(No Model.) 4 Sheets—Sheet 1.

F. F. RAYMOND, 2d.

HEEL NAILING MACHINE.

No. 346,125. Patented July 27, 1886.

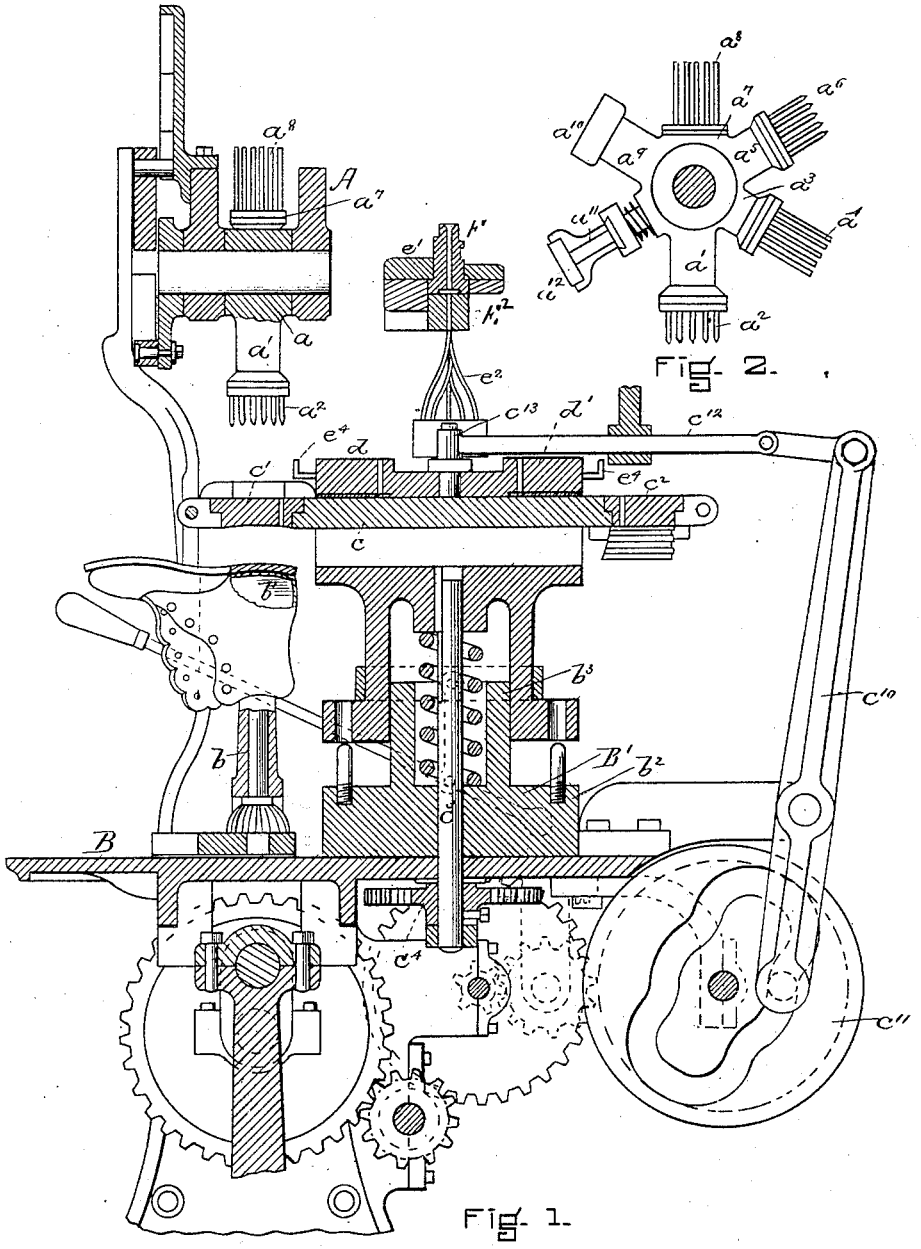

Fig. 2.

Fig. 1.

WITNESSES.
Fred. B. Dolan
J. M. Dolan

INVENTOR.
F. F. Raymond

(No Model.) 4 Sheets—Sheet 2.

F. F. RAYMOND, 2d.

HEEL NAILING MACHINE.

No. 346,125. Patented July 27, 1886.

