

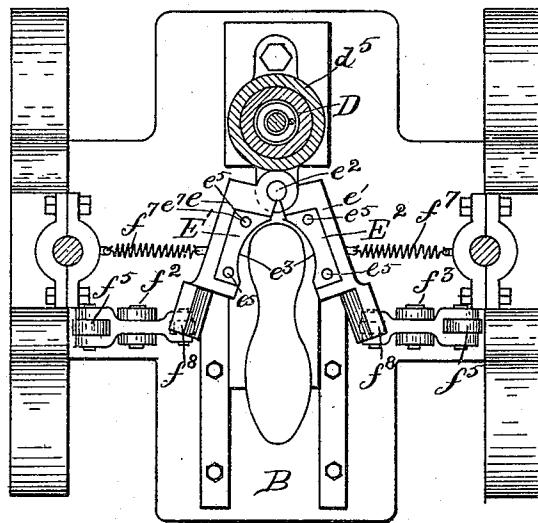
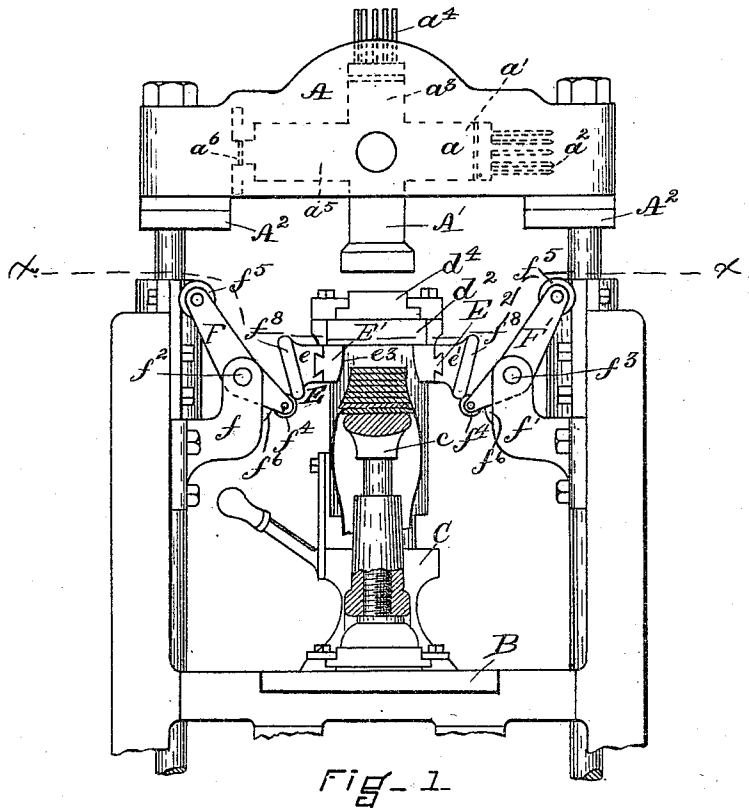
(No Model.)

4 Sheets—Sheet 1.

F. F. RAYMOND, 2d.
HEEL NAILING MACHINE.

No. 461,448.

Patented Oct. 20, 1891.



WITNESSES.
Fred. B. Dean
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Fig. 2.

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(No Model.)

