

W. R. BARCLAY & A. BATES.

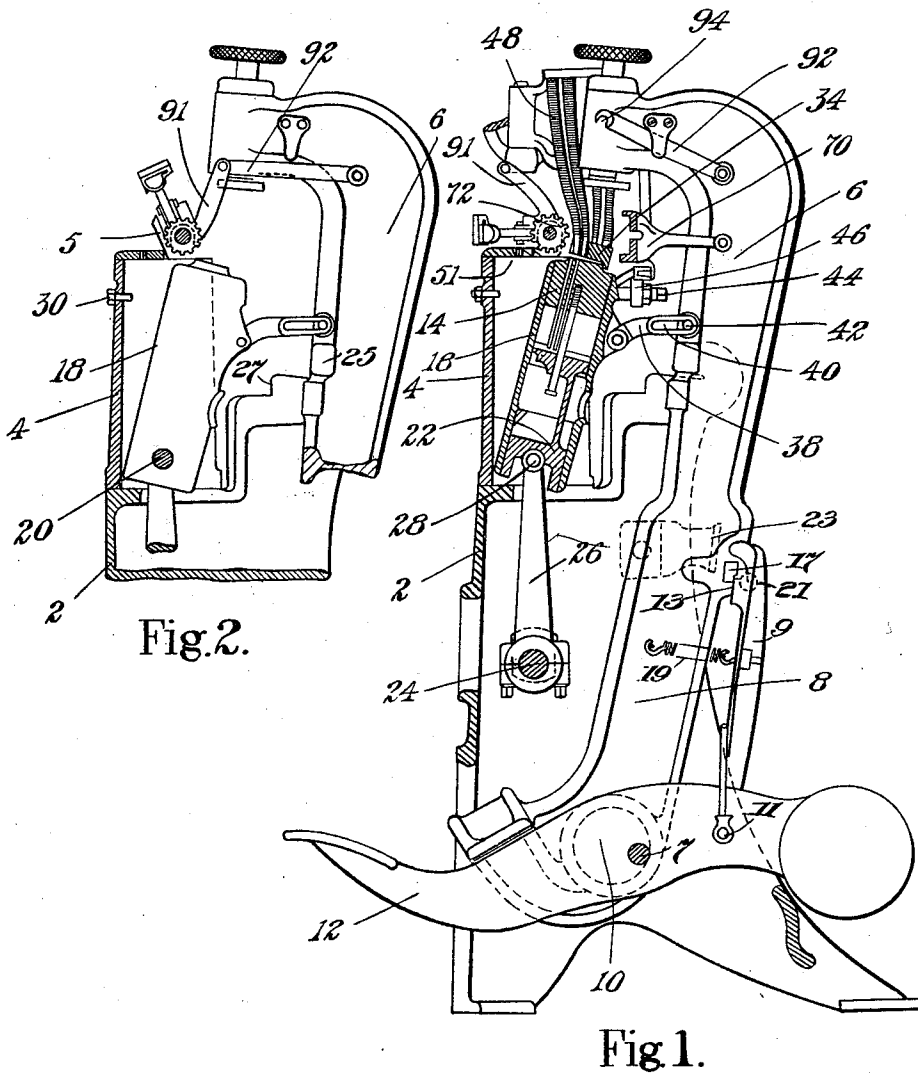
HEEL BUILDING MACHINE.

APPLICATION FILED OCT.30, 1907.

1,028,528.

Patented June 4, 1912.

4 SHEETS-SHEET 1.



WITNESSES.

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4 SHEETS-SHEET 2.

