Mar. 27, 1923. 1,449,442.

J. H. POPE.

HEEL MACHINE.

FILED DEC. 26, 1918. 5 SHEETS—SHEET 1.

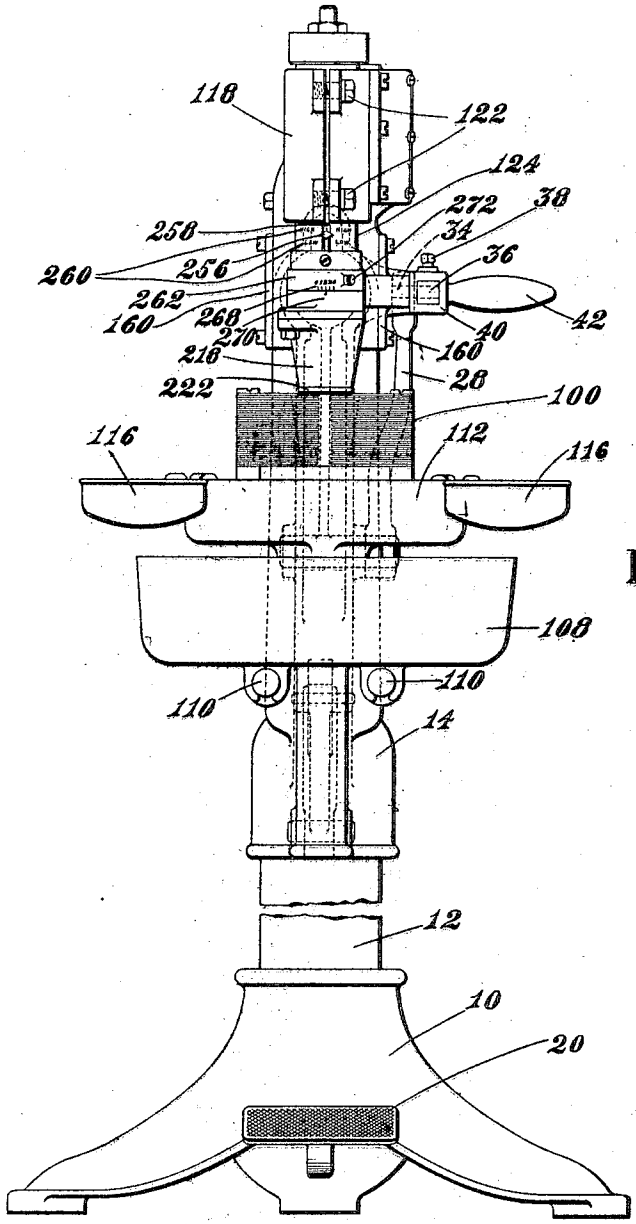


Fig.1

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5 SHEETS—SHEET 2.

