

UNITED STATES PATENT OFFICE.

THOMAS LUND, OF BEVERLY, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

MACHINE FOR ATTACHING HEELS.

1,017,778.

Specification of Letters Patent.

Patented Feb. 20, 1912.

Application filed May 17, 1906. Serial No. 317,374.

To all whom it may concern:

Be it known that I, THOMAS LUND, a citizen of the United States, residing at Beverly, in the county of Essex and Commonwealth of Massachusetts, have invented certain Improvements in Machines for Attaching Heels, 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 machines for attaching heels and is herein shown embodied in a machine for inserting nails in the heels of spring heel shoes.

As is well known, the outer sole of a spring heel shoe is spaced from the heel seat or heel part of the innersole to receive a wedge comprising one or more lifts adapted to give a required height to the heel. The heel thus formed by the wedge and the heel part of the outer sole is commonly secured to the shoe by nails driven through the outer sole and the wedge into the heel seat. According to a well known mode of production of these shoes, the heel part of the outer sole, prior to this nailing operation, depends loosely from the shoe and has lightly secured to its inner face, as by cement or otherwise, the wedge which constitutes the remainder of the heel. Heretofore heels of this class have been attached usually by nails driven singly. This mode of securing heels is open to numerous objections. For example, as the position of the shoe is necessarily largely dependent upon manual manipulation in the machines which have been used for nailing the heels, there is considerable liability of its being at times so positioned that the nails are inserted in the wrong part of the heel, for instance, too close to the edge of the heel. Also, since each nail is driven singly, there is liability of some of the nails being driven to a greater depth than others, thus occasioning difficulty in giving to the ends of the nails the uniform appearance desired. Another source of difficulty is due to the fact that machines used for this purpose have had no provision for insuring a correct relation of the heel to the heel seat prior to nailing, it being necessary to hold the heel in alinement with the heel seat by hand before driving the first nail. As a consequence of this condition

heels have been frequently attached out of alinement with the heel seat.

An object of my invention is to provide a machine for nailing heels of the class above mentioned, which will obviate objections of the nature above referred to, and which will permit the heels to be secured with greater rapidity than heretofore and in a considerably improved manner. To this end I have constructed a machine by which a group of nails may be inserted at one operation in the heel of a spring heel shoe. In this machine the heel is held firmly against the heel seat as by clamping the parts between a jack and nail-block, and while so held the attaching nails are driven at one operation through the heel into the heel seat. Substantially the entire area of the heel being clamped between the two opposed faces of the jack and nail-block, it will be seen that the effect of the heel nailing operation is to flatten the face of the heel in case it is rounded or distorted. The inside of the shoe at the heel is also maintained smooth and even, the nails being clenched against the jack or other work-support.

It is to be observed that according to the prior mode of nailing above mentioned there has been an objectionable irregularity upon the interior of the shoe where each nail is clenched, this being largely due to the fact that in the prior machines the heel seat has been supported from the interior only at the particular point where a nail is being driven.

An important feature of my invention is a means for insuring a proper alinement of heel and heel seat prior to attaching the heel. In the construction herein shown, a shoe is held upon the jack and in the operative position of the jack the shoe is supported with its heel seat in alinement with the nail-block. The heel which depends loosely from the shoe is positioned in alinement with the heel seat by a positioning means which acts before the heel is pressed upon the heel seat by relative movement of jack and nail-block preliminary to driving the nails. In the machine illustrated the jack is movable into and out of the path of the nails, this feature, as is well known, serving to facilitate the application and removal of the shoe. I have provided mechanism by which a correct relation of heel and heel seat is secured in the movement of the

jack into operative position. This mechanism, as herein illustrated, comprises gages arranged to engage the heel upon opposite sides in the movement of the shoe into position and center said heel with relation to the heel seat. Any lateral displacement of the heel is thus remedied before the heel is forced upon the heel seat.

The arrangement is preferably such that after the heel has been guided to its seat by the gages in the relative movement of jack and nail-block, said gages will be automatically moved slightly apart. This is of advantage not only in relieving pressure upon the gages as the heel is compressed upon its seat, and thus avoiding liability of injuring them, but also in preventing mutilation of the heel by said gages. The gages are also preferably yieldingly movable in the line of relative movement of jack and nail-block so that as the heel is moved to its seat they may accompany it. In the machine shown, the gages are arranged for independent movement in this direction, and their normal position may be adjusted both in the line of relative movement of jack and nail-block and transversely thereto.

