

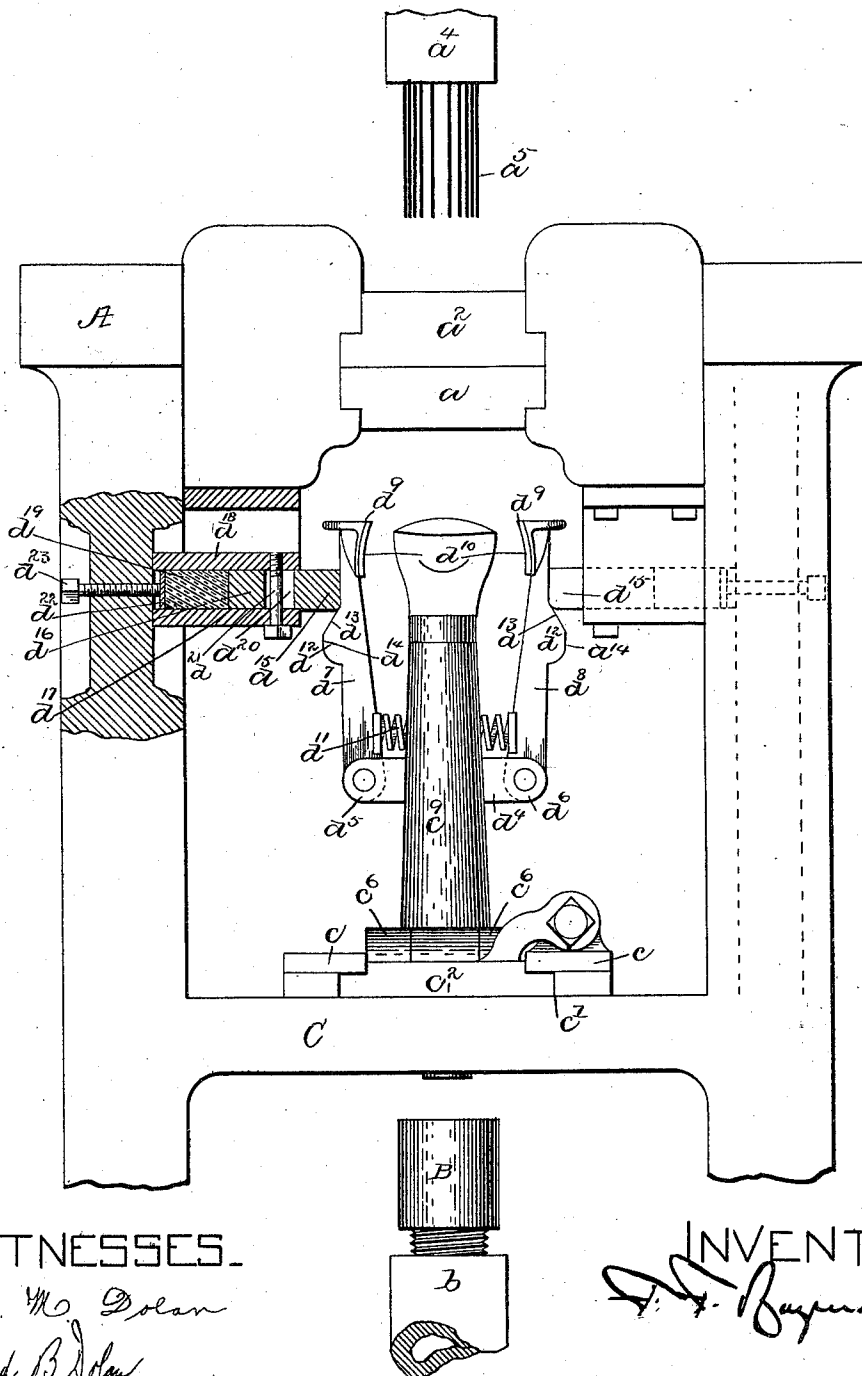
(No Model.)

6 Sheets—Sheet 1.

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

No. 561,609.

Patented June 9, 1896.



WITNESSES.