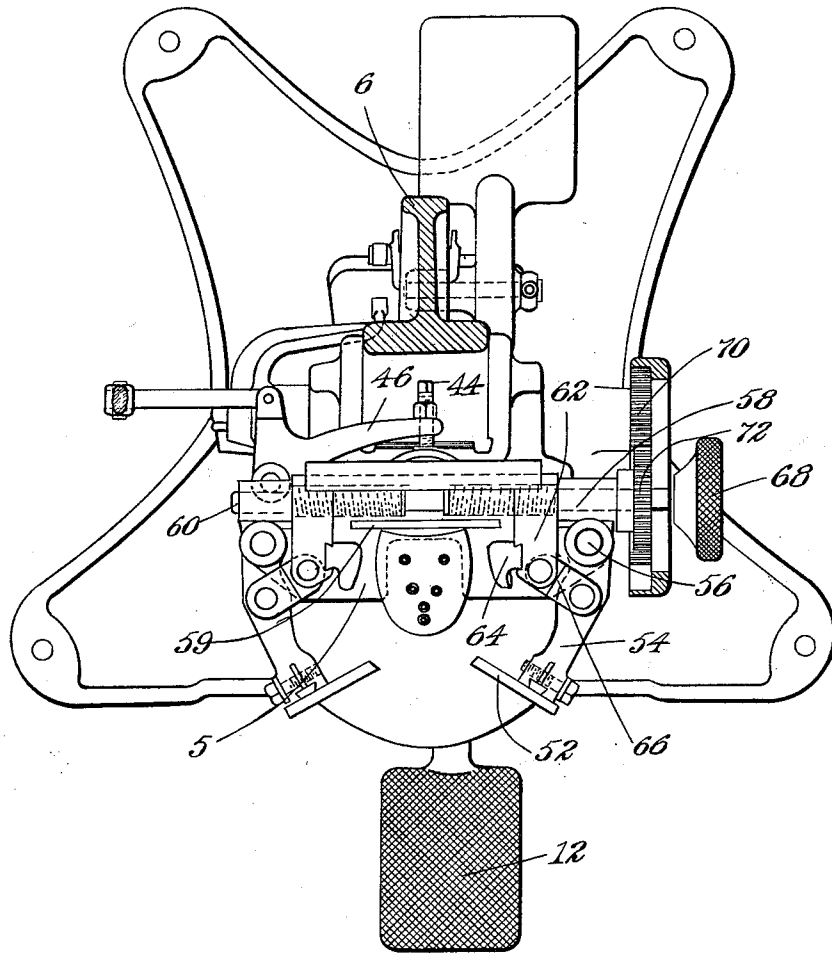


Fig. 3.

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4 SHEETS-SHEET 3.

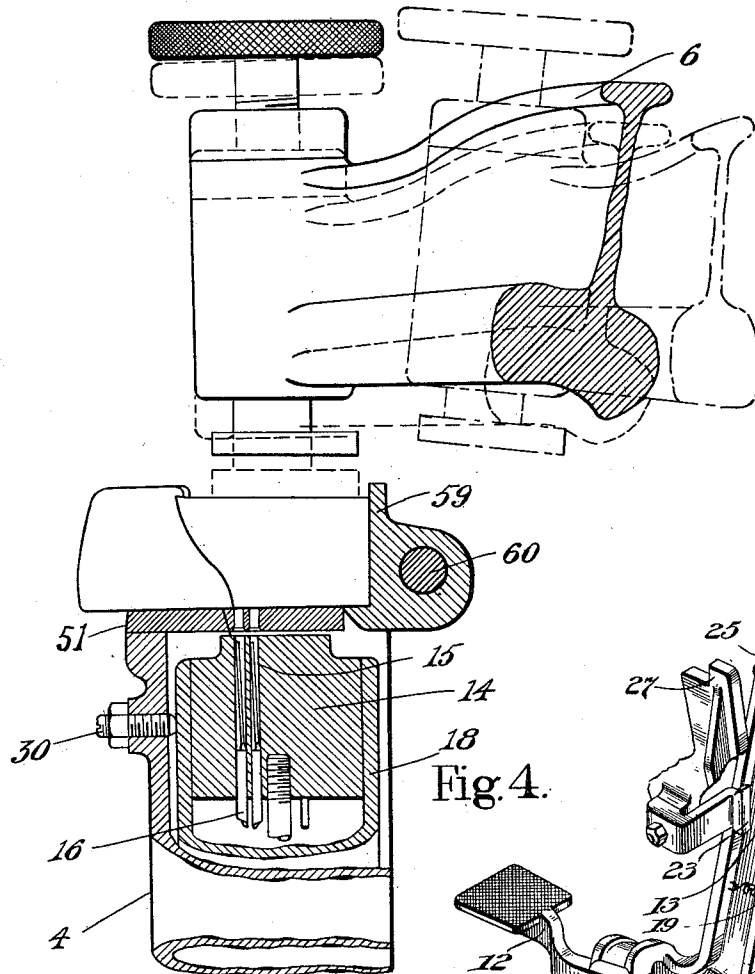


Fig. 4.