In dealing with spring heels or low heels it is desirable that the heel positioning gages should occupy an initial position in close proximity to the face of the nail block, but in such a position the gages would interfere with the movement of the loader into delivering position above the nail block.

An important feature of the present invention, accordingly, consists in the provision of means for causing a temporary relative displacement of the work gages and nail block, to permit movement of the loader for delivering nails to the nail block. One manner of effecting the desired results consists in mounting the work gages on a vertically movable slide and in providing means for elevating the gages from the nail block during the movement of the loader, thus permitting the loader to move into delivering position above the nail block and beneath the gages.

The nails are preferably not fully driven by the nail drivers, their larger ends being left exposed for a short distance. A spanker plate is provided which is interposed between the heel and the nail-block after the operation of the drivers, and which in a second relative movement of jack and nail-block spans the nails even with the face of the heel. The ends of the nails are thus given a uniform appearance, and the face of the heel is made flat and even.

In the machine shown in the operation of pressing the heel upon its seat and driving the nails, the nail-block is vertically movable, and the jack is stationary. The gages are preferably sustained independ-

ently of the movable nail block. As shown, said gages are mounted upon opposite sides of the heel, and are movably supported in guideways, said guideways diverging from the line of movement of the nail-block, so that as the gages move upwardly they are moved away from each other. The gages are yieldingly held toward the nail-block, for example, by means of suitable springs, and are preferably capable of such adjustment that they are normally out of contact with the nail-block and are engaged by the nail-block in its upward movement.

Other features of the invention will be hereinafter described and defined in the claims.

In the drawings which illustrate one embodiment of the invention:—Figure 1 is a view in perspective of the more important parts of a machine embodying my invention; Fig. 2 is a vertical sectional view of parts shown in Fig. 1; and Figs. 3 and 4 are detail views.

I have shown my invention embodied in a machine of the type shown in United States Letters Patent No. 694,656, dated March 4, 1902. This machine comprises a jack 2 pivotally sustained by a spindle 4, held in vertically adjustable position on the frame 6. A spindle 8 is mounted to slide in guideways upon the frame 6, and is vertically reciprocated by mechanism such as shown in said patent. A head 12 carrying drivers 16 is secured to the upper end of the spindle 8. The head 12 carries secured to its opposite ends guides 18 sustaining the lower ends of strong springs 20, said springs receiving through them reduced portions of rods 22 fitted to slide in bearings in the head 12, the lower portion of the rods being extended through the guides 18, said springs acting at their upper ends upon shoulders on the rods 22. Secured to the upper ends of the rods 22 is a nail-block head carrying a nail-block 24 provided with holes in line with the drivers 16.

In the operation of this machine, as the spindle 8 is lifted the driver head 12 and nail-block 24 rise in unison until the upper side of the heel meets the heel seat of the shoe held on the jack. After the pressure of the nail-block on the heel has been exerted to the proper amount, measured by the springs 20, the nail-block is stopped. The driver head continues to rise, sliding upwardly on the rods 22 and cam pressing the springs 20, the upward movement of the drivers independently of the nail-block causing the drivers to act against the heads of the nails in the block to drive them from the block into the heel. A support 26 is secured to a rod 28 rigidly carried by the frame 6. The support 26 is provided with a horizontal guideway to receive a member 30 which carries at its outer end a slide 32.

As illustrated, the slide 32 is horizontally adjustable in a direction at right angles to the line of movement of the member 30. The slide 32 is provided with a vertical guideway to receive the stem of a bracket 34. The bracket 34 is provided with branches extending on opposite sides of the jack in its operative position. Pivotally secured to the outer ends of the bracket 34 are members 36, to the inner ends of which a band clamp 38 is pivotally attached. The members 36 are formed of adjustable sections to permit their effective length to be varied to change the width of the band clamp. It will be understood that the construction shown permits the band clamp 38 to have a limited movement between the branches of the bracket 34, in the direction of movement of the jack 2. After a shoe is received in the band 38 further inward movement of the jack causes the members 36 to force the sides of the band toward each other and thus clamp the shoe between them.