A. M. Dolan
Fred. B. Dolan.

INVENTOR

D. S. Baym

Fig-1-

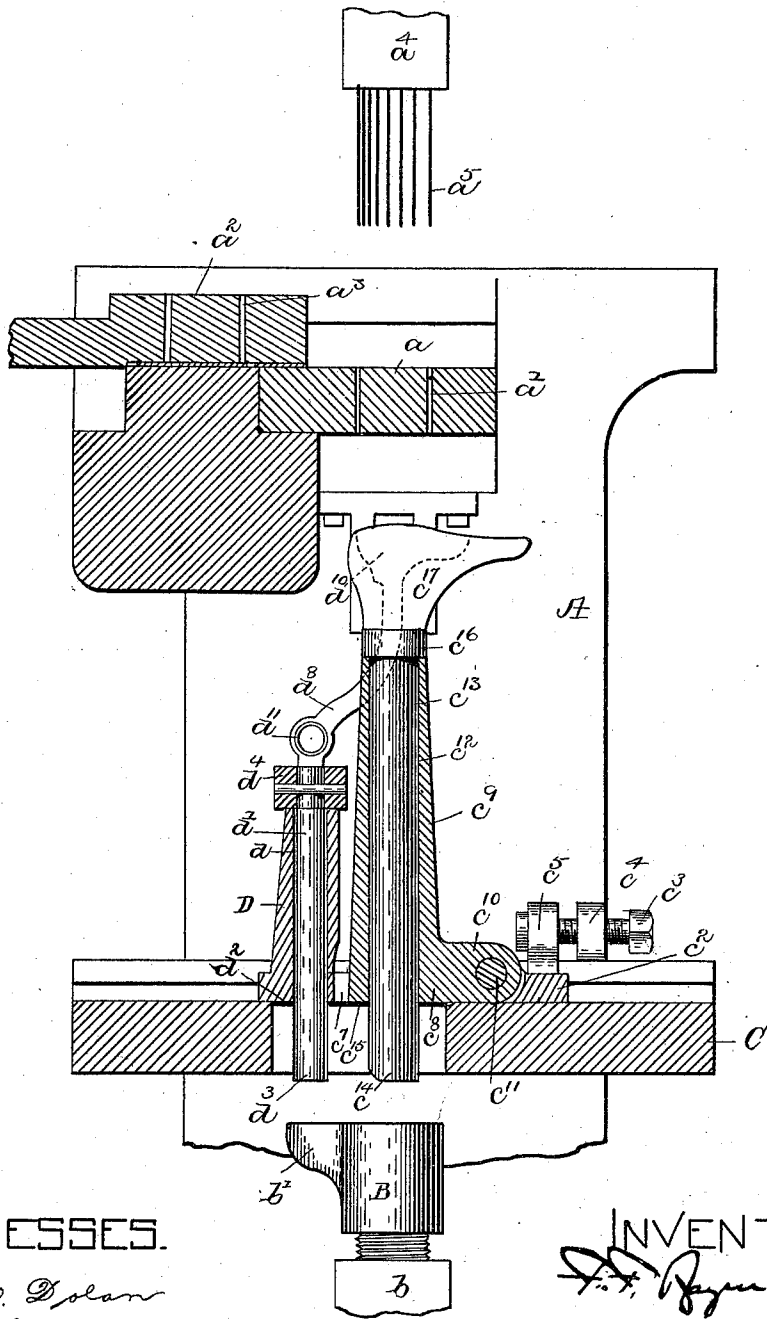
(No Model.)

6 Sheets—Sheet 2.

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

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Patented June 9, 1896.



WITNESSES.

J. W. Dolan

Fred. B. Dolan.

INVENTOR
F. F. Raymond

Fig. 2.

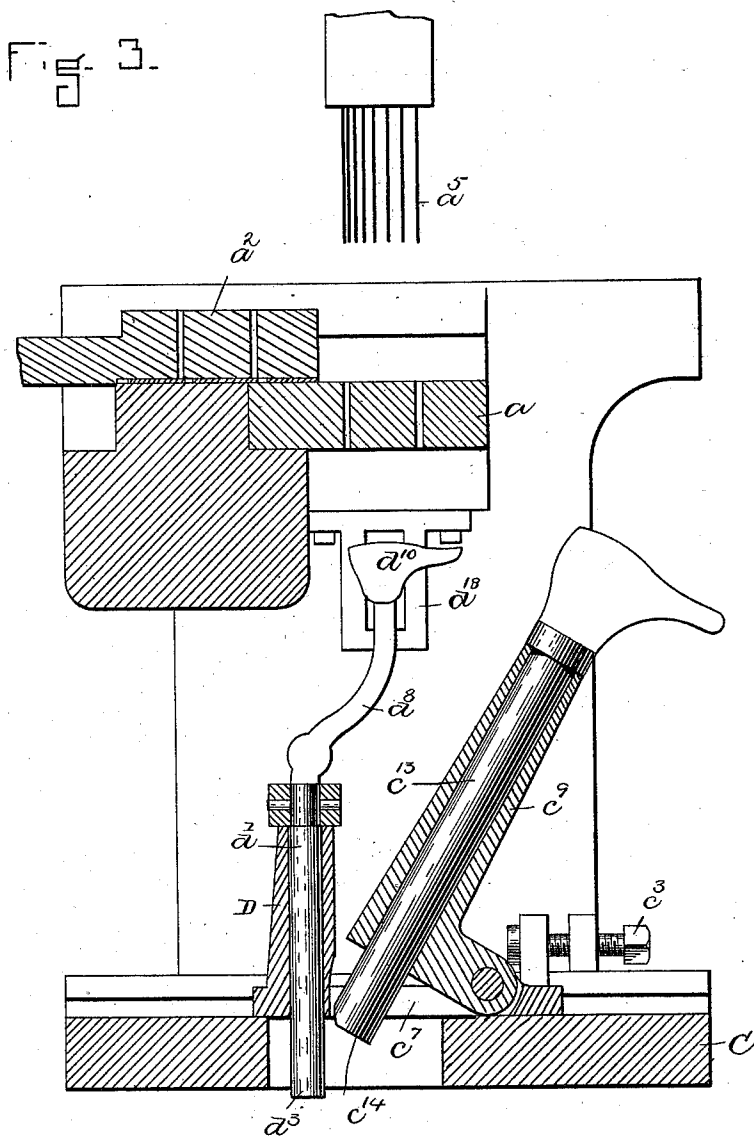
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6 Sheets—Sheet 3.