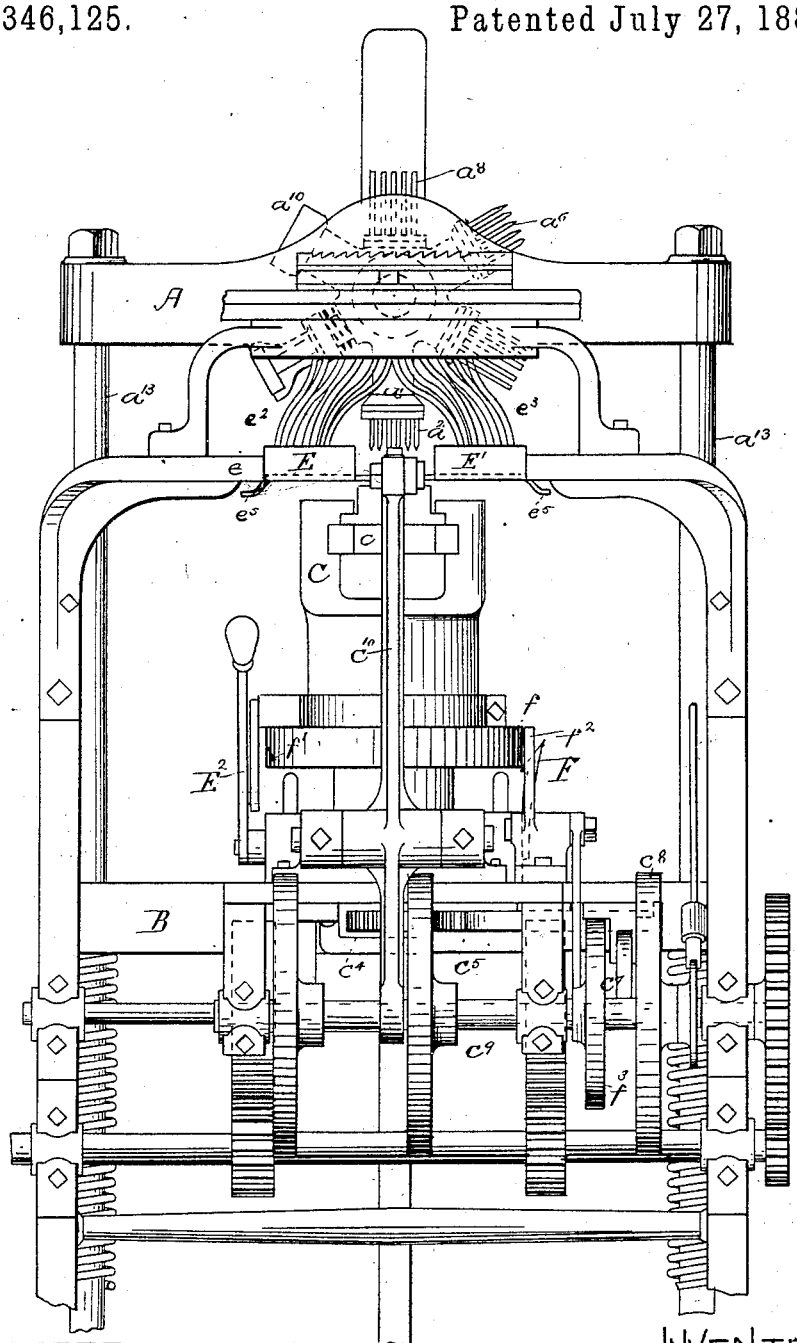

FIG. 5

WITNESSES.
Fred. B. Dolan.
J. W. Dolan.

INVENTOR.
F. F. Raymond 2d

(No Model.)

4 Sheets—Sheet 3.

F. F. RAYMOND, 2d.

HEEL NAILING MACHINE.

No. 346,125. Patented July 27, 1886.

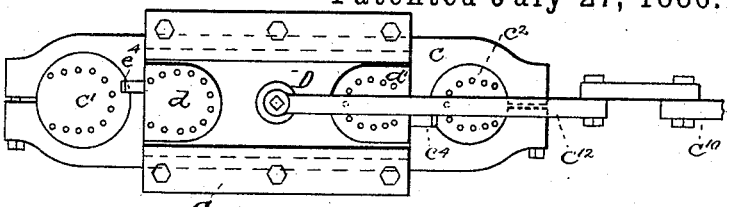

Fig. 4.