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Fig-3-

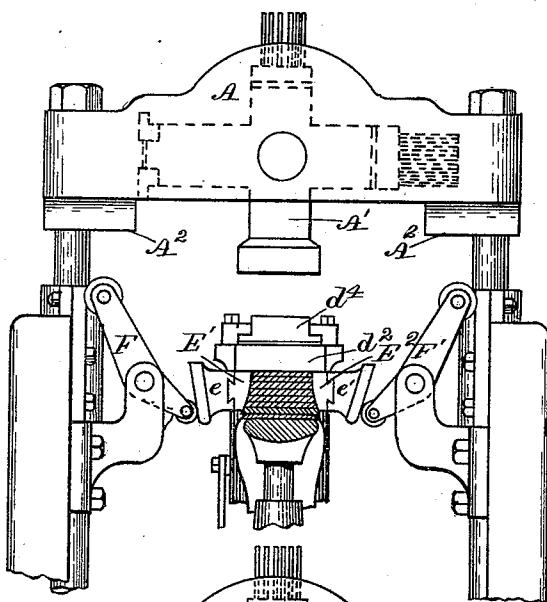
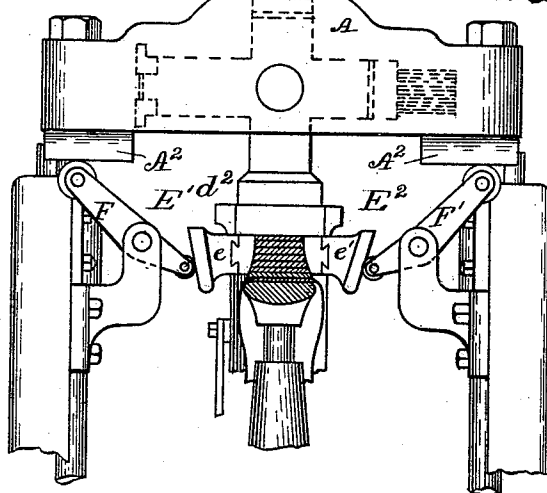


Fig-4-



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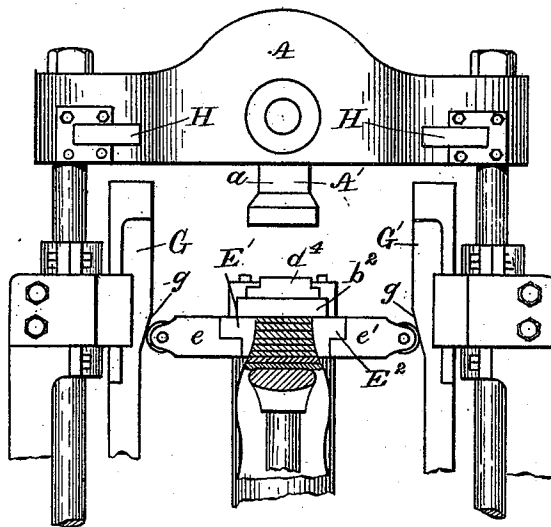


Fig- 5.

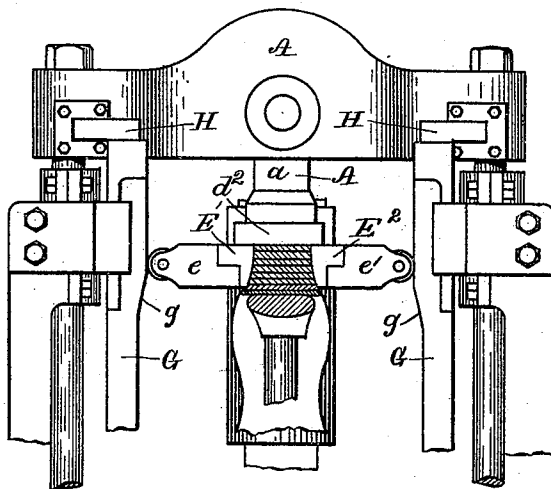


Fig- 6.

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4 Sheets—Sheet 4.