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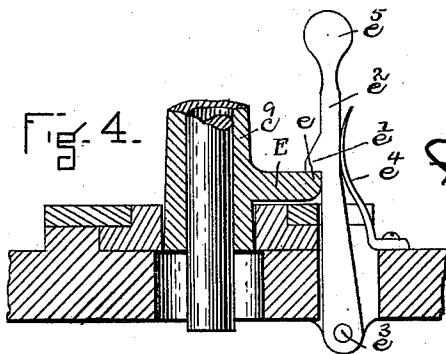
Patented June 9, 1896.



WITNESSES.

J. M. Dolan
Fred B. Dolan

Fig. 4.



INVENTOR.

F. F. Raymond

6 Sheets—Sheet 4.

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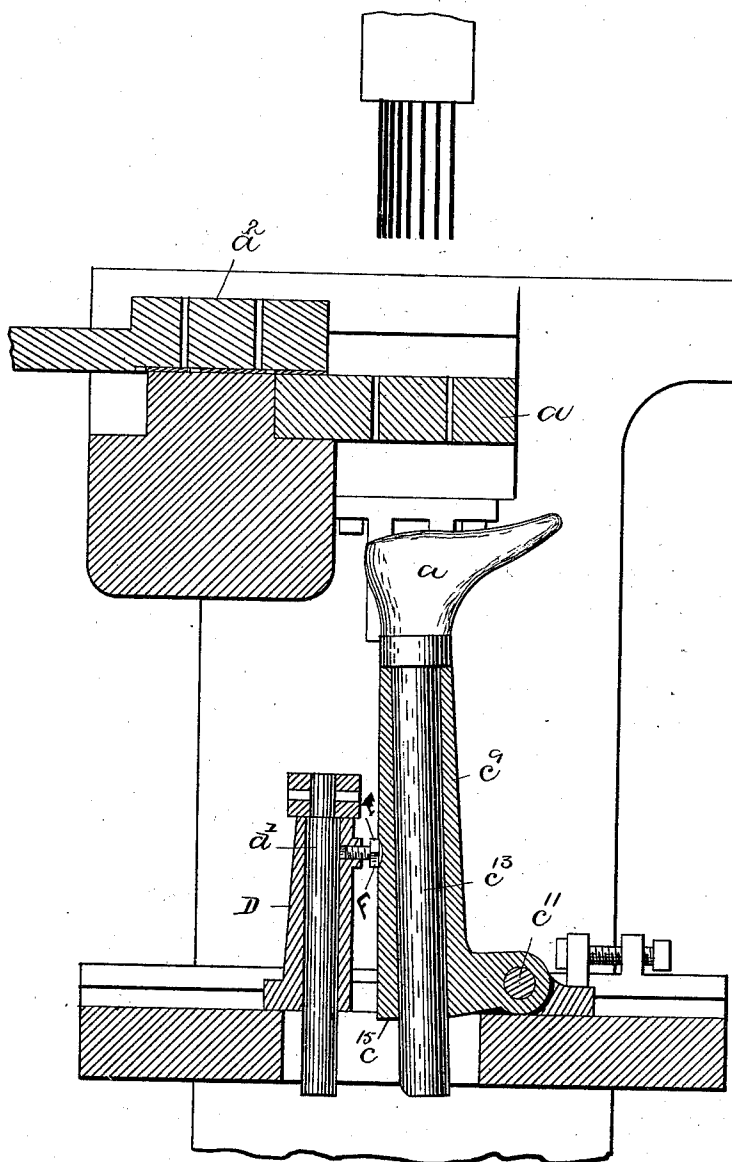


Fig. 5.

J. H. Dolan
Fred. B. Dolan.

INVENTOR.

J. F. Raymond

(No Model.)

6 Sheets—Sheet 5.

F. F. RAYMOND, 2d.
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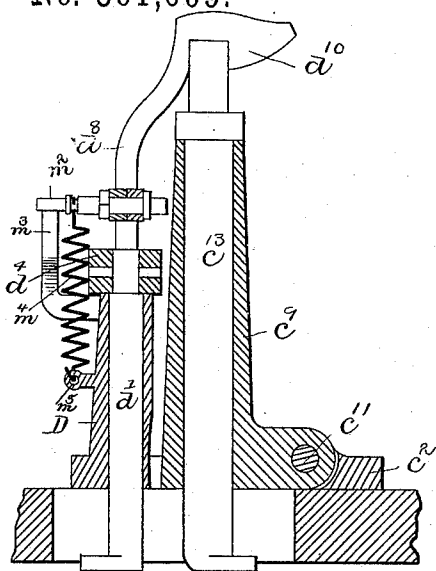


Fig. 7.

