

(No Model.)

2 Sheets—Sheet 1.

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

No. 316,826.

Patented Apr. 28, 1885.

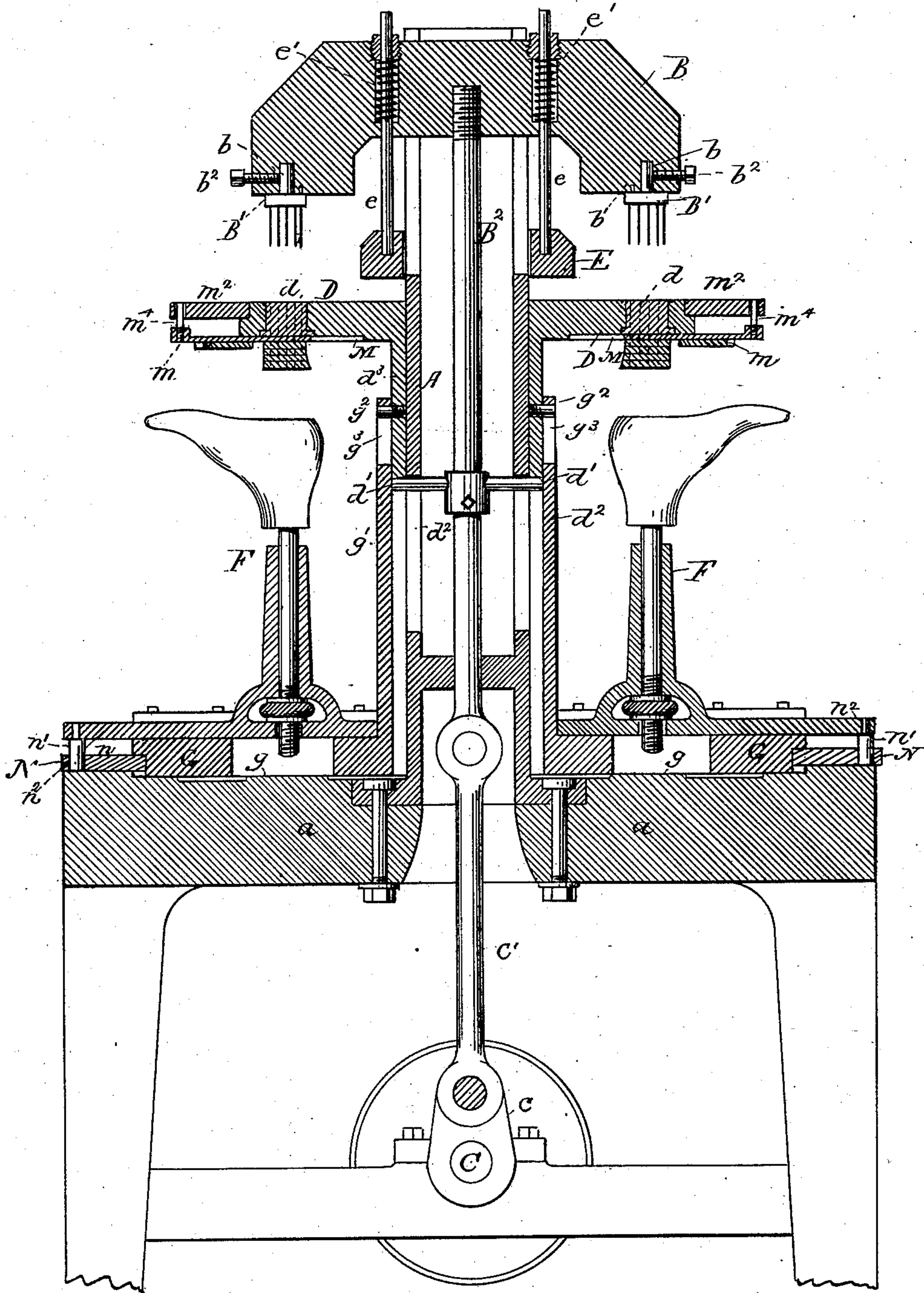


FIG. 1.

WITNESSES

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INVENTOR

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*by his atty.*  
*Charles H. Raymond*

(No Model.)