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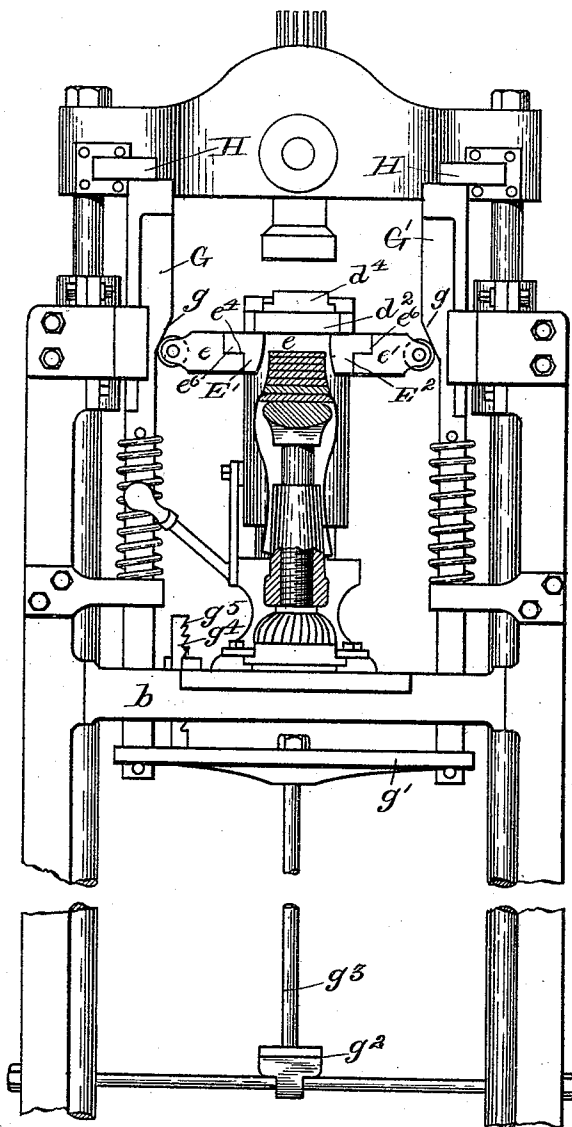


Fig- 7.

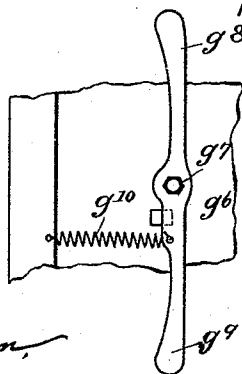


Fig- 8.

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UNITED STATES PATENT OFFICE.

FREEBORN F. RAYMOND, 2D, OF NEWTON, MASSACHUSETTS.

HEEL-NAILING MACHINE.

SPECIFICATION forming part of Letters Patent No. 461,448, dated October 20, 1891.

Application filed July 1, 1887. Serial No. 243,084. (No model.)

To all whom it may concern:

Be it known that I, FREEBORN F. RAYMOND, 2d, a citizen of the United States, residing at Newton, in the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement in Heel-Nailing Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature.

The invention is an improvement upon that described in the patent to Henry A. Henderson, No. 316,894; and it comprises a heel-attaching machine having a heel-compressing device for compressing the heel-blanks laterally or upon their side surface or edge while they are being attached to the soles of the boot or shoe.

It further relates to various features of construction and organization, all of which will be hereinafter explained.

In the drawings, Figure 1 is a view in front elevation of the central and upper parts of a machine having the features of my invention. Fig. 2 is a view in vertical section upon the dotted line xx of Fig. 1, and in plan of the parts below said line. Fig. 3 is a view representing in front elevation and in section the parts in a different position from that represented in Fig. 1. Fig. 4 is a view in elevation and section of the parts represented in Fig. 3, showing them in still another position. Figs. 5, 6, 7, and 8 illustrate in elevation and section modified forms of the invention.

Referring to the drawings, A is a cross-head, which carries the rotary head a . This rotary head has a compressing-arm A' , an arm a' , carrying a gang or group of awls a^2 , an arm a^3 , carrying a gang or group of drivers a^4 , an arm a^5 , carrying a top-lift spanker and preferably a top-lift-holding device a^6 . The cross-head A preferably is reciprocated as described in said Henderson patent—namely, by means of a crank and pitman, a lower cross-head upon which the pitman acts when it is desired to depress the upper cross-head, and connecting-rods connecting the lower cross-head with the upper cross-head. This construction is fully described in the patent referred to. The parts of said mechanism

are like those described in said patent, with the exception that the upper part of the post D, upon which the table is vertically movable, is cylindrical in shape and the table has the cylindrical sleeve d^5 , which surrounds the post.