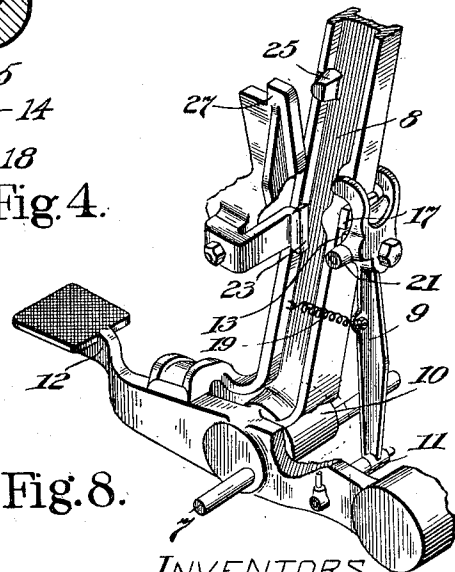


Fig. 8.

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4 SHEETS-SHEET 4.

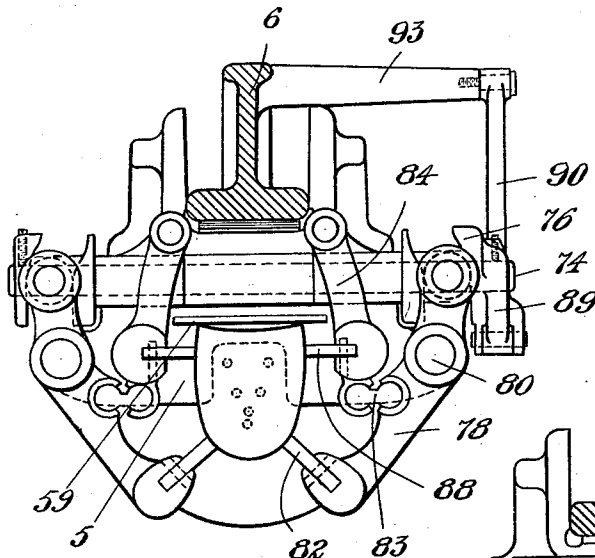


Fig. 6.

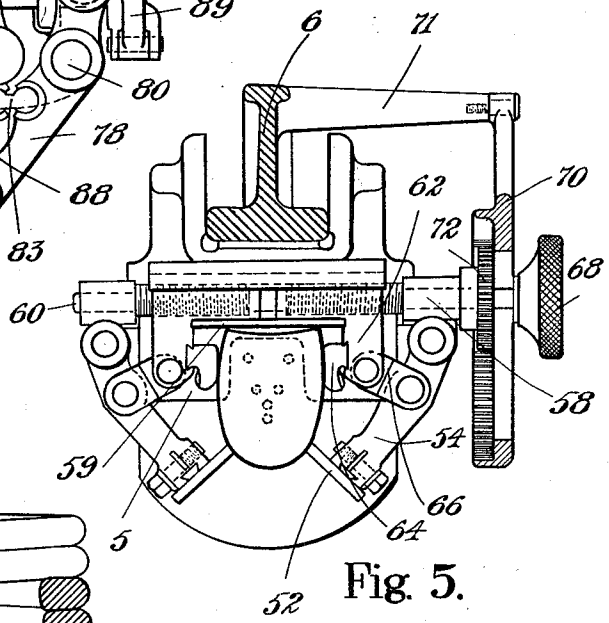


Fig. 5.

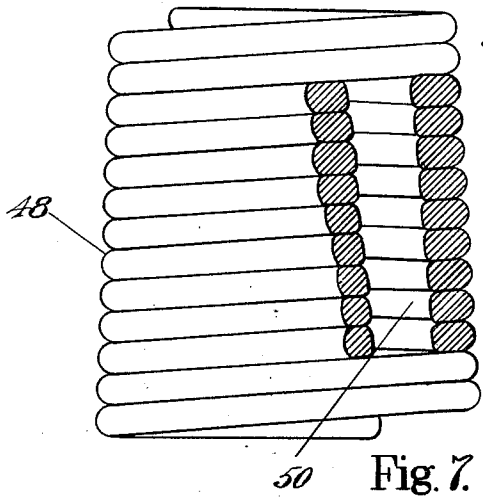


Fig. 7.

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UNITED STATES PATENT OFFICE.

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HEEL-BUILDING MACHINE.

1,028,528.

Specification of Letters Patent.

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Application filed October 30, 1907. Serial No. 399,896.