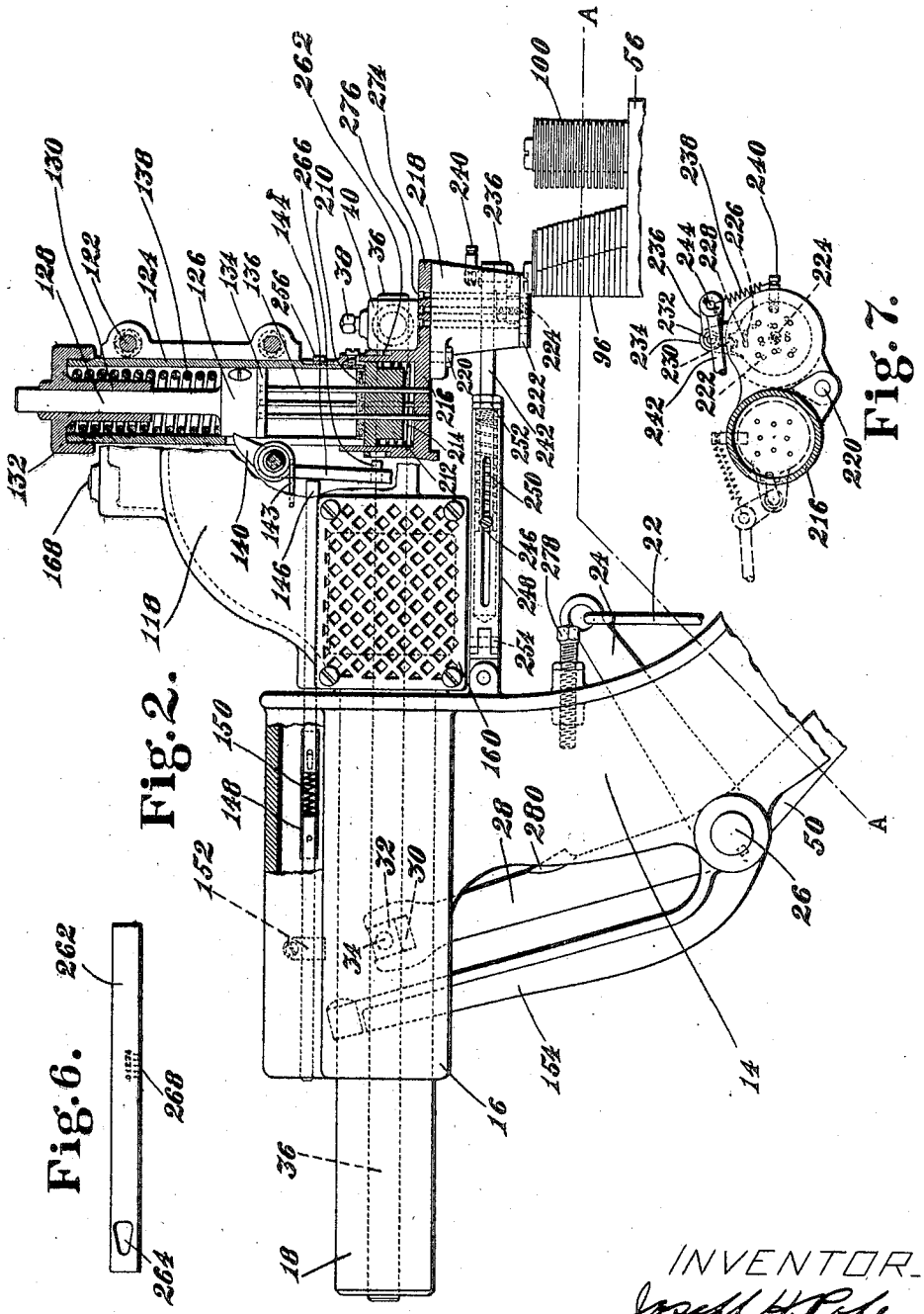


Fig. 2.

Fig. 6.

Fig. 7.

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FILED DEC. 26, 1918. 5 SHEETS—SHEET 3.

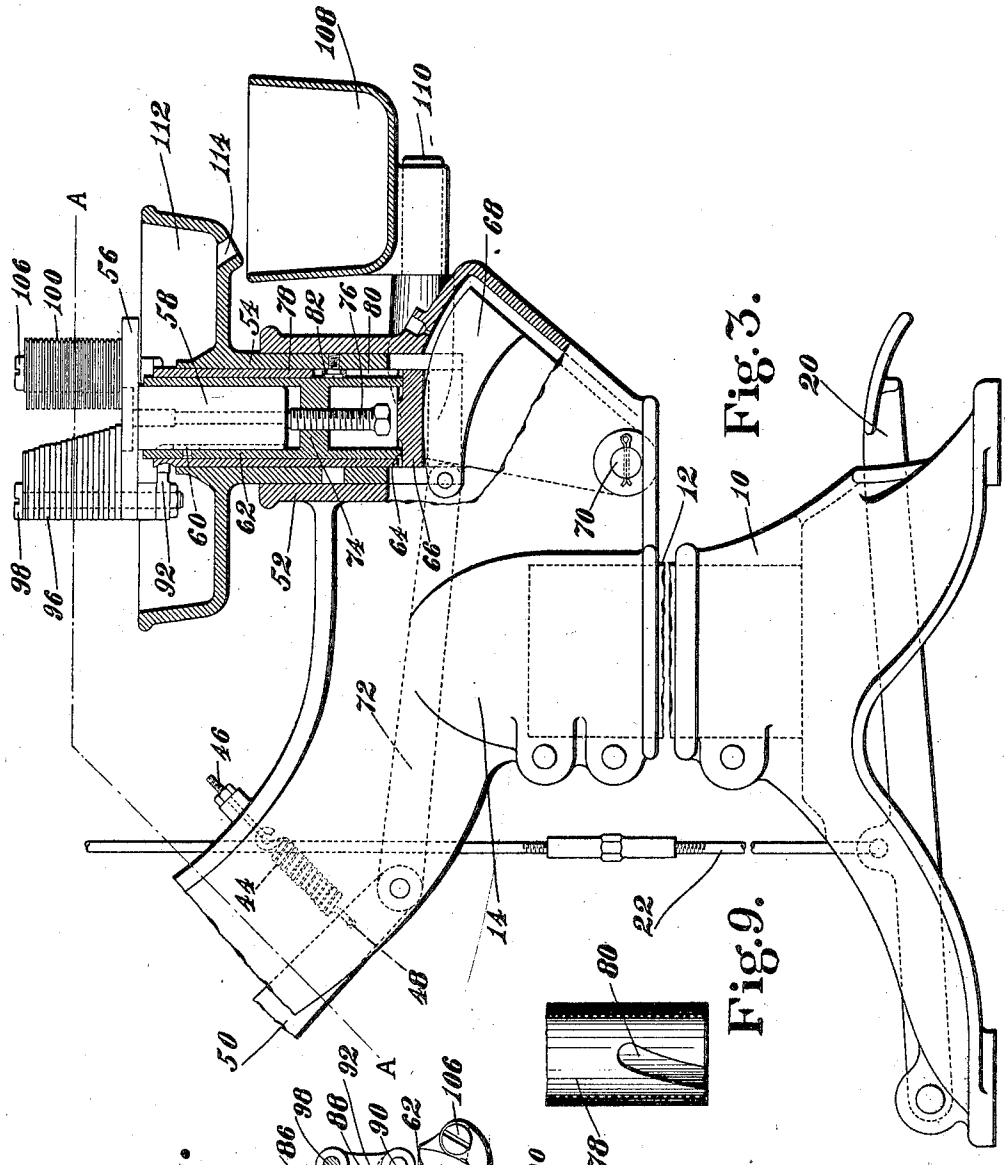


Fig. 5.

Fig. 9.

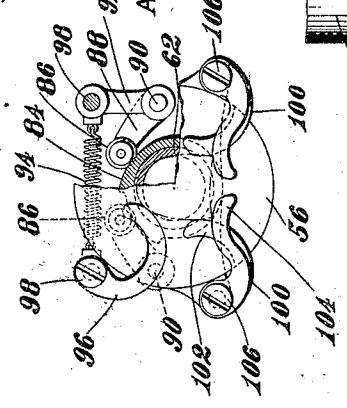


Fig. 8.