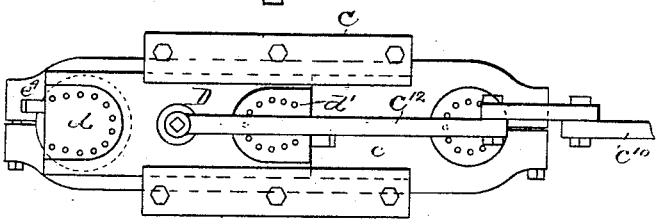

Fig. 5.

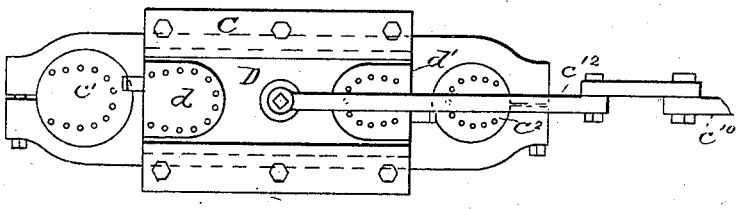

Fig. 6.

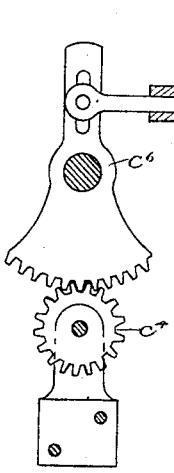

Fig. 8.

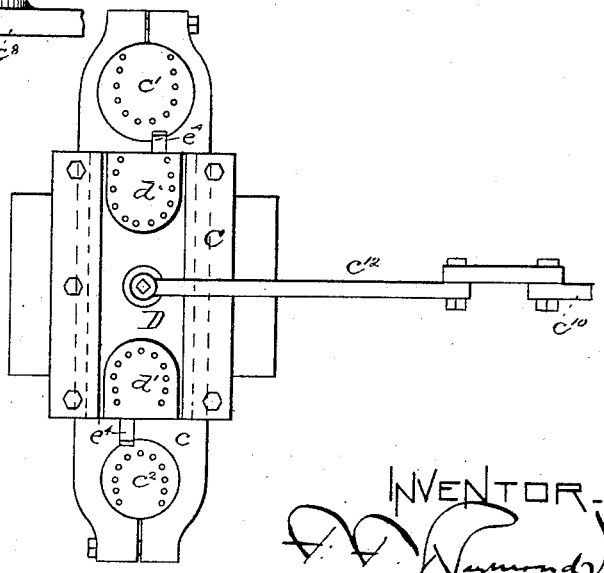

Fig. 7.

WITNESSES.

Fred. B. Dolan

J. M. Dolan

INVENTOR.

F. F. Raymond

(No Model.) 4 Sheets—Sheet 4.

F. F. RAYMOND, 2d.

HEEL NAILING MACHINE.

No. 346,125. Patented July 27, 1886.

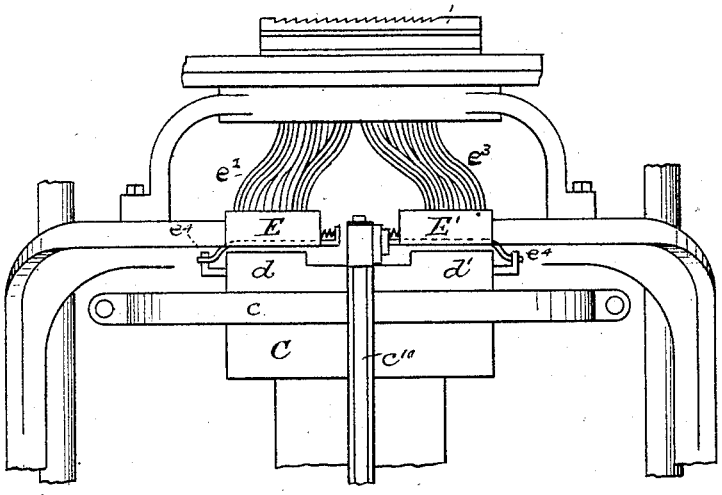

Fig. 9.

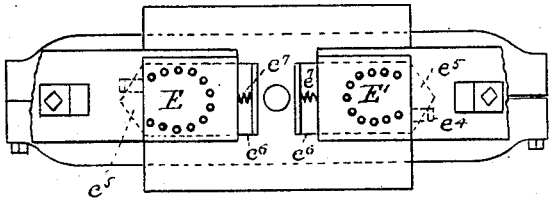

Fig. 10.