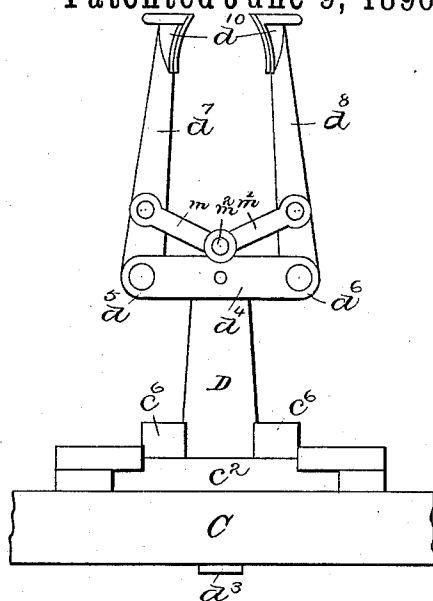


Fig. 8.

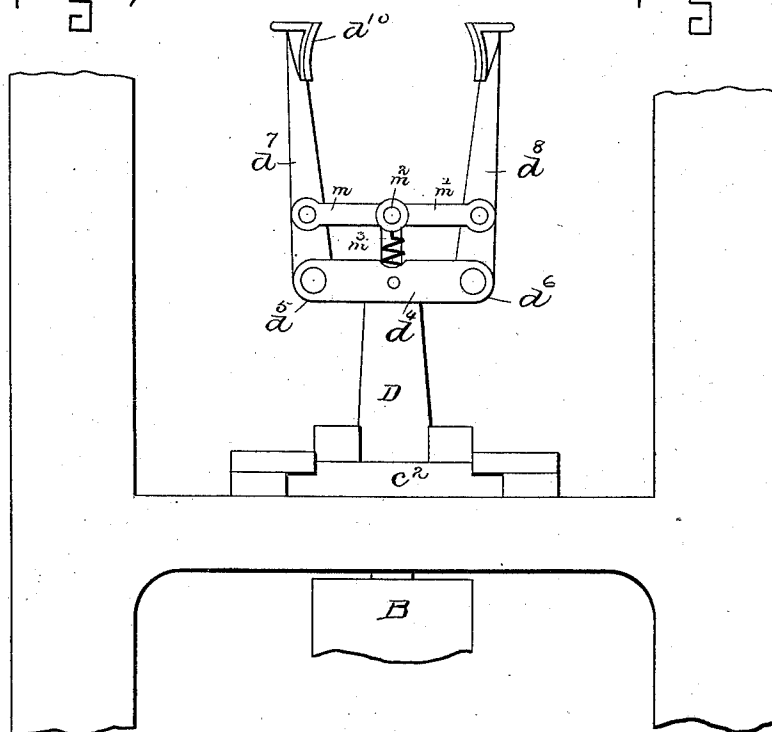


Fig. 6.

WITNESSES.

J. M. Dolan
Chas. B. Dolan

INVENTOR.
F. F. Raymond

(No Model.)

8 Sheets—Sheet 6.

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

No. 561,609.

Patented June 9, 1896.

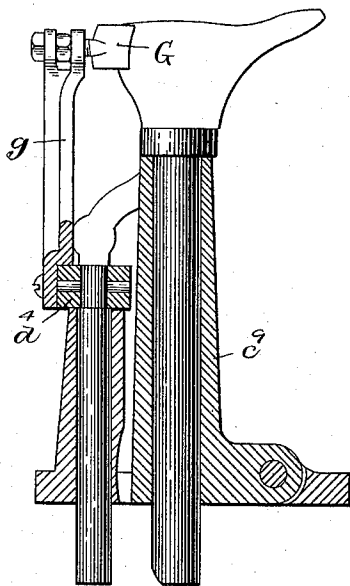


Fig. 7.

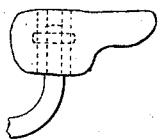


Fig. 11.



Fig. 12.

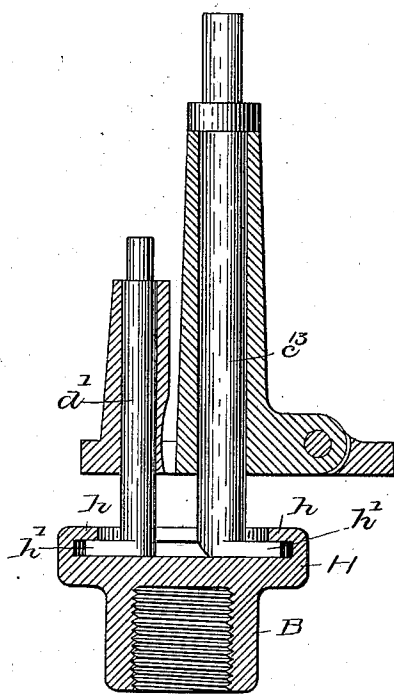


Fig. 10.

WITNESSES.

J. M. Dolan
Ed. B. Dolan

INVENTOR.
F. F. Raymond

UNITED STATES PATENT OFFICE.