To all whom it may concern:

Be it known that we, WILLIAM R. BAR-
CLAY, a citizen of the United States of North
America, and ARTHUR BATES, a subject of
5 the King of England, residing at Leicester,
in the county of Leicester, England, have
invented certain Improvements in Heel-
Building Machines, of which the following
description, in connection with the accom-
panying drawings, is a specification, like
10 reference characters on the drawings indi-
cating like parts in the several figures.

This invention relates to machines for
building heels for use in the manufacture of
15 boots and shoes.

Heretofore machines for building heels
have been used comprising suitable means
for centering the lifts of a heel, and nail-
driving mechanism for nailing the lifts to-
20 gether. As far as we are aware, it has been
necessary in this class of machines to supply
the nails to the nail-driving mechanism
either by hand or by a hand-actuated nail
carrier, and an object of this invention is to
25 provide a machine in which this necessity
is obviated.

The present invention accordingly con-
templates the provision of an improved heel
building machine which includes the com-
30 bination with means for centering the lifts
of a heel in suitable relation with each other,
of a nail-driving mechanism mounted for
angular movement and arranged to be
moved to register with the lift-centering de-
35 vice to drive nails through the said lifts,
and with a nail-supplying device to receive
nails therefrom. Suitable controlling means
are provided to cause the nail-supplying de-
vice to automatically discharge nails into
40 the nail-driving mechanism when the latter
is moved into its nail-receiving position.

In the preferred embodiment of the in-
vention a presser head is mounted for tilt-
ing and vertical movement and is arranged
45 to be moved to and from a position in which
it bears upon the heel lifts to compress
them upon their support during the nail-
driving operation. The presser head is ac-
tuated by a treadle to swing over the work
50 and then be moved downwardly to bear
upon it and a further movement of the
treadle trips the clutch by which the ma-
chine is started and the driving of the nails

into the lifts to form the heel thus accom-
plished by the operation of the nail-driving 55
mechanism. Conveniently, the motion of
the nail-driving mechanism to cause it to
register with the nail-supplying device and
the lift-centering means may be imparted by
the movement of the presser head. This deri- 60
vation of movement from the presser head
is a part of the present invention irrespec-
tive of the direction or kind of motion that
may be imparted to the nail-driving mecha-
nism. 65

An important feature of the present in-
vention comprises a centering device for en-
abling the heel lifts to be assembled in
proper relation with each other, formed of
a plurality of suitably shaped clamping 70
members arranged for relative opening and
closing movement. The arrangement is
preferably such that the operation of the
centering device is necessarily effected be-
fore the actuation of the nail-driving mech- 75
anism. In the construction shown, the cen-
tering device is actuated by an initial move-
ment of a starting treadle, the nail-driving
mechanism being brought into action by a
further movement of the treadle. The 80
construction of the centering device is such that
the clamping members are adapted to open
to a greater extent at one end than at the
other, in order to permit the insertion of
one or more lifts in a plane parallel with 85
that of the lift support. To permit the
ready insertion of the lifts or the removal
of the completed heel, the invention also
provides means by which the lift-centering
device may be tilted or it may be raised and 90
lowered with relation to the support upon
which the lifts are assembled, and prefer-
ably this movement is derived from a mov-
ing part of the machine, such as the presser
head. 95

Where the presser head, as in the pre-
ferred embodiment of the invention, imparts
movement to the nail-driving mechanism,
actuates the clamping members of the cen-
tering device, and imparts a movement to 100
the said clamping members, in addition to
its usual function of compressing the heel
lifts, the construction and arrangement is
such that the presser head can be moved to
effect compression of the lifts without dis- 105
turbance the result of the movement pre-

viously imparted to any of the parts above mentioned.

Other features of the invention will be hereinafter described and pointed out in the

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claims.
Referring to the drawings,—Figure 1 is a side elevation, partly in section, of a preferred form of heel building machine embodying my invention; Fig. 2 is a side elevation of the upper part of the heel building machine; Fig. 3 is a plan view, partly in section, of the machine shown in Fig. 1; Fig. 4 is an enlarged detail view, partly in section, of the presser head and nail-driving mechanism; Fig. 5 is a plan view of the heel-centering device which forms a feature of this invention; Fig. 6 is a plan view showing a modified form of centering device; and Fig. 7 is a detail view of an improved form of nail-conveying tube which forms a feature of this invention. Fig. 8 is a perspective view of the lower portion of the heel building machine with parts broken away.