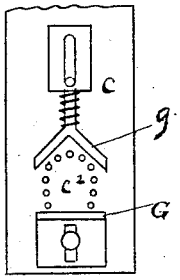

Fig. 11.

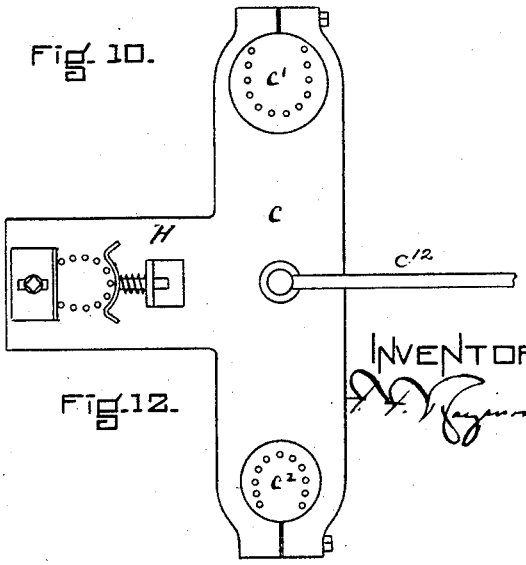

Fig. 12.

WITNESSES.

Fred. B. Dolan.

J. M. Dolan

INVENTOR.

F. F. Raymond 2d

UNITED STATES PATENT OFFICE.

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

HEEL-NAILING MACHINE.

SPECIFICATION forming part of Letters Patent No. 346,125, dated July 27, 1886.

Application filed December 23, 1885. Serial No. 186,514. (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 relates to a heel-nailing machine adapted to drive in succession two gangs or groups of nails or fastenings, and it is especially applicable for use in attaching the heel end of outsoles to the upper or upper and insole by one gang or group of fastenings, and to then subsequently attach the heel thereto by a second gang or group of fastenings, or in driving successively two gangs or groups of fastenings into the heel-blank or heel itself.

It is an improvement upon the invention described in my application for Letters Patent of the United States filed December 3, 1885, No. 184,584; and it consists, especially, in means for automatically moving the templets successively into and out of operative position, and for automatically supplying them with gangs or groups of fastenings in successive order, and, further, in the combination of these devices with the nail-driving devices, and in various details of construction, all of which will hereinafter be more fully described.

It further consists in the combination of two templets moved successively and automatically into operative position, the automatic nail or fastening feeding devices, and one or more gangs or groups of awls, and one or more groups of drivers brought automatically successively into operation for use with the templets.

Referring to the drawings, Figure 1 is a view, part in vertical section and part in elevation, of the central and upper parts of a machine containing the features of my invention. Fig. 2 is a view in elevation of the revolving head which I prefer to use. Fig. 3 is a view in rear elevation of the central and upper parts of said machine. Fig. 4 is a view representing the templet and nail carriers, one of the templets being in operative position. Fig. 5 represents the same parts, the nail-carrier plate having been advanced to bring one of the nail-holders in operative position with the templet. Fig. 6 represents the same parts after the nails have been driven through the said templet, the nail-carrier plate having been returned to its normal position. Fig. 7 represents the same parts turned or reversed a quarter, as hereinafter described, to remove both the templets from operative position. Fig. 8 is a detail view representing the mechanism employed for rotating the templet and nail carrier plates. Fig. 9 is a detail view representing in rear elevation a portion of the nail-distributing devices. Fig. 10 is a view in plan of the nail-holders and parts below the same. Fig. 11 is a plan view of a heel-holding device attached to the heel-nailing templet, inverted. Fig. 12 is a view of the templet-plate, provided, also, with a top-lift holding-plate inverted.

The cross-head A supports the revolving head *a*, which is automatically revolved by mechanism substantially as described in the Raymond and Henderson Patent No. 317,647, or in any other desirable way. It has an arm, a', supporting a gang or group of awls, a^2, adapted to be used with one of the templets, hereinafter referred to; an arm, a^3, supporting a gang or group of drivers, a^4, adapted to be used with the said templet; an arm, a^5, supporting a gang or group of awls, a^6, adapted to be used with the second of the two templets; an arm, a^7, supporting a gang or group of drivers, a^8, adapted to be used with the second templet; an arm, a^9, carrying a spanker-block, a^{10}, which may have, if desired, top-lift holding devices secured thereto, and an arm, a^{11}, carrying or supporting the heel-breasting devices a^{12}. The cross-head is reciprocated by means of the rods a^{13} and operating mechanism substantially as described in the Henderson Patent No. 316,894, Raymond Patent No. 322,562, or in any other desired way.