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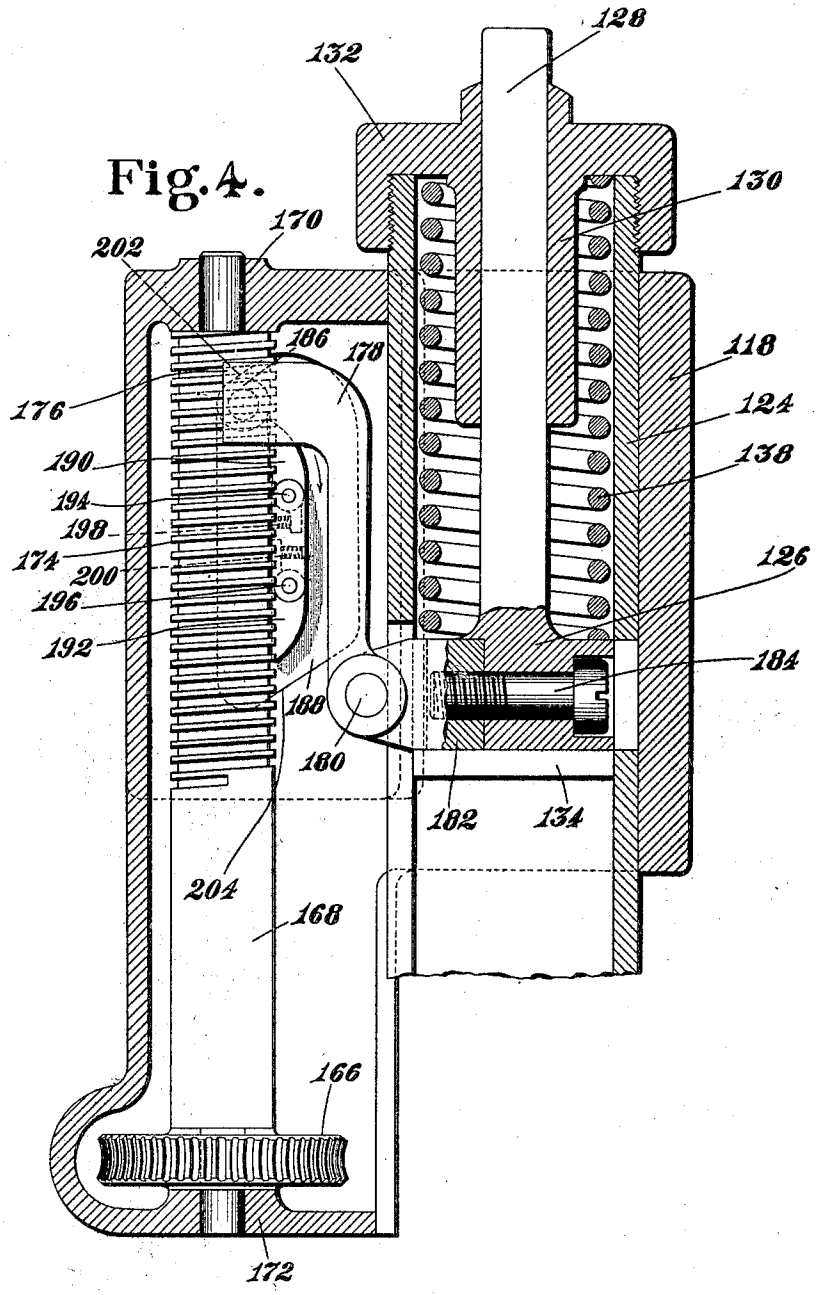
Mar. 27, 1923. 1,449,442.

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FILED DEC. 26, 1918. 5 SHEETS—SHEET 4.

Fig. 4.



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HEEL MACHINE.

FILED DEC. 26, 1918. 5 SHEETS—SHEET 5.