2 Sheets—Sheet 2.

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

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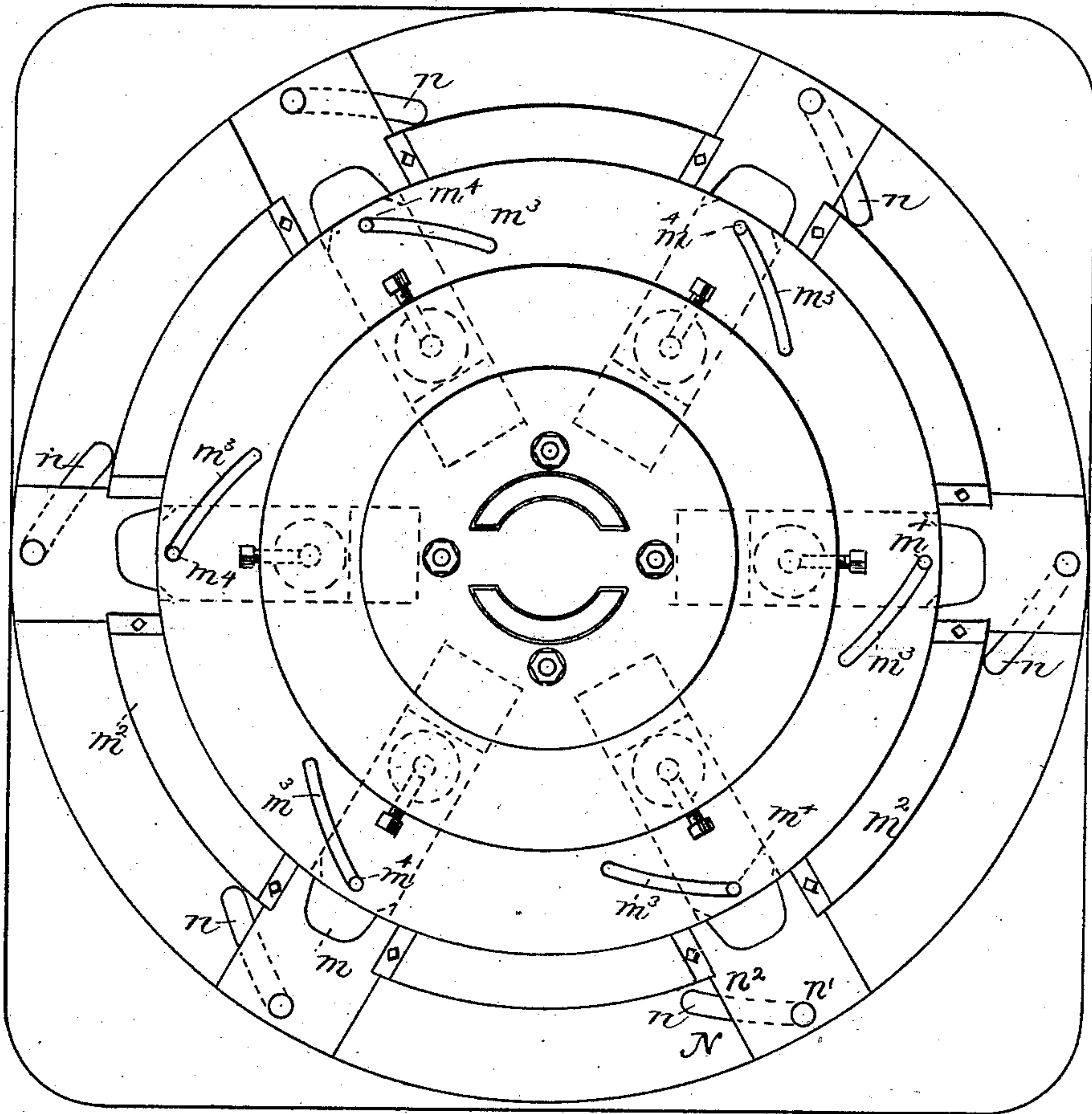


Fig. 2.