25 In the drawings, 2 is the main frame of the machine upon which is mounted a column 4 which has a perforated abutment plate 51 secured to its upper end and carries a support 5 upon which the lifts of a heel

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may be assembled.
A presser head 6 is formed upon a beam 8 which is provided at its lower end with a suitable opening to receive an eccentric 10 which serves to support the beam. The eccentric 10 is formed integral with a treadle 12 which is mounted for pivotal movement upon a shaft 7 supported from the main frame of the machine and the arrangement of the eccentric is such that the beam 8 is lowered when the treadle is depressed to its lowest position. The presser head is arranged to be swung over the lift support 5 by an initial movement of the treadle and for this purpose an arm 9 is pivoted upon the outer end of the treadle at 11 and provided with a shoulder 13 at its upper end. The shoulder 13 is normally held in engagement with a lug 17 on the beam 8 by a suitable spring 19 which connects the arm and beam. The lug 17 is arranged to be released from engagement with the shoulder on the arm 11 after the presser head is swung over the lift support in order that the treadle may be further depressed to lower the presser head in engagement with the lifts on said support. To this end a roller 21 is mounted upon the side of the arm 9 and a stop 23 supported upon the frame of the machine in the pathway of the roller serves to limit the inward movement of the arm 9 and thus allows the lug 17 to swing clear of the shoulder 13. A projection 25 on the beam 8 is arranged to be moved beyond a vertical lug 27 when the beam is swung forward by the initial move-

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ment of the treadle, and when the presser head is thereafter lowered by a further depression of the treadle to bear upon the lifts the projection 25 will descend in front of the lug 27 and thus prevent rearward movement of the presser head in the nail driving operation.

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The automatic loading of the nail-driving mechanism may be obtained by mounting a nail block 14 provided with the usual nail conduits 15 and drivers 16 in a sleeve 18 which is pivoted within and at the lower part of the column 4 upon a pin 20, and the piston 22 which sustains the drivers may be operated from a crank 24 by a connecting rod 26 which is pivoted to the piston at 28 in a position nearly coincident with the said pin 20. The crank 24 is arranged to be operated from the power shaft of the machine when the treadle 12 is depressed to its lowest position.

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A screw 30 projects through the column 4 and provides an adjustable abutment against which the sleeve 18 bears when it is positioned beneath the lift support 5, so that the nail conduits in the nail block may be properly alined with the openings in the top of the column. The column 4 has an opening at one side so that the sleeve 18 which carries the nail block 14 can be swung from its position of alinement with the lift support 5, through the opening, into an inclined position where the nail block 14 will be alined with a fixed delivery plate 34, which is provided with nail delivery openings corresponding in number with the conduits in the nail block 14.

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The sleeve 18 may be conveniently swung from its nail-receiving position beneath the plate 34 into its nail-driving position beneath the lift support 5 and vice versa by being connected with the presser head 6, and to this end a link 38 is provided which is pivoted to the sleeve 18 and has a slot 40 in which engages a pin 42 upon the presser head 6, and with this connection the movement of the swinging presser head 6 will move the sleeve in one direction or the other when the pin 42 reaches either extremity of the slot 40.

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A tappet screw 44 is arranged to engage the sleeve 18 when the latter is moved beneath the nail delivery plate 34, and the said screw 44 is mounted on a lever 46 that is connected to a clutch tripping mechanism, not illustrated in the drawings, which may be of any suitable construction, and is arranged to control any suitable form of nail counting and loading device whereby nails will be counted and delivered to the nail block 14 without any attention on the part of the operator and without interfering with the heel building operation of the machine.

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Nails may be conveyed to the nail delivery

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openings in the nail plate 34 by flexible tubes 48. It has been found, however, that where the nail tubes have been made from coiled wire which is round in cross-section, that the nails have been liable to become lodged or their travel down the tubes has been retarded, and the machine thereby rendered less efficient. This is particularly noticeable when the tubes are elongated and the convolutions separated from each other. A feature of this invention consists in overcoming this disadvantage by constructing nail-conveying flexible tubes from a coil of wire which is flat upon opposite sides, as shown at 50 in Fig. 7. Such a construction permits the convolutions to lie close to each other and the intervening spaces are correspondingly decreased in size both in the normal condition of the tubes and when they are elongated.