E is the heel-compressing device. It may consist of two plates or levers $e e'$, which are pivoted at e^2 to the table d beneath the template, or they may be separately pivoted to the table, or the plates may have a horizontal sliding movement. Each plate or lever $e e'$ supports a section of the heel-compressing device, the lever or plate e supports the section E' , and the lever or plate e' the section E^2 . Each of these sections is represented as formed from one block of metal and as having the compressing-surface e^3 of the shape which it is desired to give the side or edge of the heel. They, however, may be made in two or more parts, if desired. They are also made movable from their holding plates or levers $e e'$. In Figs. 2 and 7 I have represented the holding-plate levers as having a shoulder e^4 and dowel-pins e^5 , and the die-blocks $E' E^2$ as having extensions e^6 and dowel-pin holes e^7 . The extensions rest upon the shoulders e^4 and the dowel-pins fit the holes e^7 . In Fig. 1 I have represented the levers or plates $e e'$ as each provided with a dovetail recess, which receives the dovetail tongue upon the upper edge of each die-block, the die-blocks being fastened in place to their respective plates or levers by a screw or in any other suitable way. The plates or levers $e e'$ are extended forward from the blocks $E' E^2$ any desired distance, and their ends are located to be closed or moved toward each other by the cross-head and a connecting operating medium or device. There are a number of ways by which these levers or plates can be provided with a closing movement toward each other upon the downward movement of the cross-head A, and I have represented some of them. The one represented in Figs. 1 to 4, inclusive, comprises the levers $F F'$, attached to or carried by brackets $f f'$, bolted to the side frames of the machine or to the table, or to both. The lever F is adapted to operate or move the plate e , carrying the die-block E' , and the lever F' is adapted to

move the lever or plate e' , carrying the die-block E^2 .

In this form of the invention the templet is given a vertical movement in relation to the last or work-support, and the die-block supports are mounted upon the table supporting the templet and moved vertically therewith, and as it is desirable, although not essential, that the die-blocks $E' E^2$ be opened before the attachment of the top lift, I have represented the levers $F F'$ as placed so that they shall not operate to move the levers or plates $e e'$, excepting when the table carrying them is being depressed or while it is depressed. To accomplish this result, the levers are shaped and pivoted substantially as represented in Fig. 1, the lever F being pivoted at f^2 and the lever F' being pivoted at f^3 . Each lever carries at its lower end a cam-roll f^4 and at its upper end a roll f^5 . There is also a stop f^6 for limiting the extent of the downward movement of the cam-roll f^4 and a spring f^7 for returning the lever to its normal position. When this form of construction is employed, each plate or lever $e e'$ has the bearing-section f^8 upon its outer edge in line with the cam-roll f^4 , and upon which the cam-roll acts. It is made of any desired length, and it may have any desired inclination in relation to the cam-roll f^4 . The cross-head A has blocks A^2 , preferably vertically adjustable, which are arranged to come in contact with the rolls f^5 of the levers $F F'$.

In operation, the boot or shoe having been placed upon the jack and the jack moved into operative position between the compressing-blocks $E' E^2$, (see Fig. 1,) the templet is moved downward by hand to clamp the heel-blank upon the outsole of the boot or shoe. This downward movement of the templet is caused by moving the table d , which operates it downward, and this causes the bearing-surfaces f^8 of the plates $e e'$ to come into contact with the cam-rolls f^4 , which are then stationary, and the plates are thereby caused to be closed or moved toward each other during the downward movement of the templet, and the working surfaces of the die-blocks are moved toward the side surface or edge of the heel-blank, so that upon the end of the downward movement of the templet the side-compressing blocks $E' E^2$ have also been moved simultaneously inward to or toward the side surface of the heel-blank, and the heel is held confined upon the outsole by the templet and by the compressing-blocks $E' E^2$. The compressing-blocks also serve by this movement to accurately center the heel-blank in relation to the heel-seat of the boot or shoe. The positions of the parts are then as represented in Fig. 3. The machine is then set in operation, and the cross-head A makes one reciprocation, and at the beginning of its downward movement, before the points of the awls have entered the heel-blank, the cross-head A comes in contact with the rolls f^5 , and the