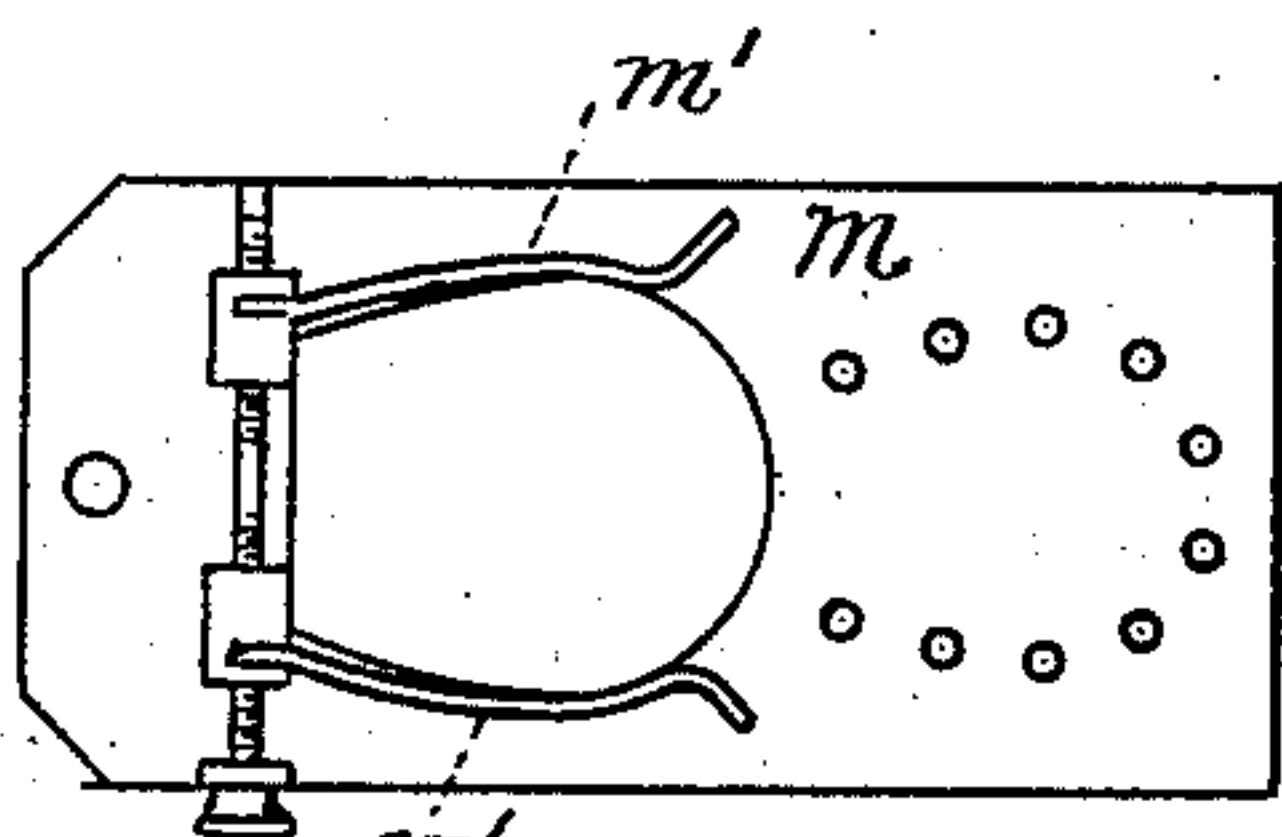


Fig. 3.