The mechanism for centering the heel lifts is mounted upon the lift support 5 and comprises a series of clamping members which conform to the contour of the heel and are adapted to open and close to permit of the introduction of the heel lifts in a plane parallel with that of the lift support 5, and in the drawings four such members are shown and the two members more distant from the breast of the heel have a greater amount of motion imparted to them than the two nearest the breast. The outermost members 52 are detachably mounted upon the ends of a pair of levers 54, as shown in Fig. 5, which are pivoted at 56 upon bosses 58 which carry a right and left hand threaded screw 60. Upon the screw 60 two slides 62 are mounted so that they approach nearer to, or recede from, one another as the screw 60 is rotated in one or the other direction. The slides 62 are guided in the base plate of the lift support and carry clamping members 64 which are arranged to engage the heel lifts near their breast ends, and a link 66 connects each slide 62 with one of the levers 54 which carry the outer clamping members 52. A breast gage 59 is mounted upon the lift support and arranged to position the breasts of the heel lifts.

The rotation of screw 60, which effects the closing of the centering members, may be effected by a hand wheel 68 secured upon the said screw which when turned in one direction will cause the clamping members to center the lifts, and when turned in the opposite direction will move the clamping members out of contact with the said lifts. In the preferred embodiment of the invention, the screw 60 is preferably rotated automatically by the movement of the presser head 6 and this movement is obtained through the medium of a rack 70 pivoted at one end to an arm 71 secured upon the said presser head, and engaging a pinion 72 secured upon the screw 60, so that when the

presser head is moved forward by the operation of the treadle 12 the said screw 60 will be rotated in a direction to cause the slides 62 to approach each other, and center the lifts upon the lift support. As the presser head 6 is swung forward by an initial movement of the treadle 12 it will be apparent that the clamping members will be actuated by the movement of the said treadle to center the lifts before the machine can be started to actuate the nail-driving mechanism. The rack 70 is formed with a part that embraces the pinion, as shown in Fig. 1, so as to maintain the rack in contact with the pinion during its travel.

A modified construction of the lift-centering apparatus is shown in Fig. 6 of the drawings, and in this arrangement the shaft 74 takes the place of the screw 60 hereinbefore described. Upon the shaft 74 two cams 76 are secured, which are arranged to act upon levers 78 pivoted at 80 upon the lift support. The levers 78 carry clamping members 82 similar to those previously described and are connected by thrust links 83 with levers 84, pivoted upon the lift support, which carry clamping members 88. The shaft which carries the cams 76 is partially rotated to effect the closing of the clamping members by the movement of the presser head 6 through the medium of an arm 89 secured to the shaft and a connecting link 90 which is pivoted to an arm 93 secured upon the presser head.

The lift-centering apparatus is preferably mounted so that it can be swung upward together with the support 5 when desired to allow greater facility for the insertion and removal of the heel lifts, and this raising and lowering of the lift-centering apparatus may be effected by connecting it with the presser head 6. For this purpose, the lift-centering apparatus and support 5 are arranged to swing upon the screw 60, or, in the modification shown in Fig. 6, upon the shaft 74, and an arm 91 is secured to the lift-centering apparatus and is operated by a link 92 pivoted upon the presser head. The link is provided with a slotted end 94 so that it can be lifted out of engagement with the arm, and the connection between the link 92 and arm 91 may be rendered inoperative when it is not required by the nature of the work or from any other reason. Under these circumstances the lifts are assembled, centered and nailed upon the stationary abutment plate 51. The support 5 comprises a plate cut out at its center, as indicated in Fig. 3, and arranged to lie flush with the surface of the stationary abutment plate 51 when in its horizontal position as shown in Fig. 4.

In the operation of the machine, assuming it to be in the position in which it has stopped, as shown in Fig. 1, the operator

places the lifts upon the lift support 5 and depresses the treadle 12 to successively swing the presser head 6 forward, which causes the lifts to be centered as before described, and to lower the said presser head to compress the lifts upon the lift support 5 and against the abutment plate 51. Further depression of the treadle 12 throws in the clutch which operatively connects the nail-driving mechanism with the power shaft of the machine, and nails are then driven upwardly through the heel lifts and clenched upon the presser head by the operation of the said mechanism. The treadle 12 is then allowed to rise and the presser head swings back to its original position and opens the clamping members and swings the nail-driving mechanism in alinement with the delivery plate 34 of the nail-supplying device, and in its movement the nail-driving mechanism engages the tappet screw 44 on the lever 46 which causes the nail-supplying device to automatically supply nails through the tubes 48 to the conduits in the nail block in readiness to nail together another set of lifts.