upper ends of the levers $F F'$ are moved downward and the cam-rolls f^4 upward upon the bearing-surfaces f^8 of the die-holding plates. This causes the plates $e e'$ and the compressing-blocks $E' E^2$ to be moved forcibly toward and upon the side surfaces or edge of the heel-blank, and the degree of this lateral compression is varied, of course, by the extent of movement of the plates or levers $e e'$. This is governed by the inclination of the bearing-surface f^8 and the extent of movement of the cam-rolls f^4 thereon. As above stated, the surface f^8 may have any desired inclination. The distance which the cam-rolls travel may be adjusted by adjusting the height of the blocks A^2 . The awls then immediately enter the heel-blank and form the holes therein, and the awl-block comes into contact with the upper surface of the templet, forcing it downward and completing the compression of the heel-blank by direct vertical pressure applied to the upper surface thereof while the heel-blank is held by the blocks $E' E^2$, the levers $F F'$ holding the blocks closed upon the heel during the vertical compression of the heel-blank by the contact of the face of the awl-block with the templet, and also, if desired, still farther closing, setting, or moving the blocks $E' E^2$ upon the heel. This insures a very powerful and accurate compression of the heel-blank and an accurate fitting of the compressed heel-blank to the soles of the boot or shoe to which it is to be attached, and also the formation of the holes in the compressed heel-blank while it is under powerful compression and while it is held compressed upon the sole of the boot or shoe to which it is to be immediately attached. This is very important in attaching what is known as "pieced" heels, because it provides for forcing together the parts or pieces of each lift of the heel to bring their adjacent surfaces into solid contact with each other upon the sole of the boot or shoe to which they are to be attached and before the holes for the attaching-nails are made, and holds them in this compressed condition and position while the holes for the reception of the attaching-nails are being made, and also while the attaching-nails are being driven, uniting the pieces which form the heel-blank together and to the soles of the boot or shoe while they are held compressed or forced into contact with each other.

It will be observed that as the side compressors or blocks $E' E^2$ are moved or operated to compress the heel-blank laterally before the full vertical compression is given it the pieces of the heel-blank are forced together throughout the blank very compactly; also that the heel-blank while it is being attached is caused to be forced downward upon the outsole, so as to provide for the proper fitting of the blank to the sole and the proper formation of the heel-seat.

I have represented in Figs. 5 to 8, inclusive,

a modified form of construction above described for operating the side-compressors, and it comprises two slide bars $G G'$, adapted to have vertical movements imparted to them, preferably by means of the cross-head A , although they may be given it from the crank-shaft or from cams operated by the crank-shaft. Each of these slide-bars $G G'$ has an inclined surface g located to be moved into contact with the outer ends of the levers or plates $e e'$, so that upon the vertical movement of these slide-bars the inclines are moved into or out of contact with the ends of these levers or plates and either cause them to be moved toward each other or to be opened by their respective opening-springs, which are like those shown in Fig. 2. I prefer that these bars be not rigidly secured to the cross-head, although in some instances they may be. Each bar preferably is supported by the side section of the frame and is extended downward and connected with the cross-bar g' , which is connected with a treadle g^2 by a rod g^3 , (see Fig. 7,) in order that the bars may be drawn downward after the downward movement of the templet and before the machine is operated, so that the inclines may be moved against the levers or plates $e e'$ and close them upon the side surfaces or edge of the heel by hand before the machine is operated by power. The bars are locked in this position by means of the ratchet-bar g^4 , which extends upward through a hole in the bed b and has the ratchet-teeth g^5 , which are adapted to be engaged by the latching-lever g^6 . This latching-lever is pivoted at g^7 , and has the rear handle g^8 , the front handle g^9 , (see Fig. 8,) and a spring g^{10} for holding its locking-edge in contact with the ratchet-bar g^4 to automatically engage its teeth. Upon the downward movement of the cross-head it comes in contact with the upper ends of the bars and moves them still farther downward, causing the inclines g to move the levers or plates forcibly or with pressure toward each other to compress or solidify the side or edge of the heel.