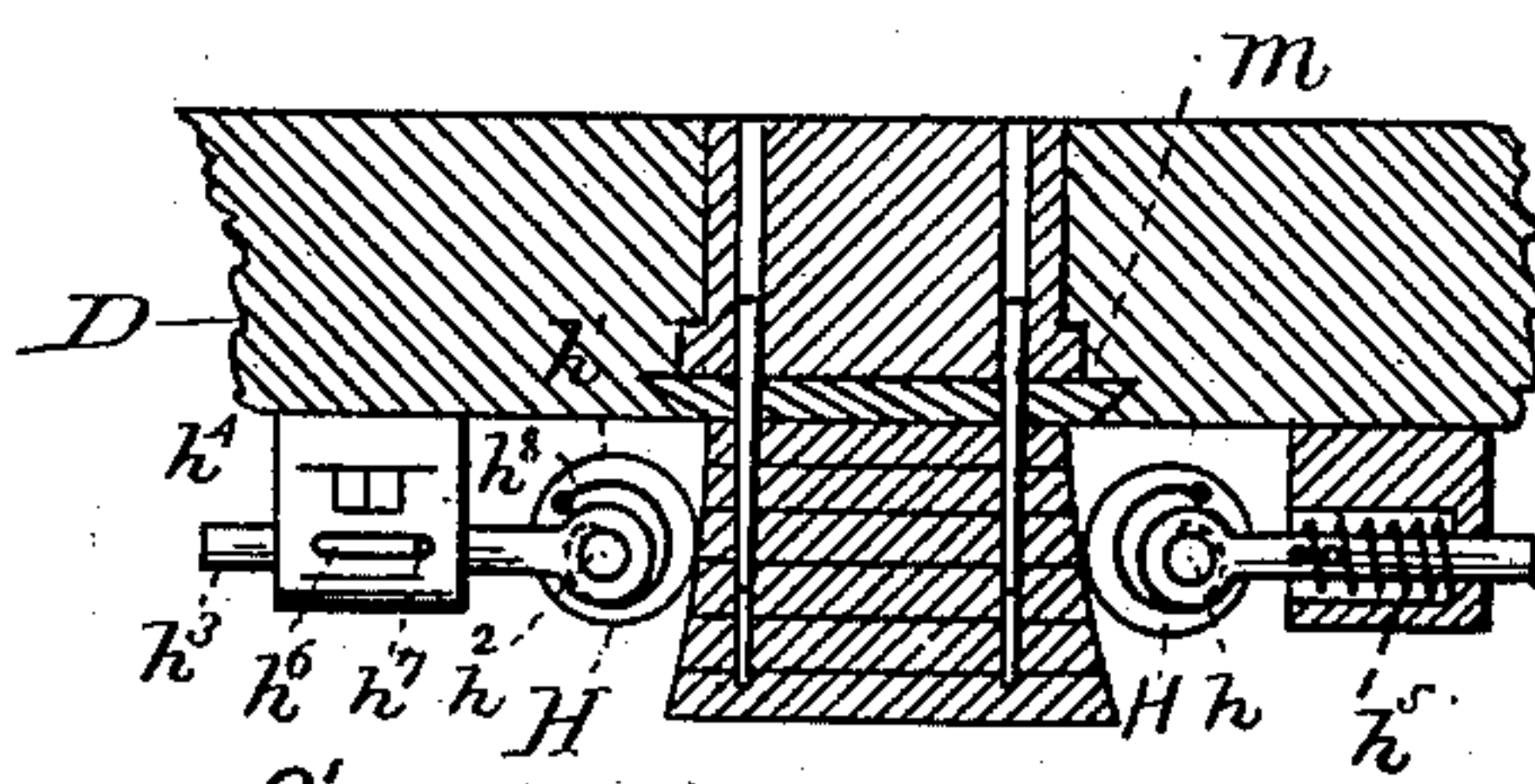


Fig. 4.