FREEBORN F. RAYMOND, 2D, OF NEWTON, MASSACHUSETTS, ASSIGNOR TO
JAMES W. BROOKS, OF PETERSHAM, AND JOHN BROOKS, OF CAMBRIDGE,
MASSACHUSETTS, TRUSTEES.

GANG NAILING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 561,609, dated June 9, 1896.

Application filed May 2, 1890. Serial No. 350,313. (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 Gang 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 represented as applied to a heel-attaching machine, but is not necessarily confined to that class of machines, as it may be used in connection with any boot or shoe or other work into which a gang of nails is adapted to be automatically driven.

The invention relates especially to the construction and operation of the jack or work-support; and it comprises a jack having a spindle and a last or work-support carried by a hinged post which is adapted to be moved from beneath the nail-driving devices outwardly upon an arc of a circle of which the pivot of the hinged post is the center. It also embraces the combination of such a jack spindle and post and work-support with work-centering devices which do not move outward or are not secured to the jack-post to swing outward therewith, but which have an opening and closing movement in relation to the work-support or last and when it is in a vertical position.

The invention further embraces a hinged jack-post, spindle, and last or work-support and work-centering devices which are automatically opened and closed in relation to the last or work-support.

The invention further embraces the employment, in connection with a hinged jack-post, jack-spindle, last or work-support, and of the work or shoe centering devices, of a pressure-head to work upon the spindles carrying the jack or work-support and the shoe-centering devices to move them simultaneously in relation to the templet or perforated plate, through which the fastenings are driven or by which they are received from the nail-carrier.

The invention further relates to various details of organization and construction, all of which will hereinafter be specified.

In the drawings, Figure 1 is a view, principally in front elevation, of enough of a heel-

nailing machine to represent the application of my invention. Fig. 2 is a view, partly in vertical section, from front to rear of the machine and partly in side elevation thereof, showing the jack and work-centering devices in operative relation to each other prior to the operation of the machine. Fig. 3 represents the same parts, showing the upper end of the jack-post, jack-spindle, and the last or work-support moved outward or away from the shoe-centering devices and from underneath the nailing devices. Fig. 4 is a detail view to represent latching mechanism for locking the jack-post, spindle, and work-support in their vertical position beneath the shoe-centering devices. Fig. 5 is a view in front elevation to represent the relation which the parts bear to each other upon the end of the upward movement of the jack, representing the centering devices as closed upon the last or work-support and the work carried thereby. Fig. 6 is a detail view, principally in front elevation, representing a modified form of the shoe holding and centering apparatus. Fig. 7 is a view, principally in vertical section, of the said apparatus and of the jack-post, to further illustrate the same. Fig. 8 represents the device in front elevation when in closed position. Fig. 9 represents the shoe-centering devices and holder as provided also with a back-stop. Fig. 10 represents the jack-spindle and shoe centering devices and holder-spindle as coupled to the pressure-head, so that they may be drawn downward by it. Fig. 11 is a detail view showing the side clamps of the boot or shoe holder as having a vertically-swinging movement upon a horizontal pivot connecting them with their levers or holders. Fig. 12 is a detailed view of the back-stop.

A represents the frame of the machine. a is the templet, having the hole a' , through which the nails or fastenings are driven. a^2 is the nail-carrier, having the holes a^3 . a^4 is a reciprocating head carrying a gang of drivers a^5 . These parts are like similar parts described in many of my heel-nailing-machine patents and applications and need not further be described here.

B is a pressure-head, preferably vertically

adjustable on the pressure-slide *b* and operated by a cam, (not shown,) but like that described in application for patent for heel-attaching machines, filed April 19, 1887, Serial

5 No. 235,316, or similar to it.

The pressure-head B is provided with an enlargement *b'* to provide sufficient size to the top of the head to permit it to act upon not only the jack-spindle but the work-centering

10 spindle hereinafter referred to.

C is the central table of the machine. It has the guides *c*, furnishing a slideway *c'*, which receives the base-plate *c²* of the jack. This plate is movable in the slideway for the

15 purposes of horizontal adjustment only, and such adjustment is represented as provided by means of the adjusting-screw *c³*, which screws in a stationary nut *c⁴*, fastened to the bed C, and turns in the lug *c⁵*, attached to or

20 formed on the base-plate *c²*. The base-plate has lugs or upward extensions *c⁶* upon either side of an opening *c⁷*, and in this opening there is arranged the base *c⁸* of the jack-post *c⁹*. This jack-post has a forward extension

25 *c¹⁰*, which extends between the lugs *c⁶*, and through which and the lugs a pin or pivot *c¹¹* extends, by which the jack-post is hinged or secured to the plate *c²*. The post extends upward any desired distance or extent, and has

30 a central hole *c¹²*, in which is a slide last-spindle *c¹³*. The lower end *c¹⁴* of this spindle extends below the lower surface *c¹⁵* of the jack-post, and is always in position to receive movement from the pressure-head B. A collar *c¹⁶* acts as a stop in preventing the spindle

35 *c¹³* from dropping through the post or more than a given distance in relation to it. The upper end of the spindle has a pin which receives the last or work-support *c¹⁷*. The jack