B is the table of the machine. It supports the jack *b*, which carries or sustains the last or heel support b'. The table also supports the post B′, which has the broad base b^2, and a cylindrical upwardly-extending section, b^3. This post carries or supports the carriage or table C, which is automatically revolved or oscillated thereon, as hereinafter described.

The post or carriage supports the plate *c*, which has at one end the templet *c'*, and at the other end a templet, c^2. These templets may be removable from the plate *c*, if desired, and they are made and the holes therein arranged according to the use to which they are to be put.

If the machine is used for nailing heel-seats and attaching heels thereto, the templet *c'* will be shaped substantially as shown in Fig. 1—that is, it will be provided with a cavity for closing upon or receiving the heel end of the outsole and for shaping it to the surface of the last or heel support.

If the machine is arranged to drive two gangs or groups of nails into the heel, then the templet *c'* will be similar to the templet c^2 in every respect, except so far as it relates to the arrangement of the holes therein, as it is necessary when two gangs or groups of nails are driven into a heel that the holes in the two templets should not be on the same line; and when the templets are so used one gang or group of nails may be driven into the heel-blank, so that their ends may be left projecting for the reception of the top-lift and the second gang or group then driven through the top-lift; or the gangs or groups may be arranged and driven in any other form or shape in relation to each other desired; and I would here remark that when the machine is operated to drive one gang or group before the top-lift is attached, and to then drive a second gang or group, it will be necessary to make the spanker-arm of the revolving head the third of the series of arms, or to bring it or similar mechanism into operation to apply the top-lift after the first gang or group of nails has been driven.

The carriage or table C is revolved from the position represented in plan in Fig. 7 to bring the templet *c'* into operative position with the jack and nail-driving devices by means of the shaft c^3, the pinion c^4, sector c^5, pivoted at c^6, the link c^7, and the cam c^8 on the shaft c^9, and it is moved to bring the templet c^2 into operative position by the same mechanism, which also operates to return it to its normal position. The shaft c^3 may be movable vertically with the table C, or the table may be arranged to slide upon it. I have shown the latter construction. The table or carriage C also supports the plate D, having at one end a nail-carrier, *d*, adapted to carry nails to the templet *c'*, and at the other end a nail-carrier, *d'*, for transferring nails to the templet c^2. The plate D is arranged to slide or be moved horizontally upon the plate *c* by means of the lever c^{10}, cam c^{11}, and arm or link c^{12}, connecting the end of the lever with the pin or stud c^{13}, extending upward from the central part of the plate D. The cam, however, does not operate to move the plate D until the carriage or table C has been moved to bring one of the two templets into operative position, and after it has been so moved then the plate D is moved horizontally to bring either the nail-holder *d* over the templet *c'* or the nail-holder *d'* over the templet c^2, as may be required; and after the nails have been driven from the nail-holder and templet the block D is moved back again by its lever and cam before the table or carriage C is revolved to move the templet out of operative position, and by so doing the plate D is brought under the nail-holders E E', and its center c^{13} brought to a position immediately over the center of the post B', so that the plate D may be turned with the carriage and the templet-plate C upon the center c^{13}.

The nail-holding blocks E E' are supported by suitable plates, *e*, and the nail-holding block E has holes or perforations of the same form and arrangement as the holes and perforations of the nail-holder *d* and templet *c'*, and the nail-holding block E' has holes of the same arrangement as the holes in the nail-carrier *d'* and templet c^2.

The nail-holder blocks E E' form part of the nail-distributer, which comprises a perforated block, F^2, the tubes e^2 connecting one section of the holes in said block with the holder E, and the tubes e^3 connecting another section of the holes in the block with the holder E'. The holding-plates E E' may or may not have sliding bottom plates for covering the holes. When they are used, however, they are moved automatically against the stress of closing springs by the movement of the nail-holding block D as it is revolved to bring the nail-carriers *d d'* under the nail-holders, the projections e^4 thereon being arranged to come in contact with the ends e^5 of the plates e^6, and to move them sufficiently to open the holes of the two nail-holding blocks when in register with the holes in the nail-carrying blocks, and the closing-plates are moved to close the holes by the springs e^7, so that the plate D may be revolved to clear the projecting ends of the plates while they return automatically to again close the holes in the nail-holders. It is not necessary, however, to use closing-plates, as the nails may be discharged through the distributers from the nail receiving and delivery block, hereinafter described, directly into the nail-holders.