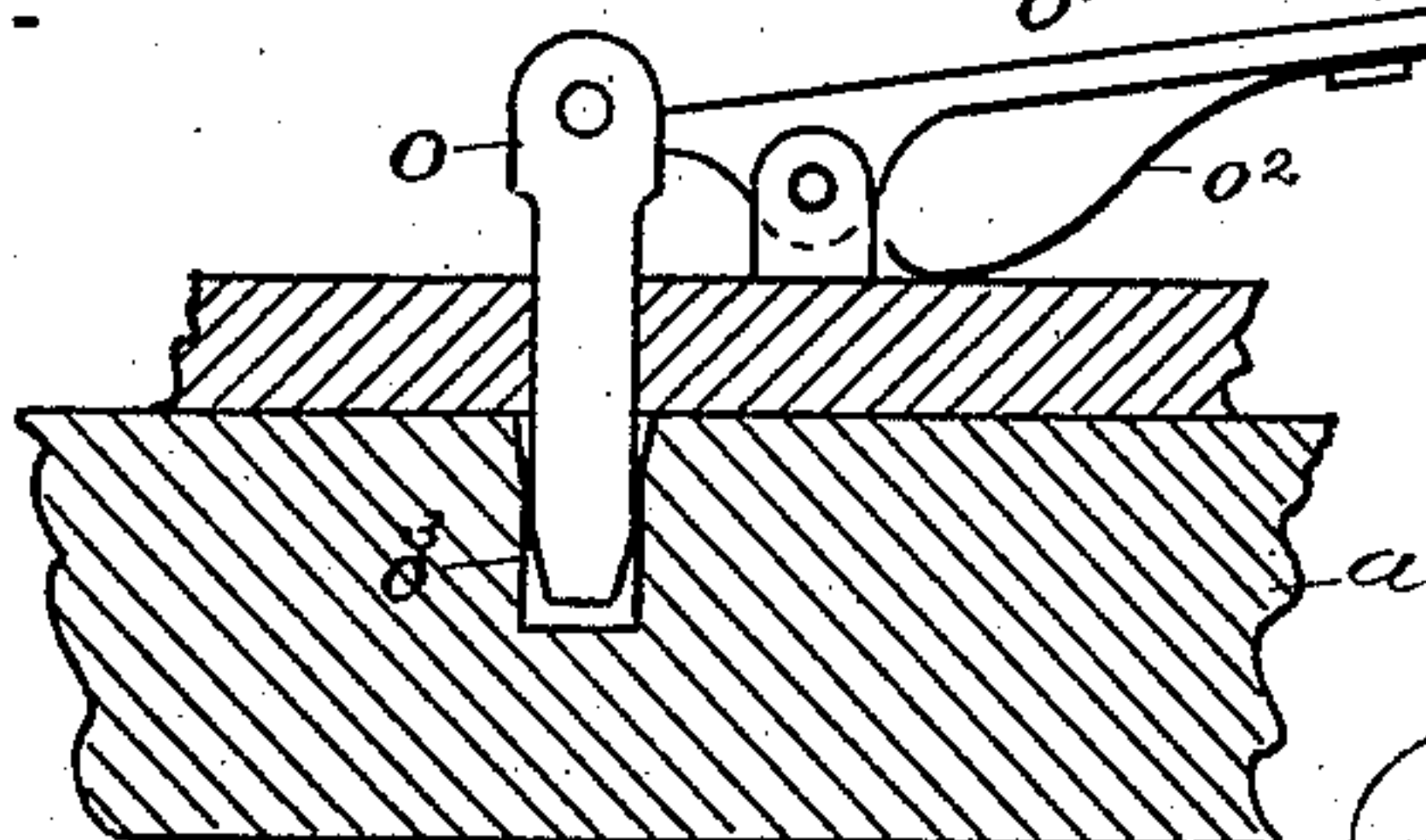


Fig. 5.

WITNESSES.

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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. 316,826, dated April 28, 1885.

Application filed January 13, 1885. (No model.)

*To all whom it may concern:*

Be it known that I, FREEBORN F. RAYMOND, 2d, of Newton, in the county of Middlesex and State of Massachusetts, a citizen of the United States, 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 comprises the arrangement and organization, in a heel-nailing machine, of two or more sets of drivers, a corresponding number of templet or pressure plates, and of jacks, all arranged in relation to each other to permit two or more heels to be attached simultaneously. It further relates to the arrangement of the templet and jacks so that they may be revolved either separately or together, in order that the work may be applied to the jacks and templets at one point, if desired. It further relates to the arrangement of a gang of drivers and templet or pressure plates and of the jacks in a circular group, form, or order, whereby compactness of parts, economy, and strength of construction and ease of operation are obtained. It also relates to other details of construction, all of which will be hereinafter more fully described.

Referring to the drawings, Figure 1 is a vertical central section of a machine having the features of my invention. Fig. 2 is a plan view of the machine, looking downward. Fig. 3 is a plan view inverted of a top-lift plate. Fig. 4 illustrates the heel-blank-holding device. Fig. 5 is a detail view of the revolving bed-locking device.

A is a strong hollow column rising from the bed *a*. B is a head, arranged to be reciprocated upon the column and supporting two or more driver-holder blocks, B'. In the drawings I have represented it as arranged for supporting six driver-holder blocks. These driver-holder blocks are attached to the head in any desirable way, and I prefer that shown in Fig. 1, where each block has a spindle, *b*, and dowel-pin *b'*, which enter holes in the head, the spindle being locked by the locking-screw *b<sup>2</sup>*. This head is shown as reciprocated by means of the crank *c* on the shaft C, connecting-rod B<sup>2</sup>, and the link *c'*; but of course I may use for this operating mechanism any mechan-

ical equivalent therefor. The shaft C may be a pulley-shaft; or it may be driven by the pulley-shaft, as may be desired. The templet or pressure plate D is vertically movable upon the column A, and it supports the removable templet-blocks *d*, there being one for each group of drivers. It is moved downward upon the downward movement of the head and upward upon its upward movement. Its downward movement, preferably, is accomplished by means of the pressure foot or ring E, which is suspended from the head B by the rods *e*, and is held away or down therefrom by the springs *e'*, which surround the rods, so that upon the downward movement of the head the pressure plate or foot comes in contact with the templet or pressure plate first, and moves it down upon the work, and gradually increases its pressure thereon as the springs are compressed by the downward movement of the head B, and therefore, as will be hereafter seen, the pressure upon the heel-blanks is a steadily-increasing pressure, instead of a rapid blow. The drivers, however, are rapidly reciprocated, and moved so that the nails are driven under the impact of a blow rather than by a continuous pressure or push. The templet or pressure plate is lifted upon the upward movement of the head B by means of the lugs or projections *d'*, which extend through the holes or slots *d<sup>2</sup>* in the column underneath the templet or pressure-plate sleeve *d<sup>3</sup>*, and upon the upward movement of the head come in contact therewith and lift it and the pressure-plate. The jacks F preferably are arranged to be moved horizontally in and out of position upon the revolving table or bed G in suitable ways or guides, and the table G is adapted to be moved or revolved upon the column A. It is supported by the bed *a*, which is stationary, and which, preferably, has circular ribs *g* or anti-friction rolls or bearings, upon which the table may be revolved. The templet or pressure plate preferably is connected with the table by means of the sleeve *d<sup>3</sup>* and the sleeve *g'*, the sleeve on the templet or pressure plate closing within the sleeve extending upward from the revolving table, and attached thereto, and the two sleeves are connected by pins or projections *g<sup>2</sup>*, which project from one sleeve and enter the slots *g<sup>3</sup>* in the other, so that the ta-