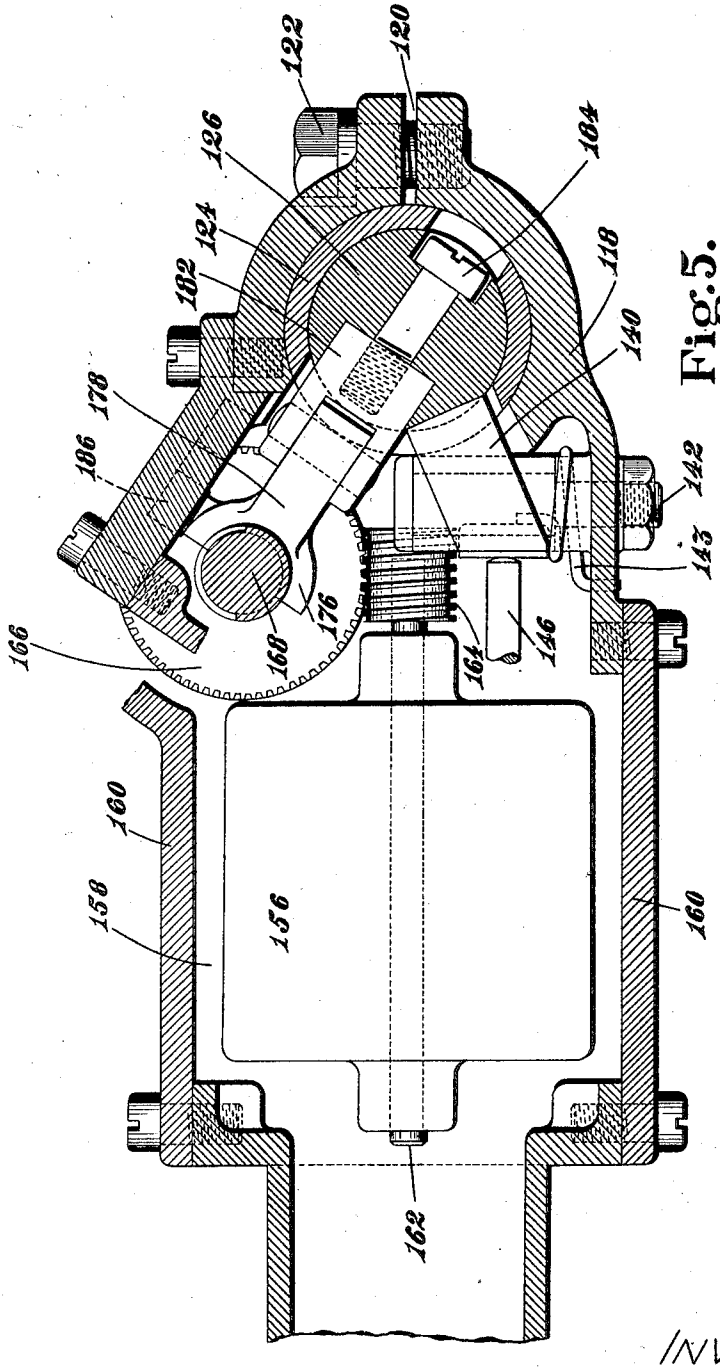


Fig.5.

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Patented Mar. 27, 1923. 1,449,442

UNITED STATES PATENT OFFICE.

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HEEL MACHINE.

Application filed December 26, 1918. Serial No. 268,278.

To all whom it may concern:

Be it known that I, JOSEPH H. POPE, a citizen of the United States, residing at Hamilton, in the county of Essex and State of Massachusetts, have invented certain Improvements in Heel Machines, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to heel machines and particularly to machines used for securing together lifts or heel sections assembled in a pile to form a so-called heel blank. Machines of this class are sometimes called heel building machines and, while I have herein illustrated and described in detail a machine in which the lifts or heel sections are assembled manually, it should be understood that many features of the invention are capable of a broader range of use and may be readily adapted to other specific types of heel machines.

An important feature of the invention resides in the provision of improved mechanism for pressing together the lifts which have been assembled into a pile and which constitute the heel blank. In this connection I have found it advantageous to assemble the lifts upon a vertically movable support, which may carry a suitably shaped heel form for engaging the edges of and alining the lifts, and then to move the support toward a blank pressing member located over the form to apply the desired pressure. The pressing member is preferably mounted to yield upwardly when engaged by the blank and may be backed up by a spring of sufficient strength to apply the proper amount of pressure to the blank. A further improved feature consists in the combination with the elements just described of means for moving the blank pressing member into and out of alinement with the heel form, providing an unobstructed space over the form and permitting easy access thereto by the operator while assembling the lifts. In order to secure the greatest speed and efficiency in operation, the pressing member is moved into alinement with the form, and the form is closed upon the blank, simultaneously with the relative approaching movement of the blank support and pressing member. This movement may conveniently be effected by manually operated means connected to both the support and said member, and another feature of the invention consists in the provision of manual means for effecting the operation of the machine comprising separate devices, engageable respectively by the hand and foot of the operator, who is thus enabled to operate the machine in whichever way may seem most convenient or comfortable.

In accordance with a further feature of the invention nail driving means is provided which is movable over and away from the heel form, in combination with a nailing die movable from a nail receiving position out of alinement with the driving means to a nail driving position in alinement with said means. The movements of the nail drivers and the die preferably occur simultaneously, and the movement of the drivers into operative position may advantageously be utilized to effect the alinement of the nailing die with the drivers and the form.

Still another feature of the invention relates to an improved organization of the means for securing the lifts of the heel blank together by driving a nail or similar fastening through them. This improvement is herein disclosed as embodied in a self contained construction comprising a movable nail driver head containing a power developing device in the form of a motor operatively connected to the nail driving means. A continuously running electric motor may conveniently be utilized for this purpose and, in a preferred construction, an energy storing device, for example, a strong spring is employed to actuate the drivers directly while the spring itself is energized at proper times by connecting it to the motor. In the best form of the invention the operation of this mechanism is entirely automatic, requiring no attention on the part of the operator.

A further feature of practical importance consists in the provision of blank measuring means arranged to prevent the operation of the mechanism for securing the lifts together when the pile of lifts is not of the proper height, provided with adjustments permitting the operator to predetermine variably the amount of departure from the standard heel height that may be allowed without rendering the securing mechanism inoperative. Other features of the invention relat-

ing to means for controlling the nail drivers, details of the construction and operation of the form jaws and various other improvements will appear in reading the following detailed description of one embodiment of the invention in connection with the accompanying drawings, in which—

Figure 1 is a front elevation of a heel building machine constructed in accordance with the invention;

Fig. 2 is a side elevation view of the upper part or head of the machne with portions broken away to reveal the internal mechanism;

Fig. 3 is a view similar to Fig. 2, showing the lower or base portion of the machine;

Fig. 4 is a view in vertical section illustrating the mechanism for actuating the driver plunger;

Fig. 5 is a view of the same mechanism in horizontal section;

Fig. 6 is a developed view of the gage for determining the height of the heel;

Fig. 7 is a plan view showing details of the nail loading mechanism;

Fig. 8 is a plan view showing details of the heel form; and

Fig. 9 is a view showing a detail of the form jaw actuating sleeve.

The machine is supported by a base 10, from which rises a column 12, the upper end of which supports a casting 14 constituting the frame of the machine proper.

The upper end of the frame 14 is provided with an enlarged head 16, in the interior of which is formed a guideway for a horizontally movable slide 18, the front end of which carries the blank pressing and nailing head.

