been depressed far enough the operator releases treadle M, when spring $M^2$ throws clamp-rods *g' g'* and clamp-piece M' up, when frame $B^4$ is raised together with its die, and which may be attained by means of a weight, chain, and pulley properly arranged, or by a hand-crank attached to the end of shaft $F^2$, to be operated at pleasure by the operator either to raise or lower frame $B^4$ and its die D.

When the leather piece is removed, it will be stretched and molded into a seamless shoe or boot blank, N, closed on each side N' at the top $N^2$ and at the back $N^3$, but open at the toe end $N^4$, as shown in Figs. 8, 9, and 10, Fig. 8 showing a side view, and Figs. 9 and 10 cross-sections on lines *x x x*, respectively.

By catching the toe part $L^3$ of the leather by point $E^3$ of the die D and forcing it between the jaw parts $H^2$ $H^2$, while the instep part $L^2$ is held up by the stationary and elevated parts *m m* of jaw-pieces $H^2$ $H^2$ of table H, the leather is stretched and drawn forward and up from the heel and shank parts and carried into the instep, as shown at $L^4$, Fig. 8, and also forward into the toe part $L^3$, and which toe part itself is subjected to great lateral stretching, whereby when the blank N is applied to the form or last and the heel and toe parts drawn down and receive the sole in the usual manner, a shoe or boot, as the case may be, is produced in which an easy fit is obtained about the instep and the toe, while there will be no wrinkling about the shank or on top of the forward part of the foot. Then, again, by subjecting the piece of leather to the peculiar manner of stretching and molding above described, much leather is saved, since a piece of leather of a given size, when stretched and molded by our new mode or process, will make a shoe or boot full one size larger than when made by the common modes or processes in use prior to our invention.

We only make the forward part, say from $b^2$ to $b^3$, of the stretching and molding die D of sufficient thickness to stand the strain incident to forcing the leather down into the matrix K. Consequently all the leather except the narrow portion covered by the lower edge of the die is drawn and stretched over the upper edges of the jaw-pieces $H^2$ $H^2$, which,

in combination with the stretching of the instep and toe parts, as above described, enables us to produce a shoe or boot blank, N, from which superior and easy fits can be obtained, and that, too, with the least possible expense of leather.

Our seamless upper-blank is especially adapted to make Congress shoes and tongue-and-stay boots, as those skilled in the art will readily perceive.

What we claim, and desire to secure by Letters Patent, is—

1. The combination, with table H, consisting of the horizontal stationary part H′, and jaw parts $H^2$ $H^2$, made as described and pivoted to their respective supporting-pieces $B^3$ by bolts I I, of movable frame $B^4$, working between stationary standards B′ B′, and stretching and molding die D, made with the heel part E, instep part E′, and forward or toe parts $E^2$ and $E^3$ relatively arranged and formed, all substantially as and for the purposes described.

2. The combination, with the rear of the jaw parts $H^2$ $H^2$ of table H, of the horizontal part H′, provided with stay-pins *f f*, clamp-piece M′, clamp-rods *g′ g′*, treadle M, spring $M^2$, and adjusting-screws and cranks I′ and $I^2$, substantially as and for the purposes set forth.

TIMOTHY BALCOM.
WILLIAM H. ALLEN, JR.

Witnesses:
THOS. H. DODGE,
WILLIAM C. CURTIS.