ble and templet or pressure plate are moved or revolved simultaneously. The revolving table preferably has shoe-guides or centering devices like those described in the Henderson pending application of January 10, 1883, arranged behind each jack for the purpose of centering and holding the shoe on the last or heel-support.

The machine as thus organized is especially adapted for nailing loaded heels—that is, heels which have been pricked in a pricking-machine and their holes filled with nails by hand or in any other desired way.

Although I would say that I do not confine myself in the use of this invention to that form of heel, as by a modification which will form the subject-matter of another application it will be seen that the holes can be pricked and loaded in place upon the boot or shoe, if desired. When, however, the loaded heel-blanks are to be attached, I arrange below each templet or pressure block the spring or yielding heel-holders H, which are formed to press against the sides of the heel with sufficient pressure to hold the same against the pressure-plate, the nails in the heel-blank entering the holes in the pressure or templet blocks, and being thereby centered.

The heel-holders may be spring-holders, such as are described in the Henderson application of January 10, 1883, or they may be eccentric jaws or surfaces, such as are shown in Fig. 4—that is, a surface that will bind or clamp the heel by the upward movement of the heel-blank into position, and which will readily release it upon the vertical movement of the templet-block or pressure-plate in relation to the heel.

In Fig. 4,  $h$  represents these jaws or eccentric surfaces. They are formed upon the rolls  $h'$ , each of which is pivoted at  $h^2$  eccentrically to the yielding rod  $h^3$ , which is supported by the bracket  $h^4$ , bolted to the templet or pressure plate D. The spring  $h^5$  operates to throw or move each jaw inward or toward each other, and a slot,  $h^6$ , in the housing, and a pin,  $h^7$ , which enters the slot, prevent the turning of the holder-rod. The rolls preferably are so made and hung that they will by gravity turn the jaws automatically to a position to always receive the heel-blank; but if desired the light spring  $h^8$  may be used additionally for so turning the surface. Of course it will be understood that before the heel is inserted the cam-surfaces must be down, so that upon contact of the side of the heel therewith they are caused to exert a clamping action by the movement of the heel-blank upward therewith. Of course it is not necessary that the cam-surfaces should be arranged upon a disk or roll, as they may be made upon any other shaped block or jaw. Of course the pressure-plate may be placed so near the heel-support that if the heel is first put in position its nails entering the holes in the templet or pressure block and the work afterward moved into position, the heel may be allowed to drop on the sole,

provided the heads of the nails do not leave the holes in the pressure or templet plate. If the heels are to be blind-nailed, then I arrange the dovetail or other recesses, M, in the under surface of the templet or pressure plate, one below each templet or pressure block, and arrange thereon to slide, preferably outward, a thin plate,  $m$ , upon the under surface of which are arranged spring-arms  $m'$ , for holding the top lifts, which are like those described in the Henderson patent, filed April 14, 1884. These plates are moved in and out of operative position by means of the revolving ring  $m^2$ , which is supported at the edge of the templet or pressure plate, and has the cam or eccentric grooves  $m^3$ , which receive pins  $m^4$ , projecting upward from the top-lift-holder plate, so that upon the revolution of the ring in one direction the plates are simultaneously moved outward, and upon its movement in the other they are simultaneously moved inward. It is desirable of course that each of the jacks should be accurately located, and that they should be as a rule located in exactly the same position. To accomplish this I employ a cam-ring, N, which is similar in principle to the cam-ring  $m^2$ . It has the eccentric slots  $n$ , which receive the pins  $n'$  attached to arms  $n^2$  projecting outward from the base of the jack, and it will be seen that upon the movement of this cam-ring N the jacks are simultaneously moved into or out of operative position, and that the position of one jack shows the position of all the others. Consequently the operator, in locating or moving the jacks into operative position, need have but one jack before him, as by it he can govern the position of the other jacks, and the cam-ring also serves the purpose of locking the jacks in any desired position.