Movement may be imparted to the slide 18 by a foot operated treadle 20, connected by a rod 22 to an arm 24 secured to a rock shaft 26. Keyed, or otherwise secured to the rock shaft 26 is a slide operating arm 28 which is slotted at its upper end, as shown at 30, to receive a block 32 pivoted at 34 to a horizontal sliding rod 36. The front end of the rod 36 is secured by a set screw 38 in a member 40 which is secured to, or forms part of, the presser or nailing head. The member 40 is provided with a handle 42 which may be grasped by the hand of the operator when it is desired to operate the machine by hand rather than by foot power. A spring 44 attached at 46 to the machine frame and at 48 to a lever 50 secured to the rock shaft 26 opposes the action of the treadle and serves to return the parts to inoperative position when the treadle or handle is released.

By an inspection of Figs. 2 and 3, which may be assumed to join along the line A—A, it will be apparent that depression of the treadle 20 will cause the arm 28 to be swung toward the right and the slide 18 carrying the nailing head to be moved toward the right.

A socket 52 in the front portion of the frame 14 affords a mounting for a hollow upright 54, which constitutes a guide and support for the heel form. The base plate of the heel form is mounted upon a spindle 58 connected by a spline 60 to a sleeve 62 provided at its lower end with lugs 64 which enter slots in a block 66 mounted to slide vertically in the hollow upright 54. A swinging cam 68, pivoted at 70 in the frame 14, supports and moves the block 66. This cam in turn is connected by a link 72 to the lower end of the lever 50 and is, consequently, actuated to raise the block 66 when the treadle is depressed and the nailing head projected.

The sleeve 62 is provided with a web 74, through which is threaded a screw 76 which bears against the lower end of the spindle 58 and serves to support and adjust the height of the base plate 56 of the heel form.

Surrounding the sleeve 62 and located between it and the upright 54 is an intermediate sleeve 78, the lower end of which rests upon the block 66. The sleeve 78 is provided with a cam slot 80 in which engages a stationary cam roll 82 which operates to turn the sleeve 78 about a vertical axis whenever the sleeve is raised or lowered. The upper end of the sleeve 78 is provided with eccentric cam faces 84 which are engaged by cam rolls 86 carried by the free ends of cam levers 88 pivoted at 90 to the base plate 56. Rigidly attached to the levers 88 are arms 92, the outer ends of which are connected by a tension spring 94 which serves to keep the cam rolls 86 in engagement with the cams 84. Mounted upon the outer end of each arm 92 is a pile or stack of similar, thin, curved, plates 96, through holes in the ends of which passes a clamping bolt 98. The two groups of plates 96 constitute the rear jaws of the heel form. By loosening the bolts 98 the individual plates may be adjusted to the size and conformation of the blank to be built and then secured in adjusted relation by tightening the bolts.

The two rear jaws of the form just described are movable about the pivots 90 to open and close the form upon the blank being built and are actuated as units, without disturbing the adjusted relation of the individual plates, by the rotation of the cam sleeve 78 consequent upon its rise or descent. The remainder of the form consists of other jaws for engaging the breast corners of the blank which are illustrated in plan view in Fig. 8, in which each of the breast corner jaws as a whole is indicated by 100. These jaws are normally stationary and each consists of a group or stack of curved plates, alternate plates in the stack being reversely curved or turned in different directions, as

at 102 and 104. The plates 102 engage the side faces of the blank while the plates 104 engage the breast thereof. These plates are likewise secured in position by clamping bolts 106 which may be loosened to permit adjustment of the plates 102, 104 in accordance with the size and shape of the heel blank and tightened to secure the plates immovably in adjusted position. The plates 96 constituting the rear form jaws are preferably of approximately the thickness of the heel lifts while the plates 102, 104 comprising the stationary jaws 100 are approximately half the thickness of a heel lift, with the end in view that one each of the plates 102, 104 shall engage each lift.

A paste receptacle 108 is mounted upon supports 110 which extend forwardly from the frame 14 and a receptacle 112 formed integrally with the upright 54 catches any surplus paste which may drip from the heel form and discharges it through an opening 114 into the receptacle 108. Convenient pans 116 are provided for holding the heel building nails.