I have not shown devices for making nails and delivering them to the nail receiving and delivery block, and I would here state that any form of nail-making or nail-sorting machine adapted to deliver nails in successive order from a throat or nozzle may be used for this purpose. The nail receiving and delivery block F is like that described in the Towns and Raymond application for Letters Patent executed November 23, 1885, and is operated by mechanism therein described, and it is unnecessary to again describe said operating mechanism here.

The block has an intermittent movement in one direction to bring its nail-receiving holes in succession in register with the throat of the nail making or sorting machine, and is moved in the opposite direction to bring its holes in line with the holes in the upper block of the

nail-distributer, in order that it may deliver its nails through the said holes to the nail-holders E E′ or the nail-carrying blocks.

The nail-distributer varies from that described in the said Towns and Raymond application, in that it is adapted to distribute nails into two gangs or groups instead of one, as therein specified, and upon but one movement of the nail receiving and delivery block. In other words, the nail receiving and delivery block is of a capacity to receive from the nail sorting or making machine in one movement sufficient nails for two gangs or groups, the nails received by the first or forward holes of the nail receiving and delivery block to any reasonable number being delivered to the holder E, and the nails received by the last or rear holes to the holder E′. The two gangs or groups, however, are simultaneously discharged from the receiving and delivery block into said holders.

It will be necessary for certain uses that the nails delivered to one holder be made shorter than the nails delivered to the other. This is especially desirable when the machine is used for nailing heel-seats and attaching heels as successive operations, and in such case, when a wire-nail-making machine is used its wire-feeding device is automatically varied by a cam to make shorter nails of the desired number, and then, without stopping the machine, to make longer nails. As above stated, however, any form of machine for delivering nails to the nail receiving and delivery block may be used, and there are many organized to deliver nails of the same length or of varying lengths.

I do not confine myself to the special form of nail-distributer herein shown and described; and the nail receiving and delivery block or the holding-plates E E′ may be filled with nails of the proper size by hand, if desired, instead of automatically. I would state that the centering mechanism described in my Patent No. 321,530 may be used for registering the templet and nail holders with the awls and drivers, if desired. I would further say that in the drawings the carriage or table C is shown as vertically movable upon the post B′ against the stress of a spring. It is not essential, however, that the carriage or table be provided with this vertical movement, as the last or heel support may be moved vertically against the templet, as described in my Patent No. 322,560.

The shaft carrying the cams and the crank operating the cross-head are geared to the pulley-shaft, and the pulley-shaft is provided with a stop-motion mechanism similar to that described in Patent No. 322,562, whereby the machine is permitted to make the desired number of reciprocations, and to then automatically stop, so that all the various operations of the machine from the time that the treadle is moved until the machine comes to rest are automatic.

When the templets are moved vertically, there may be employed a lever, E^2, like that shown and described in the Henderson patent, for moving the first templet down upon the work before the machine is started, and there will also be used a latch, F, for locking the first templet automatically upon its work, and to hold it there while the awls are being withdrawn and the drivers operated by engagement with the catch *f*. The latch F also automatically locks the second templet upon its work while the second gang or group of awls is being withdrawn, and the nails driven by the drivers by engaging the catch *f′*. It is automatically released from the catches at the desired interval by means of wiping-levers f^2, which are operated at proper intervals by the cam f^3 upon the cam-shaft c^3; and in order that the operation of the machine may be continuous after it has been once started, when it is organized to nail soles as well as heels, I have attached to the heel-nailing templet a heel-blank-holding device, which is fastened to the templet and arranged to project downward therefrom to grasp and hold the heel-blank centrally in relation to the templet while it is being moved from an inoperative to an operative position. When this device is used, of course the heel-blank is inserted before the machine is started. The device comprises the adjustable gage-plate G, and the spring-operated holder *g*. I may use, however, in lieu of these grasping-arms an automatic heel-blank-feeding device similar to that described in my application for Letters Patent filed May 29, 1885, Serial No. 167,047.