For locking the table G, and consequently the pressure-plate in position, I preferably use the spring-bolt having a tapering point and carried by the table G. This bolt is moved upward by the handle  $o'$  and downward by the spring  $o^2$ , and it is adapted to enter automatically the bolt-hole  $o^3$  in the bed  $a$ , so that when the templet-blocks and jacks are in line with the drivers the bolt automatically enters the hole  $o^3$  and locks the bed firmly in place. In lieu of this bolt, or in addition thereto, I may use for locking and centering the templet-plate and the table G a locking-bolt attached to the head B and having inclined sides, the said bolt or locking device being carried in advance of the drivers and entering a hole in the templet or pressure plate; also having inclined sides, so that if the pressure-plates should be a little out of register the bolt upon entering the hole and passing down therein a short distance will bring it automatically into line and before, of course, the drivers enter the hole. This device is described in my pending application, filed April 14, 1884, Serial No. 127,755, and need not be described here.

The machine may be operated by one man, or by a man and a boy, as may be desired.



When operated by a man, he takes his position at a convenient point and places the boot or shoe upon a heel-support, moves it in position, and the heel-blank and top lift (if the heel-blanks are to be blind-nailed) are placed in position. He then revolves the table and brings the next jack and templet block or presser before him and proceeds as before, and so on until all the boots or shoes to be nailed and their heels have been placed in position. Of course, if desired, the shoes are placed first upon their respective holders and the top lifts in theirs, and this with or without moving the revolving table to the operator. The machine is then ready to be set in operation, and it makes one revolution and then stops. This revolution brings the pressure or templet plates down upon the heels and holds them under as much pressure as may be desired, and also under a gradually-increasing pressure, while the various gangs of drivers are moved simultaneously rapidly downward and drive the nails; and upon the upward movement of the head the templet or pressure plate is lifted from the heels, and if the work is to be blind-nailed the operator by simply moving the ring  $m^2$  moves the top-lift-holding plates into position, and with one more reciprocation of the machine the top lifts are spanked on. The plates which are herein mentioned as top-lift plates or top-lift-holding plates are also top-lift-spanking plates. In other words, the under surface of the plate against which the top lift is held by the top-lift-grasping devices is the spanking part of the plate, so that these plates might more properly be called "spanker-plates," with top-lift-holding devices attached. By making the top-lift plate extend so that it forms a portion of the templet-plate or pressure-plate, as represented in the figures, there need be no adjustment, as is common in some machines in applying the top lift as the top-lift-holder plate simply takes the place of that portion of the templet or pressure block moved away by the movement of the top-lift plate into position. If a boy is employed, it will be his duty to attend to a certain portion of the work, either to stand at one side and feed the heels and top lifts to their holders or to make such other division of the work as may be desirable.

It will be seen that by a machine of this construction great saving in the time of attaching is accomplished, for the reason that a number of boots or shoes may be placed, heel-blanks located, and top lifts placed as continuous and systematic operations, in much less time than it takes to place one shoe upon the jack, move it into position, set the machine in operation, attach the heel, and remove it therefrom; also, that two reciprocations of the machine attach anywhere from two to six heels, or even more, instead of one, as in the ordinary machine.

While I show the presser foot or ring E as operated by the crank C, I would say that I do not confine myself to this method of oper-

ating it, as it may be moved independently of the head B. I would also say that instead of moving the templet or pressure plate D down to the last or work-support the bed G, with the work-supports thereon, may be moved simultaneously upward against the pressure-plate. I would further say that in lieu of the templet or pressure plate and the gangs or groups of drivers I may use driver-blocks or surfaces, which may be attached directly to the head B, which are brought by the reciprocation of the head directly in contact with the heads of the nails projecting from the loaded blank; or, in other words, the pressure and templet plates would not be necessary, and in lieu of the gangs of drivers there would be used driving-blocks only. With this modification, however, the heel-blanks will be placed upon the heel-supports instead of being secured to the templet or pressure plate; or, if desired, the templet or pressure plate may be made so thin that the heads of the nails will project therefrom, so that the driver-block will drive only the distance they project above the templet-plate; but when this construction is employed the templet should not be thicker than the height of the portions of the nails which are left projecting for receiving the top lift in blind-nailing.