The nailing head 118 is, as previously stated, secured to the forward end of the slide 18. The head 118 is split at 120 and provided with clamping bolts 122 for securing in position a plunger guide or housing 124, within which is located a driver plunger 126 having an upwardly extending guiding stem 128 arranged to slide in a boss 130 forming part of a cap or cover 132 screwed upon the upper end of the plunger guide 124. To the lower end of the plunger 126 is secured a driver plate 134 carrying a gang of nail drivers 136. A heavy spring 138 surrounding the plunger stem 128 and bearing at its upper end against cap 132 tends to force the driver plunger downward. The driver plunger is normally locked in elevated position, as shown in Fig. 2, by a pawl 140 pivoted at 142 to the head 118 and held in a co-operating notch in the plunger 126 by a torsion spring 143. In this positon the spring 138 is energized or under tension, ready to actuate the drivers when the pawl 140 is disengaged. The pawl 140 is provided with a tail 144 arranged to be engaged by a horizontally slidable trip rod 146 when it is desired to release the driver plunger. The trip rod is made in two sections yieldingly connected by a sliding sleeve 148 and a compression spring 150 interposed between the two sections of the rod. An adjustable collar 152 upon the trip rod is arranged to be engaged by the upper end of a lever 154 secured to the rock shaft 26 to move the trip rod forward and disengage the pawl 140 at the proper time in a manner to be described hereinafter. The energization of the spring 138 is effected by mechanism now to be described: A continuously running power developing device, herein shown as an electric motor 156, is located in a chamber 158 in the nailing head. Reticulated guard plates 160 serve to protect the motor while permitting circulation of air though the casing. The shaft 162 of the motor carries a worm 164 which meshes with a worm wheel 166 secured upon the lower end of an upright shaft 168 mounted to rotate in suitable bearings 170, 172 (see Fig. 4). The upper portion of the shaft 168 is threaded to form a screw, as shown at 174, and co-operates with a half nut 176 formed in the upper end of an arm 178 pivoted at 180 to a block 182 secured by a bolt 184 to the driver plunger 126. The upper end of the arm 178 also carries a cam roll 186 arranged to travel in the direction indicated by the arrow in Fig. 4 in a cam track 188. The direction of travel of the cam roll 186 is controlled by switch cams 190 and 192 pivotally mounted at 194 and 196 respectively and normally held in the position illustrated by compression springs 198 and 200. After the plunger 126 has been raised by the screw 174 up to, or above, the point where the pawl 140 will engage in the notch in the plunger, the upper end of the arm 178 is thrown to the right by engagement of the cam roll 186 with the inclined face 202 of the cam path, disengaging the nut 176 from the screw and permitting the screw to continue to rotate idly. The switch cam 190 yields toward the right to permit this swinging movement of the arm 178 and, after the roll 186 has passed its tip, snaps back into the position shown. When the pawl 140 is tripped, the spring 138 lowers the drivers forcibly, the roll 186 traveling down the right-hand side of the cam path 188 until the roll engages the inclined face 204, whereupon the arm 178 is swung toward the left and the nut engaged with the screw 174. The switch cam 192 yields to permit this to occur and then snaps back into position to guide the roll 186 as it passes upwardly in the left-hand portion of the cam path. The nut 176 is thus held in engagement with the screw, the continued rotation of which again elevates the driver plunger and energizes the spring 138.

At the end of the driving stroke of the plunger 126 the driver plate 134 is arrested and the shock of its sudden stoppage is absorbed by a pad 210 of yielding material resting upon the upper face of a driver guiding block 212, which is rigidly secured to the upright 124. A compression spring 214 is located in the annular space between the guide block 212 and the nail block support 216 which surrounds the guide block in the lower end of the upright 124 and is arranged for a limited, vertical, yielding movement against the action of the spring. The supporting member 216 is provided with driver guiding holes in alinement with those in the guide block 212, and a nailing die or

block 218 is pivoted to its under side at 220. The nail block 218 is provided with passages corresponding in arrangement to the drivers and has on its lower face a circular cover plate or shutter 222 arranged for limited movement about a central pivot screw 224. A stop pin 226 mounted in the nail block co-operates with a circular slot 228 in the shutter to limit the movement of the latter. The shutter is provided with a series of holes corresponding in arrangement to those in the nail block and arranged to be brought into register therewith at one limit of movement of the shutter. The edge of the shutter is provided with a notch in which engages a short arm 230 secured to a vertical stud 232 mounted to turn about an upright axis in a projection 234 extending laterally from the nail block. Also secured to the stud 232 is an arm 236 to which is connected one end of a pull spring 238 having its other end connected to a pin 240 secured in the face of the nail block. The tendency of the spring 238 is to turn the shutter 222 to a position in which the holes therein are out of register with the holes in the nail block. Under these conditions the shutter serves to retain nails in the nail block preparatory to the location of the latter over a heel, in register or alinement therewith, ready for the nail driving operation.

One end of a rod 242 is pivoted to the arm 236 at 244 and the other end is provided with a plunger 246 guided to slide in the bore of a tube 248. The rod 242 within the tube is surrounded by a compression spring 250, and the distance to which the rod can enter the tube is determined by a nut 252 threaded upon the rod. The tube 248 is pivotally mounted at 254 to swing in a horizontal plane.

Connected to the nail block support 216 is a pointer 256 arranged to slide in a guiding slot 258 in the upright 124 and to co-operate with stationary indicating marks 260 to indicate whether the heel blank about to be nailed is of the proper height, too high, or too low.

A ring 262, shown in developed view in Fig. 6, surrounds the upper portion of the member 216 and is arranged to be turned thereon in a horizontal plane. The ring 262 is provided with a substantially triangular opening or recess 264 arranged to co-operate with a projection or pin 266 in the lower end of the tail member 144 of the pawl 140 to prevent the tripping of the driver plunger 126 when the heel blank is not of the proper height. By adjustment of the ring to present different parts of the triangular recess 264 in line with the pin 266 any desired variation in the height of the blank may be permitted. The amount of this variation is indicated by a graduated scale 268 upon the ring 262 which co-operates with a stationary index mark 270. The ring 262 may be secured in adjusted position by a set screw 272.

The nail block support 216 is provided with a forwardly projecting plate 274 which may be termed a loader plate. This plate has a group of holes 276 corresponding in arrangement with those in the nail block and when the nail block is swung about its pivot 220 into the position shown in Fig. 2, its passages are in register with the holes 276, through which a load of nails may be inserted into the nail block either by hand or by any suitable automatic nail loading mechanism.

By an adjustable stop screw 278 threaded through the frame member 14 and co-operating with an abutment 280 upon the arm 28, the throw of the slide 18 and associated mechanism may be variably limited.

The operation of the machine is as follows: Assuming the motor 156 to be running and the parts of the machine to be in the positions shown in Figs. 2 and 3, the heel building nail or nails are inserted through the loader plate into the nail block, which at this time, occupies the position in which its nail passages are in register with the holes in the loader plate. It being assumed that the plates 96, 102, 104 have been adjusted to the heel blank to be built, the heel form will now be open to its full extent. The lifts or heel sections are assembled by hand in the heel form until the blank has been built up to the desired height, the superposed plates forming the jaws of the form, serving as gages to indicate approximately to the operator when the proper height has been reached.