The operation of the machine is as follows: If the machine is organized to nail the sole as well as to attach the heel, the boot or shoe is mounted upon the last or work support and moved into position. The table or carriage C has been previously revolved or moved to bring the templet *c′* over the last or work support. The operator then moves the carriage or table downward by means of the lever E^2, to bring the templet upon the upper surface of the heel end of the sole, or, if the entire sole is nailed, upon the entire sole. The treadle is then depressed and the machine put in operation. The first reciprocation of the cross-head pricks the sole, or forms holes therein, and the templet is automatically locked upon the work. The nail-carrier plate *d* is then moved forward and its nails deposited in the templet. A second reciprocation of the cross-head immediately follows and drives the nails from the templet into the sole, and the table is automatically unlatched and the templet lifted, and the nail-carrier plate withdrawn. The table C is then turned to bring the templet c^2 into operative position, and the heel-blank, which has previously been secured to the lower edge of the templet by the clamping or holding arms, is moved with the templet into position over the heel end of the sole. The third reciprocation of the cross-head causes the heel to be compressed against the sole, and the carriage to be

locked down by the latch F, and at the same time pricks the heel-blank, so that it is held compressed and pricked upon the sole while the awls are being withdrawn, and until after the drivers are operated. The nail-carrying block d' is then moved forward to feed the nails in the templet c^2, and another reciprocation of the cross-head drives the nail from the templet into the heel and out and in soles. The latch is then automatically unlatched, the nail-holder plate D moved backward, the table partially revolved, the nail making or sorting machine set in operation, and the nails delivered to the nail-carriers d d', unless they have been previously delivered to the nail-holders E E'. Meanwhile another reciprocation of the cross-head spanks on the top-lift, if one be used, and another reciprocation breasts the heel, when the machine automatically comes to rest. If the heel-blank is not automatically fed into position, either by being secured to the heel-templet or by independent means, substantially as described in my application for Letters Patent filed May 29, 1885, Serial No. 167,047, then the machine comes to rest after the second reciprocation; and when it is again started it attaches the heel and then comes to rest, making either two, three, or four additional reciprocations, as may be desired—that is, a reciprocation for the awls, one for the drivers, one for applying the top-lift and spanking, and one for driving.

If, instead of nailing the heel-seat of the sole or the entire sole, two gangs or groups of nails are driven into the heel, then the operation of the machine is substantially as above indicated, with the exception that the heel-blank is placed by hand upon the heel end of the sole or automatically fed thereto, and one templet is then used to compress the heel-blank, one set of holes is formed therein, and the nails fed and driven, and the nail carrier or templet then moves out of, and the other templet moves into, position to permit the driving of the second set or group of nails. If one only is to be driven through the top-lift, then the top-lift is spanked on after the first group has been driven. Of course it will be necessary that the table C be locked down automatically and unlatched automatically twice, first when the first gang or group of awls is operated, and is unlatched after the first gang or group of nails has been driven. It is latched again when the second gang or group of awls is operated, and unlatched after the second gang or group of nails has been driven.

I would state that for sole-nailing it is not essential that the gang or group of awls be used.

In Fig. 12 I have represented a modified form of construction adapted to be used in applying the top-lift, and it comprises the plate H, extending laterally either on one side or the other of the table C, as may be desired, carrying on its under surface top-lift holding or grasping devices. When this form of construction is used, the table C will be provided by the cam and lever with means to bring the templets and top-lift holder successively into operation. The top-lift is spanked on either by the descent of the spanker-arm of the cross-head upon it, or the table or carriage may be moved down vertically by mechanism substantially as described in my application for Letters Patent filed March 18, 1885, Serial No. 183,178.

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

1. In a nailing-machine, the combination of a last or work support, two templets, c' c^2, supported by a table or other support, a cam and connecting mechanism, substantially as specified, for moving the templets automatically and successively into operative position, and two gangs of nail-driving devices adapted to be brought successively into operative position and operated, substantially as described.

2. In a nailing-machine, the combination of a last or work support, two templets, c' c^2, carried by a table or other support, a cam and connecting devices, substantially as specified, for moving them automatically and successively into operative position, the nail carriers or transferrers d d', a cam and connecting devices, substantially as stated, for moving each carrier or transferrer automatically into and out of operative position, and two gangs of nail-driving devices adapted to be brought successively into operative position and operated, substantially as described.