I provide adjacent to each end of the branches formed upon the bracket 34 carriers 40 horizontally and independently adjustable in slots formed in the upper face of said branches and arranged approximately at right angles to the path of the jack. The carriers 40 are held from movement upon the bracket 34 by screws 42 passing through slots in the carriers and entering the bracket 34. Thumb screws 44 may be employed, if desired, to adjust the carriers to and fro upon the bracket. The inner ends of the carriers 40 are provided with depending guideways 46 adapted to receive slides 48 which carry gages 50 pivotally supported upon their lower ends. The slides 48 are provided with adjustable stops 54 arranged to limit downward movement of said slides, as by coming in contact with the carriers 40. Springs 56 are shown secured to the lugs 52 and guideways 46, these springs tending to hold the slides 48 downwardly. The check nuts 58, which are shown, may be employed, if desired, to hold the stops 54 from movement. The guideways 46 are inclined inwardly, as will appear from Fig. 2, so that upward movement of the gages 50 is in relatively diverging lines and vice versa. It will be observed that the pivotal movement permitted the gages 50 is in a horizontal plane, see Fig. 3. The gages 50 may be engaged by springs 51 mounted upon the stems 48, said springs maintaining the gages in position to permit the heel to be brought between them, and at the same time permitting a pivotal movement of the gages.

A frame 62 is pivoted at 69 upon a stud on the nail block head and is horizontally movable upon said head about its pivot. The frame sustains a spanker plate 66 longitudinally adjustable in guideways formed upon the frame, a thumb screw 68 being

provided to facilitate adjustment of the spanker plate. The frame 62 in the machine shown is actuated in the same manner as the top lift and heel carrier shown in United States Patent No. 694,656 above referred to, means being provided tending to move said frame into operative position in which the spanker plate is in line with the heel of the shoe and a latch 70 being arranged to hold said frame in inoperative position, said latch being automatically released in the downward movement of the head after the nails have been inserted in the heel, as disclosed in said patent.

A nail loader 72 is pivotally supported upon the rod 28 to swing in over the nail-block 24 and deliver nails thereto. An actuator 74 mounted upon the loader arm engages an abutment 76 upon the frame 62 in the inward movement of the loader arm and moves said frame to inoperative position where it is held by the latch 70. In the inward movement of the loader arm it moves beneath the bracket 34 and in order to prevent any of the devices carried by the bracket 34 from interfering with the movement of the loader 72 into nail-delivering position I provide means for raising said bracket as the loader is moved inwardly. A convenient construction comprises a cam 78 mounted upon the loader arm and arranged to engage a roller 80 upon the bracket 34. The cam 78 and roller 80 are relatively arranged so that the bracket 34 and the parts sustained thereby are elevated before the loader reaches them. The bracket 34 is maintained in a predetermined initial position by a small rod extending from its upper end and sliding in a hole in the jack mounting, above which it is provided with a stop nut, not shown.

It will be understood that prior to the presentation of a shoe to the machine, a wedge 60 formed of one or more lifts has been lightly secured to the inner face of the outer sole at the heel, as by cement, tacks, or otherwise, and that the heel formed by the wedge 60 and the heel part of the outer sole depends loosely from the shoe, the forepart of the outer sole having been permanently secured to the shoe. Such a shoe having been placed upon the jack, or, in the event that the shoe is to be heeled upon a last, the last which carries the shoe having been placed upon a last-support sustained by the jack, the shoe is swung into operative relation to the nail-block. In this movement the shoe is embraced at the counter by the clamp 38, which, as is well known, serves to position the shoe upon the jack. As will appear from Fig. 2, the clamp 38 engages the sides of the shoe closely adjacent to the outer sole and accurately centers the shoe with relation to the jack. In the inward movement of the shoe the heel

loosely hanging from the shoe engages the gages 50, these gages having been adjusted to fit the particular width of heel being nailed. The gages being symmetrically located with reference to the jack, it will be seen that if the heel on the shoe to be nailed happens to be displaced laterally it will be deflected into proper alinement with the heel seat of the shoe by the action of the gages 50. For the best results, the gages 50, after a shoe has been moved into position, should engage the heel approximately at the widest part of the heel as shown in Fig. 3. It will be seen that with this arrangement, the gages 50 offer substantially no obstruction to the withdrawal of the heel from between their acting faces, and at the same time the position of the heel is accurately controlled by said gages. It will be observed that each of the gages shown in Fig. 3 engages the heel at a plurality of points somewhat removed from each other, this construction insuring that the heel will be accurately positioned. As above stated in the particular machine shown, the gages 50 are pivotally mounted upon the stems 48. This permits movement of the gages in the insertion of a heel between them, so that each may bear evenly upon the face with which it is in contact. The gages 50 are maintained in proper position upon the stems 48 by the springs 51.