After the appropriate lifts have been assembled in the form to produce the required blank, the operator either depresses the treadle 20 or seizes the handle 42 and draws it forward until the abutment 280 engages the stop screw 278. In this manner the slide 18 and nailing head are moved forward over the heel form into vertical alinement therewith and, simultaneously, the cam 68, which is connected to the slide through the levers 28, 50 and the link 72, is swung to the rear, raising the block 66 and the heel form supported thereby until the blank contained in the form is pressed upwardly against the nail block. During the forward movement of the nailing head, the nail block, actuated by such movement, is swung by the rod 242 about the pivot 220 until the nail passages register with the drivers 136, the spring 250 yielding thereafter, if necessary, until the nailing head is in proper position over the heel blank in the form. In this swinging movement of the nail block the shutter 222 and its associated operating mechanism move from the position shown in full lines in Fig. 7 to that shown in dotted lines. In this latter position the holes in the shutter

are in register with the passages in the nail block, permitting the nails to be driven out of the block into the heel blank.

As the heel blank is moved upwardly against the pressing member or nail block by the cam 68, the form jaws are closed upon it by the cams 84 and the block and its supporting member 216 may yield more or less against the action of the spring 214, depending upon the height of the blank. During the latter part of the forward movement of the slide 18 the arm 154, which is rigidly connected to the arm 28 through the rock shaft 26, acts, through the collar 152 and the rod 146, to move the tail of the pawl 140, provided the recess 264 in the ring 262 is in position to permit the pin 266 to enter. This, of course, is entirely dependent upon the height of the heel blank. If the blank is too high or too low the nail block and its supporting member will not have been raised to exactly the proper position to permit the pin 266 to enter the recess 264, and the pawl 140 can not be tripped to permit the driver plunger to operate. Under these conditions the spring 150 will merely yield and no nail will be driven. The operator can ascertain, by looking at the indicator 256, whether the heel is too high or too low and, after having released the pressure, can make the necessary correction.

If the blank is of the proper height, within the limits previously determined by the setting of the ring 262, the pin 266 enters the recess 264 and the driver plunger is released, driving the heel building nail or nails out of the nail block and through the lifts, to secure them together.

Upon releasing the treadle or handle, the machine parts are caused by the spring 44 to assume their initial positions. During this time the nut 176, which has been picked up by the screw 174 when the driver plunger reached the lower limit of its stroke is being raised and the driver spring 138 is being re-energized, in the manner previously explained in the description of this part of the mechanism. The machine is now again in the condition illustrated in Figs. 2 and 3, ready for the removal of the completed blank and the building of another.

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

1. In a heel machine, the combination of a movable heel-blank support and a movable blank pressing member arranged for relative movement into and out of alinement with each other and for relative approaching and separating movement, and separate means for effecting simultaneously relative movements of both said support and said member into alinement and toward each other.

2. In a heel machine, the combination of a movable heel-blank support and a movable blank pressing member arranged for relative movement into and out of alinement with each other and for relative approaching and separating movement, and manually operated separate means for effecting simultaneously relative movements of both said support and said member into alinement and toward each other.

3. In a heel machine, the combination of a heel-blank support and a blank pressing member arranged for relative movement into and out of alinement with each other, said support being movable toward and from said member, and separate means for effecting simultaneously movement of the member into alinement with the support and movement of the support toward the member to apply pressure to a blank upon the support.

4. In a heel machine, the combination of a heel-blank support, a heel form upon the support, a blank pressing member movable into and out of alinement with the support, said support being movable toward and from said member, and means for simultaneously moving the member into alinement with the support and moving the support toward the member to apply pressure to a blank upon the support.

5. In a heel machine, the combination of a heel-blank support, a heel form upon the support, a blank pressing member movable over and away from the form, and means for moving the support upwardly toward said member to press a heel in the form against said member.

6. In a heel machine, the combination of a vertically movable heel-blank support having a heel form thereon, a transversely movable blank pressing member above the heel form, and means for moving the support upwardly to press a blank in the form against said member.

7. In a heel machine, the combination of a vertically movable heel-blank support having a heel form thereon, a transversely movable blank pressing member above the heel form, a cam and means for actuating the cam to move the support upwardly to press a blank in the form against said member.

8. In a heel machine, the combination of a vertically movable heel-blank support having a heel form thereon, a transversely movable blank pressing member above the heel form, and a manually operated cam constructed and arranged to raise the support to press a heel in the form against said member.

9. In a heel machine, the combination of a vertically movable heel-blank support, a spring pressed transversely movable yieldingly mounted blank pressing member, a heel form upon the support, and means for

moving the support upwardly toward said member to press a blank in the form upon the member against the tension of the spring.

10. In a heel machine, the combination of a vertically movable contractile heel form, a blank pressing member movable into and out of vertical alinement with the form, and means for simultaneously contracting the form upon the edges of a heel blank therein and moving the form toward said member to apply pressure to the blank.

11. In a heel machine, the combination of a vertically movable contractile heel form, a blank pressing member movable into and out of vertical alinement with the form, and means for simultaneously moving the pressing member into alinement with the form, moving the form toward said member, and contracting the form upon the edges of the heel-blank therein.

12. In a heel machine, the combination of a heel form, nail driving means movable into and out of register with the form, and a nailing die movable into alinement with the driving means simultaneously with the movement of the latter into register with the form.

13. In a heel machine, the combination of a heel form, nail driving means movable over and away from the heel form, and a nailing die movable from a nail receiving position out of alinement with the driving means to a nail driving position in alinement with said means.