The actuating-surfaces of the bars may be so shaped as to cause them also to operate to lock the levers or plates $e e'$ at the end of their inward or compressing movements. This is accomplished by forming upon the bars straight surfaces in continuation of the inclined surface g , so that the inclined surfaces pass or are moved by the levers or plates and the straight surfaces of the bars brought against or behind them, or, in other words, so that the front ends of the plates or levers rest against the straight surfaces of the bars. (See Fig. 6.)

I prefer that the connection between the cross-head and the bars be a loose or free connection in order that the head A may be reciprocated to spank or attach a top lift to the compressed and attached heel without actuating or moving the levers or plates e , because on account of the position of the table sup-

porting the templet and the plates or levers at that time it is desirable that the plates or levers e should be held wide open during the reciprocation of the top-lift attaching and spanning block; and this loose or free connection I have represented as obtained by means of the slide-blocks H , attached to the head A in a manner to be moved horizontally in ways thereon from a position immediately over their respective bars to a position to one side thereof, so that the head A communicates motion to the bars only when the slide-blocks are in position over their upper ends or in line with them, and when moved out of line with them the head reciprocates without communicating movement to the bars.

In operation the boot or shoe is mounted upon the last or work-support and moved into operative position. The templet is moved outward from its table or support into operative position over the heel end of the jacked boot or shoe. The heel-blank is placed over the heel end of the shoe, and the table supporting the templet and side-heel-compressing devices is moved downward by the handle-lever, as described and shown in said Henderson patent, bringing the templet into contact with the upper surface of the heel-blank, and the side-compressors, by the movement of the treadle g^2 , are brought into contact with the edge of the heel and accurately center it in relation to the heel-seat of the boot or shoe. The awls having been moved into operative position, the machine is set in operation, and the side-compressors are caused to be set or moved by the movement of the bars G with any desired force or pressure against the side surface of the heel, molding its edge to any desired shape, and, if a pieced heel is used, setting the pieces of the blank firmly and solidly together, and also forming the heel to the curved bottom of the last and of the outsole or heel-seat. This is immediately followed by the entrance into the heel-blank of the awls, which form the guiding-holes for the attaching-nails, and the coming in contact of the under surface of the heel-blank with the upper surface of the templet, which causes the templet to be moved against the upper surface of the heel-blank forcibly and to compress it by vertical compression, and the side-compressors are still farther closed or forced toward each other during this downward vertical movement of the templet, so that the compressors upon their first forcible inward movement are not forced upon the edge of the heel-blank with sufficient pressure to prevent them from being moved downward and inward simultaneously with the downward movement of the templet. Of course the extent of the downward movement of the templet is varied according to the extent of the side compression of the blank before the blank is brought into contact with the upper surface of the templet—that is, when the side-compressors are set with great force against the heel-blank before the awls are caused to

enter it. Then the extent of the vertical movement of the templet may vary from comparatively nothing to a quarter of an inch or more after contact of the upper surface of the awl-block therewith, in which case the side-compressors may be held stationary upon the edge of the heel-blank during their downward movement with the templet, or they may be farther moved inward toward each other, or they may be partially released, according to the character of the work and the results desired, by varying the shape of the actuating-surfaces *g*.

The templet is automatically locked in its lowest position, and the awls having been withdrawn the attaching-nails are fed by the nail-carrier to the templet and the drivers brought into position. If the side-compressors have been released upon the upward movement of the cross-head, they are upon the downward movement of the drivers again brought into contact with the edge of the heel, so that the heel is held compressed by them while the nails are being driven into the heel and soles of the boot or shoe. If the heel is to be spanked, or if a top lift is to be attached and spanked, the table is then released and moved forward, carrying with it the templet and side-compressors. The side-compressors are automatically opened or moved by their operating-springs, and if the bars *G* are used the operator moves the connecting-blocks *H*, thus disconnecting the cross-head from them. If the construction represented in Fig. 1 is used, then the levers will be moved by the head without operating the plates or levers *e e'*, as they are then above the line upon which the levers move.

Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States—

1. In a heel-nailing machine, the combination of a jack carrying a last or work-support, a vertically-movable table, a templet carried thereby, the lateral compressing-dies hinged or pivoted at their rear ends to said table to be vertically movable therewith, and a gang or group of awls and a gang or group of drivers adapted to be brought successively into operative position and reciprocated, as and for the purposes specified.

2. The combination, in a heel-nailing machine, of a jack having a last or work-support, a vertically-movable table supporting a templet, plates or levers hinged or pivotally attached at their rear ends to said table, carrying sections of a compressing device, a gang or group of awls and a gang or group of drivers adapted to be brought into the same operative position and reciprocated, and devices, as specified, for moving said plates or levers toward each other, as and for the purposes described.

3. In a heel-nailing machine, the combination of the last or work-support and heel-compressors consisting of horizontally-dis-

posed plates or levers pivotally attached at their rear ends to a vertically-movable support to provide a lateral adjustment thereof, substantially as described.

4. The combination, in a heel-nailing machine, of the last or work-support, the vertically-movable templet, the plates or levers *e e'*, supporting a sectional heel-compressor, said sectional heel-compressor, a lever for moving said templet and compressors vertically, devices for moving the compressors horizontally during said vertical movement and before the machine is set in operation, and a movable part of the machine adapted upon the operation thereof to come into contact with the side-compressor-moving devices and to actuate them to farther move the compressors or the plates or levers carrying them toward each other, as and for the purposes specified.

5. The combination, in a heel-nailing machine, of the last or work-support, and the plates or levers *e e'*, supporting the heel-side compressors and having the inclined or cam surfaces *f⁸*, with the levers *F F'*, pivoted to brackets or supports *f f'*, the inner ends of which levers being adapted to be moved or brought into contact with the said inclined or cam surfaces *f⁸*, and the outer ends of which levers being extended to a position to be operated by contact of the moving part of the machine therewith, as and for the purposes described.

6. The combination, in a heel-nailing machine, of the last or work-support, the sectional side-compressors, the plates or levers *e e'*, supporting the same, having the inclined or cam-surfaces *f⁸*, and the levers *F F'*, pivoted to the brackets *f f'*, as described, and having the cam-rolls *f⁴* at their inner ends, with the stops *f⁶*, substantially as specified.

7. The combination, in a heel-nailing machine, of the plates *e e'* and the heel-blank compressors with the actuating-levers *F F'* and their springs *f⁷*, substantially as described.

8. The combination, in a heel-nailing machine, of the plates or levers *e e'*, carrying the side-compressors, the levers *F F'*, pivoted, as described, and adapted to be actuated to move the levers or plates toward each other by a moving part of the machine, and the adjustable blocks *A²*, substantially as specified.

9. The combination, in a heel-nailing machine, of the last or work-support, a vertically-movable table, a templet carried thereby, the plates or levers *e e'*, also carried by said table, the heel-compressors supported by said levers or plates, and the actuating-levers *F F'*, having the rolls *f⁴* and pivoted to the brackets *f f'*, substantially as specified, and adapted to be operated or moved by a movable part of the machine, whereby upon the movement of the table downward the rolls serve to cause the compressors to be moved toward each other and upon the operation of the machine by

their movements in relation to the plates or levers $e e'$ serve to farther move them toward each other, as and for the purposes specified. the holes e^7 to receive the dowel-pins, as and for the purposes described.

10. In a heel-nailing machine, the plates or
5 levers $e e'$, each of which has the shoulder e^4 and dowel-pins e^5 , with the dies $E' E^2$, each of which has the projection e^6 provided with

FREEBORN F. RAYMOND, 2d.

In presence of—

FRED. B. DOLAN,
E. A. PHALEN.