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

1. In a heel-nailling machine, the combination of two or more jacks mounted on a table, two or more templets or pressure plates or blocks carried by a reciprocating plate or ring above the jacks, and two or more gangs or groups of nail-drivers attached to a reciprocating head and adapted to be simultaneously operated, whereby two or more heels are simultaneously attached to their respective boots or shoes, all substantially as described.

2. In a heel-attaching machine, in combination with two or more nail-drivers, the vertically-movable templet or pressure plate D, carrying a templet-block for each driving device, and two or more jacks or work-supports, all substantially as and for the purposes described.

3. The combination of the revolving table G, supporting two or more jacks or work-supports, the pressure-plate D, and two or more driving devices carried by the reciprocating head B, all substantially as and for the purposes described.

4. In a heel-nailling machine, the combination of the table G, two or more jacks horizontally movable thereon, and means, substantially as specified, for moving them simultaneously into operative position.

5. In a heel-nailling machine, the combination of two or more work-supports mounted on a bed, with the ring N, having eccentric slots and connected with the work-supports, substantially as described.

6. In a heel-nailling machine, the combination of the templet or pressure plate D, the



presser ring or foot E, and the reciprocating head B, all substantially as and for the purposes described.

7. The combination, in a heel-nailing machine, of the presser foot or ring E, adapted to be moved vertically, the templet D, also vertically movable, and the reciprocating cross-head, all substantially as described.

8. The combination of the table G, carrying two or more jacks or work-supports, with the templet or pressure plate D, coupled or connected together, substantially as described, so that the movement of one causes the movement of the other, substantially as specified.

9. In a heel-nailing machine, the combination of the templet or pressure plate carrying a series of templet-blocks, a sliding top-lift holder underneath each block, and mechanism, substantially as specified, for reciprocating the templet-plate vertically, substantially as described.

10. The combination of the templet or pressure plate D with the plate or plates *m*, all substantially as and for the purposes described.

11. The combination of the pressure or templet plate having two or more templet-blocks, a sliding top-lift holder underneath each block, and mechanism, substantially as specified, to move them simultaneously into and out of operative position, all substantially as and for the purposes described.

12. The combination of the templet or pressure plate having the templet-block *d*, through which the drivers are reciprocated, and the plate *m*, forming a portion of the templet-plate, and also the top-lift holder, and adapted to be moved horizontally in relation to the block *d*, all substantially as and for the purposes described.

13. The combination of the templet or pressure plate D and the heel-holding device, substantially as specified, for holding the heel-blanks upon the under surface thereof, all substantially as and for the purposes described.

14. The combination of the templet-plate and the yielding eccentric heel-holders H, all substantially as and for the purposes described.

15. The heel-holders H, having eccentric or

cam surfaces, and supported upon yielding arms or supports, substantially as and for the purposes described.

16. The combination of the head B, the presser foot or ring E, the rods *e*, and the springs *e'*, all substantially as and for the purposes described.

17. The combination of the templet or pressure plate D, the reciprocating rod *B*<sup>2</sup>, the arms *d'*, and suitable operating mechanism, all substantially as and for the purposes described.

18. The combination of the column A, the head B, fitted thereto and vertically movable thereon, the templet or pressure plate D, also vertically movable thereon, the rod *B*<sup>2</sup>, connected with the templet-plate, as specified, and the crank C, whereby, upon the revolution of the crank, the head and templet-plate are first moved downward and then upward, all substantially as and for the purposes described.

19. The combination of the head or column A, the head B, the presser ring or foot E, the presser plate or templet D, the rod *B*<sup>2</sup>, and the crank *c*, all substantially as and for the purposes described.

20. The combination of the column A, the reciprocating cross-head, the presser foot or ring E, made vertically movable thereon, and the presser or templet plate D, made vertically movable upon said column, and also adapted to be revolved thereon, all substantially as and for the purposes described.

21. The combination of the bed G, having the sleeve *g'*, with the templet or presser plate D, having a sleeve, *d*<sup>3</sup>, which extends by or overlaps the upper portion of the sleeve *g'*, and connecting and operating devices, all substantially as and for the purposes described.

22. The combination of the revolving table, supporting two or more jacks or work-supports, devices for simultaneously moving the jacks, and a bolt or locking device for automatically locking the table to its bed, all substantially as and for the purposes described.

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