14. In a heel machine, the combination of a heel form, nail driving means movable over and away from the form, a nailing die carried by said means, and movable from a position out of alinement therewith to a nail driving position in alinement therewith, and means for simultaneously moving the nail driving means over the form and the nailing die into register with said means.

15. In a heel machine, the combination of a heel form and nail driving means movable into and out of alinement with each other, a nailing die mounted for movement relatively to the driving means and form and into and out of nailing position between the form and said driving means, and means for simultaneously alining the form and driving means and moving the nailing die therebetween.

16. In a heel machine, the combination of a heel form and nail driving means relatively movable into and out of alinement with each other, a nailing die mounted to swing relatively to the driving means and into and out of nail driving position between the form and said means and means for simultaneously alining the form and driving means and swinging the nailing die into nail driving position.

17. In a heel machine, the combination of a heel form, nail driving means movable over and away from the form, a nailing die carried by said means and mounted to swing about a vertical axis relatively thereto, and means for simultaneously moving the driving means over the form and swinging the die about its axis.

18. In a heel machine, the combination of a heel form, nail driving means movable over and away from the form, a nailing die carried by said means and movable into and out of alinement therewith, and means actuated by movement of the driving means for effecting said movement of the nailing die.

19. In a heel machine, the combination of a heel form, nail driving means movable over and away from the form, and a motor movable with said means and operatively connected thereto.

20. In a heel machine, the combination of a movable nail driver head, nail driving means mounted in said head, a motor mounted in said head, and means for transmitting power developed by the motor to the nail driving means.

21. In a heel machine, the combination of a nail driver head, nail drivers operating in said head, an energy storing device mounted in the head to actuate the drivers and a motor mounted in the head for energizing said device.

22. In a heel machine, the combination of a nail driver head, nail drivers operating in said head, a motor mounted in said head, and means for connecting the motor to and disconnecting it from the drivers.

23. In a heel machine, the combination of a nail driver head, nail drivers operating in said head, an energy storing device in said head operatively connected to the drivers, a motor in the head and means for automatically connecting the motor to and disconnecting it from said device.

24. In a heel machine, the combination of a driver head, nail drivers movable in the head, a spring operatively connected to the drivers to actuate the same, a continuously running motor mounted in the head, and automatic means for connecting the motor to and disconnecting it from the spring to energize the latter at proper times.

25. In a heel machine, the combinaiton of a heel form, a presser head movable into and out of alinement with the form, nail driving means in the head, a normally energized spring operatively connected to said means, and means for tripping the driving means when the head is moved into alinement with the form.

26. In a heel machine, the combination of nail driving means, a normally tensioned spring for actuating said means, a screw, means for rotating the screw, and means for

connecting the nail driving means to and disconnecting it from the screw to tension the spring.

27. In a heel machine, the combination of a driver plunger, a spring for actuating the plunger, a continuously running motor, a screw in driving connection with the motor, and means for automatically connecting the plunger to the screw at the end of the nail driving movement of the plunger.

28. In a heel machine, the combination of a driver plunger, a spring for actuating the plunger, a continuously running motor, a screw in driving connection with the motor, and means for automatically disconnecting the plunger from the screw at the end of the retracting movement of the plunger.

29. In a heel machine, the combination of a heel form, a presser head movable into and out of alinement with the form, means for effecting relative approaching movement of the form and head to press a heel blank therebetween, nail driving means in the head, means for actuating the nail driving means when the head and form are moved into alinement, and means for preventing actuation of the nail driving means when a heel blank in the form is not of the proper height.

30. In a heel building machine, the combination of a heel form, means for securing together a pile of heel lifts in said form, heel measuring means, means for preventing operation of the securing means when the height of the pile of heel lifts is not within predetermined limits, and means for adjustably varying the separation of said limits.

31. In a heel machine, a heel form comprising a plurality of jaws, each consisting of a pile of relatively adjustable plates for engaging the edges of the heel lifts, the plates comprising one jaw being different in thickness from those comprising another jaw.

32. In a heel machine, a heel form comprising a plurality of jaws each consisting of a pile of relatively adjustable plates for engaging the edges of the heel lifts, the plates in one of the jaws being substantially twice the thickness of those in another of the jaws.

33. In a heel building machine, a form jaw consisting of a pile of relatively adjustable plates for engaging the edges of the heel lifts, alternate plates in the pile being turned in different directions to engage respectively adjacent faces of the heel edge and means for securing the plates in adjusted relation.

34. In a heel building machine, a heel form comprising a jaw consisting of a pile of relatively adjustable plates for engaging the edges of the heel lifts, alternate plates in the pile being turned in different directions to engage respectively adjacent faces of the heel edge, means for securing said plates in adjusted relation, and another jaw consisting of plates and turned in the same direction for engaging another portion of the heel edge, each plate being substantially twice as thick as those in the first-mentioned jaw.

35. In a heel building machine, the combination of heel pressing mechanism, nail driving mechanism, and means for preventing operation of the nail driving mechanism when the height of the heel blank is not within predetermined limits, said means comprising a controlling device for the nail driving mechanism having a projection and a member having a triangular recess into which the projection may enter when the blank is of proper height, the position of said recess being transversely adjustable to vary the limits within which the nail driving mechanism shall be operative.

36. A nail driver controlling device for heel building machines comprising a member having a triangular recess, said member being adjustable in the direction of an altitude of the triangle, and a driver controlling member having a projection arranged to enter said recess under certain predetermined conditions of operation.

In testimony whereof I have signed my name to this specification.

JOSEPH H. POPE.