The chain of mechanism connecting the lift-centering devices and the source of movement thereof, *i. e.* the tip of the foot treadle, is not only correlated with the starting device of the machine but is so proportioned and constructed that while it is capable of transmitting a sufficient predetermined thrust to properly center the lifts, if they have been initially properly positioned and proportioned, yet it will be impossible to impart to said centering devices enough pressure to damage the parts or force said devices to close against the resistance offered by a misplaced lift or a lift of abnormal size. This result may be secured by making the lever of the treadle so short as to prevent an excessive thrust being imparted to the lift-centering devices therethrough or by inserting in the chain of mechanism mentioned a clutch adapted to slip whenever the thrust transmitted reaches a predetermined limit.

It will be seen that, in the construction shown, the starting of the machine is dependent on the preliminary closing of the centering devices, and as this closure cannot occur in the circumstances stated, it will be observed that injury to the machine or to the work is prevented, such as might be caused by an excessive pressure applied to the centering devices.

Having described our invention, what we claim as new and desire to secure by Letters Patent of the United States is:—

1. A heel-nailing machine, having in combination, a nail-supplying device, stationary heel-sustaining means, and a nail-driving mechanism mounted for angular movement in a vertical plane and arranged to register alternately with the nail-supplying device and the said sustaining means, the heel-sus-

taining means being at all times out of the path of movement of the driving mechanism.

2. A heel building machine, having in combination, a support for a plurality of heel lifts, devices for centering the lifts upon said support and means for sustaining said support and centering devices for simultaneous pivotal movement about an approximately horizontal axis into an inclined lift receiving position.

3. A heel building machine, having in combination, a support for sustaining a plurality of lifts, devices for centering the lifts upon said support, mechanism for inserting nails in the lifts and means for swinging said support and centering devices about an approximately horizontal axis from operative relation to said mechanism into an inclined lift receiving position.

4. In a heel-building machine in combination, lift-sustaining means comprising clamping members arranged to receive the lifts of a heel between them, a presser head mounted for tilting movement and arranged to be moved to and from a position in which it bears upon the said lifts, and means actuated by the movement of the said presser head for closing and positively opening the clamping members.

5. In a heel-building machine in combination, a nail-supplying device, means for sustaining the lifts of a heel, a nail-driving mechanism mounted for angular movement, a presser head mounted for tilting and vertical movement and arranged to be moved alternately to and from a position in which it bears upon the said lifts, and means operated by the movement of the presser head to move the nail-driving mechanism to register alternately with the said nail-supplying device and the said sustaining means for the lifts.

6. In a heel-building machine in combination, means for sustaining the lifts of a heel, a presser head mounted for movement to and from a position in which it bears upon the lifts, a nail-supplying device, and a nail-driving mechanism arranged for movement with the presser head to register alternately with the lift-sustaining means and the nail-supplying device.

7. A heel-building machine having, in combination, means for centering a series of lifts in suitable relation to form a heel, mechanism for driving a nail into the lifts while the lifts remain in the position wherein they were centered, a power driven actuating device for the driving mechanism, and means under the control of the operator for successively bringing into operation said centering means and the actuating device for said nail-driving mechanism.

8. In a heel-building machine the combination of a nail-supplying device, a station-

ary lift support, means for driving nails through the lifts positioned upon the said support and a nail-receiving device mounted for angular movement in a vertical plane and arranged to convey nails from the said nail-supplying device to a position in which they may be driven through the said lifts by the action of the said driving means, the lift support being disposed out of the path of movement of the nail receiving device.

9. A heel building machine having, in combination, a lift support provided for clamping members for centering the lifts of a heel, a nail driver for driving a nail into the assembled lifts, a power driven member, and mechanism manipulated by the operator for preliminarily closing the clamping members and then transmitting movement from the power driven member to the nail driver for causing it to operate upon the lifts while they remain in the position wherein they were centered.

10. A lift support, having, in combination thereon, a breast gage, clamping members arranged to engage the sides of lifts positioned between them upon the support, auxiliary clamping members for engaging the rounded ends of the said lifts, and means arranged for moving said clamping members apart a sufficient distance to permit the insertion of a lift in a plane parallel with that of the said support.

11. In a heel-building machine a lift support, having in combination thereon, clamping members for engaging the sides of lifts on opposite sides, auxiliary clamping members for engaging opposite sides of the rounded ends of the lifts arranged to be moved apart to permit the insertion of a lift in a plane parallel with that of the said support, and means for actuating the said clamping members constructed to move the auxiliary clamping members in directions oblique to the breast gage to force the lifts into engagement with said gage.