3. In a nailing-machine, the combination of a last or work support, the nail carriers or transferrers d d', a cam and connecting devices, substantially as specified, for revolving or operating the carrier, and a cam and connecting devices, substantially as stated, for reciprocating successively the said carriers or transferrers, and two gangs of nail-driving devices adapted to be brought successively into operative position and operated, substantially as described.

4. In a heel-nailing machine, the combination of a post or support, a carriage carrying the plate c, the templets supported by said plate, a cam and connecting devices, substantially as specified, the nail-driving devices, and a top-lift spanker, all substantially as and for the purposes described.

5. The combination of the plate c, bearing or supporting two templets, c' c^2, a cam, c^3, and connecting devices, substantially as specified, whereby the templets are moved successively into operative position, and are then moved and held out of operative position while the top-lift spanker or heel-breasting knives, or either, are being reciprocated, all substantially as described.

6. The combination of the plate D, supporting the nail-carriers d d', and devices, substantially as specified, for automatically revolving and reciprocating the same, substantially as described.

7. The combination of the plate D, carrying or supporting the nail-holders d d', a cam, c^{11}, lever c^{10}, and arm c^{12}, connecting the lever with the pin, and said pin, all substantially as described.

8. The combination of the plate c, having ways upon which the nail-carrier is reciprocated, devices, substantially as set forth, for automatically turning the plate, and a cam and connecting mechanism for reciprocating the nail-carrier upon said plate at predetermined intervals, all substantially as described.

9. In a nailing-machine, the combination of the nailing devices, the nail-carriers d d', and the nail-holders E E', adapted to deliver nails automatically to said nail-carriers, all substantially as described.

10. The combination, in a nailing-machine, of the nailing devices, the nail-carriers d d', the nail-holders E E', and the covering-plates e^6, adapted to be automatically and simultaneously moved by the nail-carriers in one direction and by the springs e^7 in the opposite direction, all substantially as described.

11. The combination of a nail-holder, E, having the covering-plate e^6, provided with a downward-extending V-shaped extension, e^5, a pin, e^4, supported by a nail-carrier and adapted to come in contact with the edge of the said extension, and the spring e^7, all substantially as described.

12. The combination, in a nailing-machine, of the nailing devices, the nail-carriers d d', and a nail-distributer for receiving nails and distributing them in two separate gangs or groups for delivery to the nail-carriers, all substantially as described.

13. The combination, in a nailing-machine, of the nail-driving devices with a nail-distributer having the block F^2 and the two sets of tubes or passages e^2 e^3, one set adapted to deliver a gang or set of nails of one arrangement and the other set to deliver a gang or group of another arrangement, all substantially as described.

14. The combination, in a nailing-machine, of the nail-driving devices and nail-distributing devices, comprising the block F, intermittingly moved in one direction to receive nails from a nail making or sorting machine, the plate F^2, having holes, and two sets or groups of tubes or passages, e^2 e^3, all substantially as and for the purposes described.

15. In a nailing-machine, a nail-distributer comprising the perforated nail receiving and delivery block F, the plate F^2, having holes corresponding with holes in the nail receiving and delivery block, and the tubes or passages e^2 e^3, arranged in two or more gangs or groups for dividing or separating the nails received from the nail receiving and delivery block into two or more separate gangs or groups, all substantially as described.

16. The combination of the table c, carrying the templets c' c^2, and adapted to be moved vertically and to be automatically revolved, and provided with the latch-blocks f f, with the latch F and the latch-releasing arm f^2, and cam f^3 for operating the same, substantially as described.

17. The combination of a templet or templets with the plate H, supporting top-lift-holding devices, and means, substantially as set forth, for moving them automatically and successively into and out of operative position, all substantially as described.

18. The combination of the plate H, carrying or supporting top-lift-holding devices, a cam, c^8, and connecting mechanism, substantially as specified, for automatically turning it into and out of operative position, substantially as described.

19. The combination of the heel-blank carrying devices supported by a plate, c, a cam and connecting devices, substantially as specified, for automatically turning or revolving the plate to move the said carrying devices into and out of operative position, all substantially as described.

20. The combination, in a nailing-machine, of the jack or work-support, two templets, two nail-carriers, the reciprocating nail-driving devices, the main shaft of the machine, and intermediate mechanism connecting it with the two templets and with the two nail-carriers and with the nail-driving devices, all substantially as described.

FREEBORN F. RAYMOND, 2D.

Witnesses:
J. M. DOLAN,
FRED. B. DOLAN.