The heel seat and heel of the shoe being held in alinement as above described, the machine is started, the driver head and nail-block rising, to press the heel upon its seat and then drive the nails. It will be understood that prior to moving the jack into operative position the nail-block has been supplied with nails by the loader 72, and the spanker plate moved into the position shown in Fig. 1. In the upward movement of the nail-block, it will be seen that the gages 50 are free to rise also, thus offering no obstruction to the movement of the heel to its seat. It will also be observed that in any upward movement imparted to the gages 50 said gages diverge. One of the advantages of this arrangement is that as pressure is applied to the heel, these gages are automatically displaced laterally to a slight amount, so that any increase in lateral dimension of the heel due to this pressure, will not produce excessive strain upon the gages and their supporting means. It will be noted in this connection that in the machine shown lateral pressure of the heel upon the gages is rigidly sustained by said gages so that they constitute an unyielding guide for deflecting a heel laterally into alinement with the heel seat. Another advantage of the feature of permitting the gages 50 to be displaced laterally in any upward movement which may be imparted to them is that liability of their injuring

the heel in the pressing and nailing operation is thereby prevented. While the fact that the gages 50 may rise with the heel is advantageous in preventing injury of the heel by the gages, such as bending down or otherwise mutilating the edge of the heel, the lateral movement of the gages is advantageous in forming an additional safeguard for this purpose.

It will be observed that the vertical adjustment of the gages 50 may be such, if desired, that said gages will at all times be out of contact with the nail-block, as will appear from Fig. 2. Such an arrangement would insure that the gages 50 engage the heel throughout the entire relative movement of jack and nail-block provided the distance between the acting faces of said gages corresponds to the width of the heel.

I prefer, however, to give the gages 50 such a vertical adjustment that they will be engaged by the nail-block subsequently to that point in the relative movement of the jack and nail-block at which the heel is held securely from lateral movement upon its seat and prior to the point at which compression of the heel takes place. It will be seen that this arrangement insures that the gages will be positively removed from engagement with the heel while such compression of the heel as occurs is being performed. At the same time it will be observed that any displacement of the heel from the position desired will be prevented by the gages, until it is clamped upon its seat by the nail-block.

It should be noted that on account of their diverging paths the gages form no obstruction to the upward movement of the heel between them since a slight upward movement of the gages with the heel frees them from the heel. It will be seen, moreover, that the gages tend automatically in the relative movement of heel and heel seat to assume a position in which they bear upon the lower part of the heel, even though in the movement of the shoe into operative position the upper part of the heel has been brought between the acting faces of the gages. It is important that the position of the heel be controlled more with reference to the outer sole than to the lifts 60. Hence this tendency of the gages to shift toward the bottom of the heel is in itself an advantageous feature.

At the close of the acting movement of the drivers in the operation of inserting the nails above described the nails are left with their ends exposed for a short distance. In the downward movement of the nail-block the latch 70 is tripped—as, for example, in the manner described in the patent above referred to—and the spanker plate assumes automatically its operative position below the heel of the shoe. In the second upward

movement of the nail-block the spanker plate is forced against the heel of the shoe and completes the driving of the nails, leaving them with their outer ends flush with the face of the heel.

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

1. In a machine of the class described, the combination with means for positioning a shoe, of mechanism for positioning a heel carried by the shoe, said mechanism being constructed to permit relative approaching movement of the shoe and heel and arranged to automatically release the heel during said movement.
2. In a machine of the class described, the combination of means for positioning a shoe and mechanism for positioning a heel in relation to the shoe, said mechanism being constructed to permit relative approaching movement of the shoe and heel and arranged to release the heel automatically during said movement.
3. In a machine of the class described, the combination with a relatively movable nail block and work support, of gages constructed for engagement with the sides of a heel carried by a shoe to position said heel between the nail block and work support in alinement with the heel seat of the shoe, said gages arranged to be positively withdrawn from engagement with said heel during the relative movement of the work support and nail block.
4. In a machine of the class described, the combination with means for sustaining a shoe and means for pressing a heel upon the heel seat of said shoe, of a positioning device constructed to engage and position a heel in line with the heel seat, said device being arranged for positive automatic movement away from the heel prior to the completion of the operation of pressing the heel upon its seat.
5. In a machine of the class described, the combination of a work support and a nail block capable of relative movement, work positioning means including a bracket having a pair of arms, a band clamp supported by the ends of said arms and heel gages supported by said arms.
6. In a machine of the class described, the combination with relatively movable work-support and nail-block, of a plurality of heel-engaging members arranged to engage opposite sides of a heel and position said heel in line with the heel seat of a shoe carried by said support, and means for sustaining the members arranged to permit movement of said members toward said work-support in relatively diverging lines.
7. In a machine of the class described, the combination with relatively movable work support and nail block, of a plurality of