40 base-plate *c²* has also a relatively short post D at its rear end, in which is a hole *d*. This hole receives a slide-spindle *d'*, which extends below the lower surface *d²* of the post or plate, and its lower end *d³* is over the extension

45 of the pressure-head B, and is adapted to be moved thereby. Across the upper end of this spindle *d'* is a horizontal bar *d⁴*. The spindle *d'* and post D are immediately behind the jack-post *c⁹* and jack-spindle *c¹³* when the

50 same are in a vertical or operative position. The bar *d⁴* has pivoted at each of its ends *d⁵* *d⁶* a member of a work-centering clamp or device. To the end *d⁵* is pivoted a member *d⁷* and to the end *d⁶* the member *d⁸*. These mem-

55 bers are in the shape of levers and are pivoted to the cross-bar *d⁴* so that their upper ends have a movement toward and from the sides of the last or work-support. (See Figs. 1, 6, and 8.) Each supports or carries at its

60 upper end a section of a clamp or holder *d⁹*. These clamps are curved or formed to approximate the curve or form of the work against which they are brought into contact. With a boot or shoe they are curved to the form of the

65 counter immediately below, when inverted, the edge of the outsole. They move any desired extent vertically and also longitudi-

nally, and they preferably are lined upon their contacting-faces with comparatively soft rubber *d¹⁰*. They are also preferably horizontally

70 adjustable upon the upper ends of their levers or supports *d⁷* *d⁸*.

A spring *d¹¹* serves to hold the levers *d⁷* *d⁸* open, so that the clamps or holders are held away from the sides of the last or work-sup-

75 port. They are closed automatically upon the sides of the last or work-support during their vertical movement and the vertical movement of the last or work-support to bring the work and heel into operative connection

80 with the templet-plate *a* and the nail-driving devices, and I have represented as one means of closing them automatically during this vertical movement the cams or wedges *d¹²*, one upon each of the levers or supports *d⁷* *d⁸*, and

85 preferably made integral therewith and upon the outer side thereof. These cams have the inclined sections *d¹³* and the substantially straight sections *d¹⁴* below the inclined sections, and have operated in conjunction with

90 the stationary cams the closers *d¹⁵*, which are supported by the frame of the machine, and the outer faces of which are in line with the path of vertical travel of the cams *d¹²*, whereby

95 upon the upward movement of the cams in relation to said closers the inclined sections of the cams first ride upon them, causing the clamps *d⁹* or work-holders to be closed in upon

100 the work to center it and hold it upon the last or work-support before the end of the upward movement of the last or work-support, whereby the work is centered thereon before it is

105 brought into contact with the plate *a*, thereby insuring the centering and proper holding of the work upon the last or work-support before there is any pressure brought to bear directly upon it, and the work is held upon the last or work-support during the continuance of the upward movement of the centering devices

110 and last or work-support by the straight or vertical sections *d¹⁴* of the closing-cams riding upon the surfaces of the closers. It is desirable that the closers *d¹⁵* be provided with a limited degree of horizontal yielding movement in order that their action upon the centering devices or holders may not be too rigid

115 or harsh and opportunity may be given for such slight variations as occur from differences in the thickness of stock and slight differences in the width of lasts or work-sup-

120 ports, and I have represented this result as accomplished by making the closers *d¹⁵* in the form of a somewhat long metal block, the inner end *d¹⁶* of each of which is held in a horizontal slideway *d¹⁷* in a bracket or support

125 *d¹⁸*, and by arranging at the inner end of said slideway or hole a spring, which in the drawings is represented as a block *d¹⁹* of rather soft rubber. Each closer-block *d¹⁶* has a slot

130 *d²⁰* arranged in it, through which a bolt or pin *d²¹* extends. This bolt or pin limits the range of movement of the closer-block and holds it in place. As it is not only desirable that the closer-blocks should have a slight yielding

movement, but also provision for horizontal adjustment, whereby the centering devices or holders d^9 are made adaptable to lasts or work-supports and work which vary considerably in width, I have arranged to vary the position of the springs d^9 , so that they may be set out or in with regard to the working faces of the closers, and whereby the position of said working faces may be adjusted or varied any desired extent. This I have represented as attained where a rubber spring is employed by means of a washer or plate d^{22} , against which the rubber backs, and which is movable in the hole or slideway d^{17} by means of an adjusting-screw d^{23} . Of course in lieu of a rubber spring d^{19} a metal one may be employed.