12. A machine for operating upon heels having, in combination, a nail-supplying device, heel-sustaining means, nail-driving mechanism mounted for angular movement and arranged to register alternately with the nail-supplying device and the sustaining means, and an actuator having at all times an operative connection with the nail-driving mechanism.

13. A heel building machine, having in combination, a support for sustaining heel lifts, clamping members for centering the lifts upon the support, a presser head mounted for movement in a vertical plane into a position over the heel lifts and thereafter for vertical movement into pressing engagement with said lifts and means movable with the presser head for closing said clamping members.

14. A heel nailing machine, having in

combination, means for clamping a heel in working position, a nail block provided with nail drivers and arranged for movement between a position in which it receives nails and a position in which the nails may be driven into said heel, power operated means for actuating the nail drivers and means manipulated by the operator for moving the nail block to its nail driving position and thereafter rendering operative the said power operated means to cause the driving of the nails into the heel.

15. A heel building machine, having in combination, a lift support for sustaining heel lifts, clamping members for centering the lifts upon the support, a presser head mounted for movement between a position at one side of the lift support and a position in which it bears upon the said lifts, means for driving nails into the assembled lifts and mechanism for actuating the clamping members, the presser head and the nail driving mechanism constructed to be controlled by movement of a single device.

16. A heel building machine, having in combination, a lift support for sustaining heel lifts, a presser head arranged for movement into and out of a position opposite the said lifts, power actuated nail driving mechanism for driving nails into the assembled lifts and mechanism under the control of the operator for moving the presser head over the lift support and thereafter rendering operative the nail driving mechanism.

17. A heel building machine, having in combination, a support for sustaining heel lifts, laterally movable clamps for centering the lifts upon the support, a presser member mounted for movement in a vertical plane toward and from a position in which it bears upon said lifts and means movable with said member for bringing said laterally movable clamps toward each other when said member is swung into operative relation to said lifts.

18. A heel building machine, having in combination, a support for sustaining heel lifts, clamping members for centering the lifts upon the support, a presser head mounted for movement into a position opposite the lifts and thereafter for vertical movement into pressing engagement with said lifts, means movable with the presser head for closing the clamping members and means for actuating the presser head to impart the said movements thereto constructed to be operated by movement of a single device.

19. A heel building machine, having in combination, a support for sustaining heel lifts, a presser head arranged for movement from a position at one side of the lift support into a position opposite the support, power actuated means for driving nails into

the assembled lifts and means for insuring movement of the presser head over the support prior to the operation of the nail driving means.

- 5 20. A heel building machine, having in combination, a support for sustaining heel lifts, clamping members for centering the lifts upon the support, a rotatably mounted shaft, means connecting the clamping members with the shaft whereby rotation of the latter will impart a closing movement to the clamping members, a presser head arranged for movement in a vertical plane from a position at one side of the lift support to a position opposite the support and means movable with the presser head for imparting a turning movement to the shaft to close the clamping members.

21. A machine of the class described having, in combination, a work supporting member, laterally movable side clamps for engaging and centering the work on said supporting member, a movable driver for inserting a nail in the work while held stationary upon the supporting member, power actuated means for operating said driver, a treadle, and connections whereby the clamps are moved to center the work, during the initial movement of said treadle and subsequently said power actuated means are set in motion for operating said driver.

22. A machine of the class described having, in combination, a nail block having an

inclined face, a horizontal heel-sustaining device, nail driving mechanism mounted for angular movement in a vertical plane and arranged to register alternately with the inclined nail block and with the horizontal heel-sustaining device, and means for delivering nails through the inclined face of said nail block when the nail driving mechanism registers therewith.

23. A machine of the class described having, in combination, a stationary perforated plate 51, a pressing member 6 movable toward and from the plate 51 to subject work placed upon said plate to pressure, laterally movable arms constructed and arranged to hold a series of lifts in symmetrical relation above said stationary plate 51, a driver working through the perforation of said plate, a power driven actuator for the driver, and means under the control of the operator for successively causing a closing movement of the laterally movable arms and then causing the power driven actuator automatically to effect the driving operation.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

WILLIAM RODERICK BARCLAY.
ARTHUR BATES.

Witnesses:

ARTHUR ERNEST JERRAM,
GRACE HOLMES

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."