guideways mounted on opposite sides of the line of relative movement of said nail block and work support, slides mounted to slide vertically upon said guideways and tending normally to move toward the nail block, gages carried by said slides and arranged to engage opposite sides of a heel secured to a shoe held from movement longitudinal of the shoe and movable laterally of the shoe, and an adjustable stop for limiting movement of the gages toward the nail block.

8. In a machine of the class described, the combination with relatively movable work-support and nail-block, said work-support being arranged to support a shoe with its heel portion in line with the acting part of the nail-block, of gages for positioning a heel sustained by a shoe between work-support and nail-block, said gages being arranged to engage opposite sides of the heel and being mounted for independent adjustment in the line of relative movement of work-support and nail-block.

9. In a machine of the class described, the combination with a nail-block and mechanism sustained in vertically movable position above said nail-block for positioning the work, of a loader mounted to be movable into nail delivering position above said nail-block, and means carried by said loader for elevating said mechanism in the movement of said loader.

10. In a machine of the class described, the combination with a nail-block, and mechanism sustained in vertically movable position above said nail-block for positioning the work, of a loader mounted for movement into nail delivering position between the nail-block and the positioning mechanism, and means for elevating the positioning mechanism out of the path of the loader before the loader reaches said mechanism.

11. In a machine of the class described, the combination with relatively movable work-support and nail block, of gages for engaging opposite sides of a heel sustained between said work-support and nail block, said gages being arranged for independent adjustment in substantially the line of relative movement of said parts and for independently yielding movement in said line of relative movement.

12. In a machine of the class described, the combination with gages for shifting laterally into alinement with the heel seat of a shoe a heel loosely secured to the shoe and held from longitudinal movement upon the shoe, means for driving nails through the heel into the heel seat leaving their heads exposed, and means for thereafter spanning the nails even with the face of the heel said gages being mounted to permit yielding bodily movement.

13. In a machine of the class described, the combination with a nail-block, of a slide

mounted for reciprocation, work positioning means associated therewith and extending in proximity to said nail block, a movable loader and means, including cooperating devices mounted respectively on said loader and said slide, for effecting a temporary displacement of the work positioning means on the movement of said loader toward the nail block.

14. In a machine of the class described, the combination with a nail block, of a slide, work gages associated therewith, a loader, a cam operatively connected with said loader and a roller on said slide, whereby the nail block and work gages may be relatively separated on movement of the loader.

15. In a machine of the class described, the combination with a nail block, of movable work positioning means located in proximity to the face of said nail block, a loader mounted for movement into nail delivering position above said nail block and means operating in properly timed relation with said loader for moving said work positioning means out of the path of the loader.

16. In a machine of the class described, the combination with a nail block, of movable work positioning means located in proximity to said nail block, a device for maintaining said means in a predetermined position relative to said nail block, a loader mounted

for movement into nail delivering position above said nail block, and means for displacing said work positioning means during the movement of the loader toward the nail block, said means allowing the return of the work positioning means to initial position on the reverse movement of the loader.

17. In a machine of the class described, the combination with relatively movable work support and nail block, of work positioning means including a bracket having a pair of arms, a band clamp supported by the ends of said arms and heel gages supported by said arms at intermediate points.

18. In a machine of the class described, the combination with relatively movable work-engaging members, of means for operating on work held between said members work positioning means including a bracket having angularly extending arms, a band clamp supported by the ends of said arms and heel gages movably mounted on said arms at intermediate points.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

THOMAS LUND.

Witnesses:

BERNARD BARROWS,

FREDERICK L. EDMONDS.