In some instances it will be desirable to lock the jack-post to the table C after it has been moved into vertical position or upon its movement into vertical position to hold it in a vertical position during the upward movement of the jack-spindle, as there may be a tendency at times, if this is not done, for the pressure-head working through the jack-spindle to throw the jack-post out of vertical line, and in Fig. 4 I have represented the jack-post c^9 as having a horizontal extension E, the end e of which acts as a catch to receive the latching extension e' upon the latching-lever e^2 . This lever is pivoted at e^3 and is held in position to engage the catch e upon the movement of the jack-post to a vertical position by means of the spring e^4 . The lever is also extended to form a handle e^5 , by which the latch is disengaged from the catch to permit the upper end of the jack post, spindle, &c., to be moved outwardly. The latch e automatically engages the catch e' upon its inward movement, its lower edge being rounded and the upper surface of the latch being inclined to permit this to take place. If desired, the pivot e^{11} may be so placed as to permit the jack-post c^9 and spindle to be moved beyond a vertical line to a somewhat inclined position, as represented in Fig. 5, and when this construction is employed the extent of the inclination of the jack-spindle from a vertical position either forward or back is fixed by means of the adjustable stop F, secured either to the jack-post, as represented in Fig. 5, or to the base-plate of the jack, or to the bed, and the position of which regulates the degree of inclination of the jack post, spindle, &c., in relation to a perpendicular one, only a slight variation from a perpendicular position is sometimes desirable to secure or obtain a better application of pressure upon and in relation to the work.

In use the operator places the boot, shoe, or work upon the last or work-support when the last or work-support occupies the position represented in Fig. 3—that is, is moved outward from the nailing devices and the centering devices. This position of the last or work-support is a very favorable one for permitting the work to be placed upon it easily

and quickly. The last or work-support, with the work thereon, is then moved to a vertical or substantially vertical position between the clamps or holders d^9 , which are wide open, to permit the location of the last or work-support and the work between them. If desired, there may be employed a back-stop G, preferably horizontally adjustable and carried at the end of an upward-extending rod or support g , fastened to the cross-bar d^4 to be vertically movable therewith, against which the back portion of the shoe or work carried upon the last or work-support is brought into contact at the end of its backward movement, which serves to press the shoe or work upon the last or work-support while it is being moved into position and insures the proper placing of the shoe or work so far as its adjustment lengthwise to the last or work-support is concerned. The operator then places a heel upon the shoe and starts the machine, and the last, the work thereon, the back-stop, and the clamps or holders d^9 are simultaneously moved upward by the coming in contact of the pressure-head B with the lower ends of the jack-spindle c^{13} and the clamp-spindle d' . During this upward movement of these parts the clamps are closed against the work, holding it firmly upon the last or work-support, and the end of the closing movement occurs before the work is brought into contact with the pressure or templet plate a , and the clamps are held closed from the time of their first closing during the continuance of the upward movement of the work while the work or heel is being compressed and during the continuance of the nailing and until the last or work-support and centering devices have fallen or been moved below the closers d^{15} . When a top lift is applied, as described in my application for patent filed February 4, 1890, Serial No. 339,166, or in any other desired way, the downward movement of the last or work-support and the work and of the clamps d^9 is not sufficiently extended to move the cams d^{14} from contact with the closers d^{15} , but only sufficient to provide a space for the movement into and out of position of the spanker-plate and top lift carried thereby, so that the holders or clamps d^9 continue to act to hold the boot or shoe or work centrally upon the last or work-support and in the same position as when originally or first closed upon them. At the end of the operation of the machine the last or work-support, work, and clamps fall or are moved below the cam-closers, the clamps are automatically opened by the spring d^{11} , and the jack or last, with the work thereon, can then be moved out from between the clamps and the boot or shoe or work removed therefrom. It is desirable that the last and clamps be drawn down by the pressure-cam or other suitable means, and to enable this to be accomplished I have represented in Fig. 10 the pressure-head as constructed with a collar H, having an inward flange h , circular in shape, which extends into a recess h' or

upon a lug or foot formed upon or attached to the lower end of the spindle c^{13} b^3 . This connects the two spindles with the pressure-head, allows the pressure-head to be turned in relation thereto to adjust the spindles vertically, and permits the movement of the jack-spindle c^{13} upon its center into and out of operative relation with the edge of the flange and so that when the jack-spindle is in vertical position it shall be engaged with the pressure-head to be moved downward thereby. (See Fig. 11.)

Instead of operating the levers or supports d^7 d^8 and therefore each clamp-section or holder d^9 by means of the mechanism represented in Fig. 1, I may operate them by means of links m m' , (see Figs. 6 and 8,) extending from the levers near their pivotal points to connect with each other by a pin m^2 and form a toggle. The links are straightened to separate the levers and clamps upon the downward movement of the spindle d' by means of a stop m^3 , which in Fig. 7 is represented as in line with an extension of the pin m^2 , and the pin coming in contact with the stop upon the downward movement of the levers and spindle is held stationary while they continue their downward movement, and this causes the links of the toggle to be straightened and the levers and clamps to be opened. To insure the closing of the levers and clamps upon the upward movement of the spindle d' and the movement of the jacked shoe to the templet or pressure plate, a spring m^4 is attached to the pin m^2 of the toggle and to a stationary lug m^5 on the post D. This spring acts to hold the pin against the upward thrust upon it upon the upward movement of the spindle d' , and therefore serves to cause the links m m' to take the inclined position represented in Fig. 8 and to act to draw the levers d^7 d^8 and the clamps d^{10} toward each other and to hold them in this position. The force with which they are closed and held of course depends upon the strength of the spring m^4 , which may be varied to any desired degree.

In Fig. 11 I have shown the clamps d^{10} as secured to the levers d^7 d^8 , respectively, in a manner to permit them to swing on a vertical arc upon horizontal centers or pivots so as to conform to the sides of boots or shoes varying as to width and as to conformation of their size.

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

1. In a machine of the character specified, the combination of the nailing devices, a hollow hinged post or sleeve, a slide-spindle carried therein and a jack or work-support carried by said spindle, as and for the purposes described.

2. In combination with the nailing devices and a movable pressure-head, an interposed hinged hollow post, a slide-spindle carried therein, its slide-plate and a last or work-sup-

port carried by the spindle, substantially as described

3. The combination of the nailing devices, a movable pressure-head, and an interposed adjustable plate, a hinged post mounted upon said plate, a spindle carried by said post, and a last or work-support upon said spindle, substantially as described.

4. The combination of the slide-plate c^2 , hinged post c^9 , slide-spindle c^{13} , last or work-support carried thereby, and the adjusting-screw c^3 connecting the plate with a stationary part of the frame, substantially as described.

5. The combination with the nailing devices arranged above the last or work-support, and a hollow post hinged upon a horizontal pivot to provide its upper end with a movement upon an arc of a circle from beneath said nailing devices toward the front of the machine, and a spindle carried in said post, and a last or work-support mounted upon said spindle, substantially as described.

6. The combination with nailing devices of the hinged hollow post c^9 pivoted below said nailing devices to provide its upper end with a movement upon an arc of a circle, a spindle carried in said post, a last or work-support mounted upon said spindle, and a latch for locking said post with its spindle in operative relation with the nailing devices, substantially as described.

7. The combination with nailing devices of a hinged post pivoted to an adjustable plate to provide its upper end with a movement upon an arc of a circle in relation to the nailing devices, with said adjustable plate, and a last or work-support carried thereby as and for the purposes described.

8. The combination of the post c^9 pivoted to provide its upper end with a movement upon the arc of a circle into and out of operative relation with the nailing devices, the last or work-support and its spindle with a latch e and an automatic catch e' , as and for the purposes described.

9. The combination of the hinged post c^9 , the upper end of which is moved upon an arc of a circle into and out of operative relation with the nailing devices, a spindle carried by said post, a last or work-support upon said spindle, and a stop for limiting the extent of the backward, swinging movement of said post whereby its inclination may be varied somewhat from a perpendicular one, substantially as described.

10. The combination in a nailing-machine of a post pivoted to provide its upper end with a movement upon an arc into and out of operative relation with the nailing devices, a spindle carried by said post, a last or work-support upon said spindle, and work holding and centering clamps, as and for the purposes described.

11. The combination of a post, the upper end of which is movable upon an arc into and

out of operative relation with the nailing devices, a slide-spindle carried thereby, a last or work-support carried by said spindle, and work holding and centering clamps having an opening and closing movement in relation to the last or work-support, but fixed in relation to its arc movement, as and for the purposes described.

12. The combination of a post, a slide-spindle carried thereby, a last or work-support and work centering and holding clamps and mechanism for automatically closing them during the upward movement of the last or work-support, as and for the purposes described.

13. The combination of a post, a slide-spindle carried thereby, a last or work-support mounted upon said spindle, a support D for the spindle d' , said spindle d' , work centering and holding clamps d^{10} carried thereby, a common pressure-head to provide the two spindles with vertical movements in their supports in unison with each other, and clamp closing and opening devices to close the clamps during their upward movement and to open them during their downward movement, as and for the purposes described.

14. The combination of the adjustable plate c^2 , the post D carried thereby to be adjustable therewith, but having no other movement, the slide-spindle d' supported by said post, the clamps d^{10} , the post c^9 hinged to said plate c^2 to provide its upper end with a movement into and out of operative relation with the clamps and nailing devices, a slide-spindle carried by said post, and a last or work-support mounted upon said spindle, as and for the purposes specified.

15. The combination with the nailing devices of vertically-movable automatically-closing work-clamps, a vertically-movable back-stop, the clamps and back-stop comprising a work receiver and holder with a post hinged to provide its upper end with a movement toward and from said receiver, and the nailing devices, a slide-spindle carried by said post, and a last or work-support mounted upon said spindle, as and for the purposes specified.

16. The combination of the side clamps d^{10} , the levers d^7 d^8 , their vertically-movable support and devices for closing said clamps upon the upward movement thereof, and opening them upon the lower movement thereof, such as the connecting-links m m' , link-straightening rod m^3 , and spring m^4 , substantially as described.

17. The work-clamps d , operating arms or levers d^7 d^8 , each of said clamps having a movement upon a horizontal pivot or center for the purpose of adjustment to various sizes and curvatures of lasts, as and for the purposes described.

18. The combination of the post c^9 , slide-spindle c^{13} , last or work-support mounted thereon, post d' , the centering and holding clamps carried thereby, the said spindles d' c^9 , but one of them being coupled to the pressure-head B, and said pressure-head, substantially as described.

FREEBORN F. RAYMOND, 2D.

Witnesses:

J. M. DOLAN,
FRED. B. DOLAN.