

July 6, 1937.

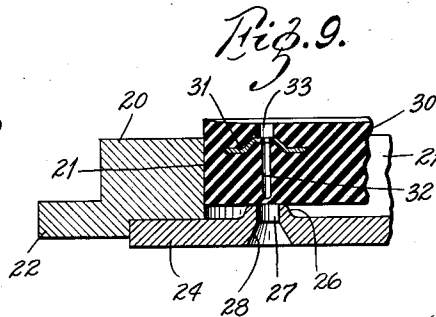
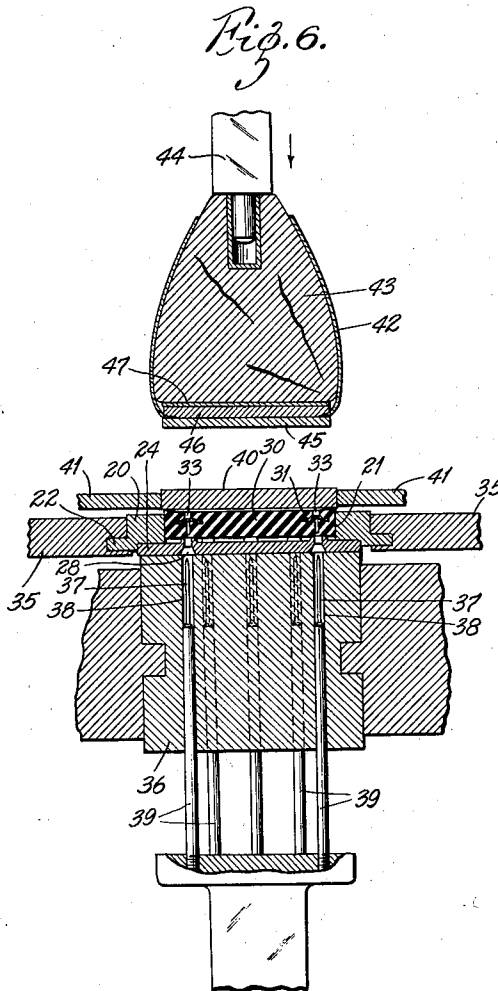
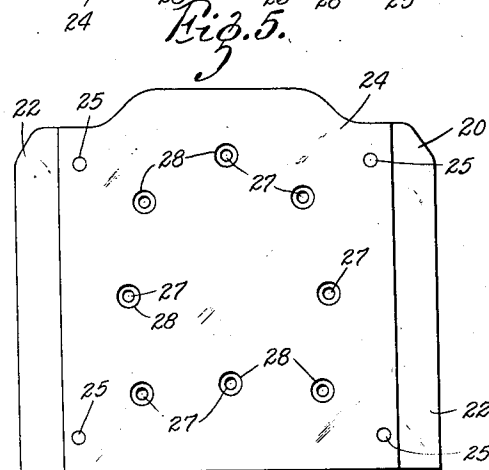
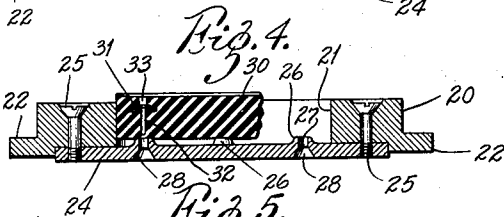
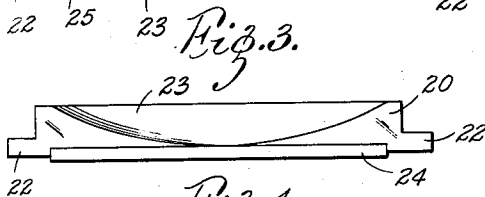
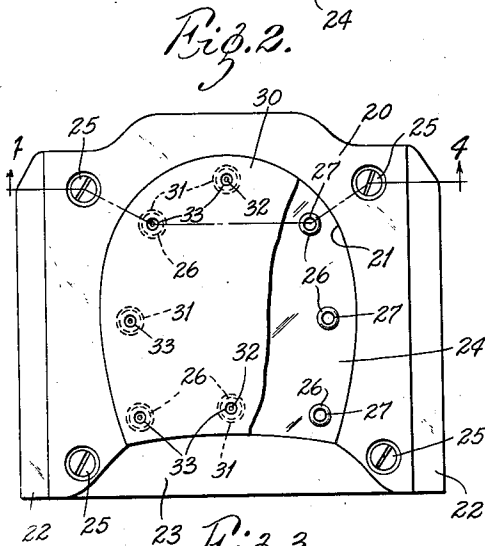
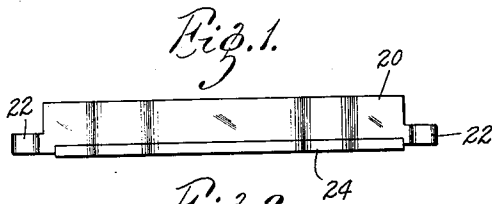
G. B. BRITTON

2,085,894

METHOD OF ATTACHING SHOE HEELS

Filed March 2, 1936

2 Sheets-Sheet 1



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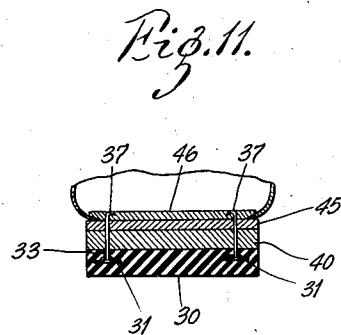
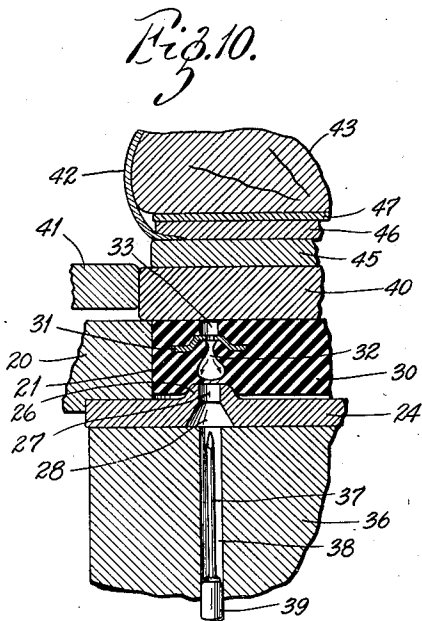
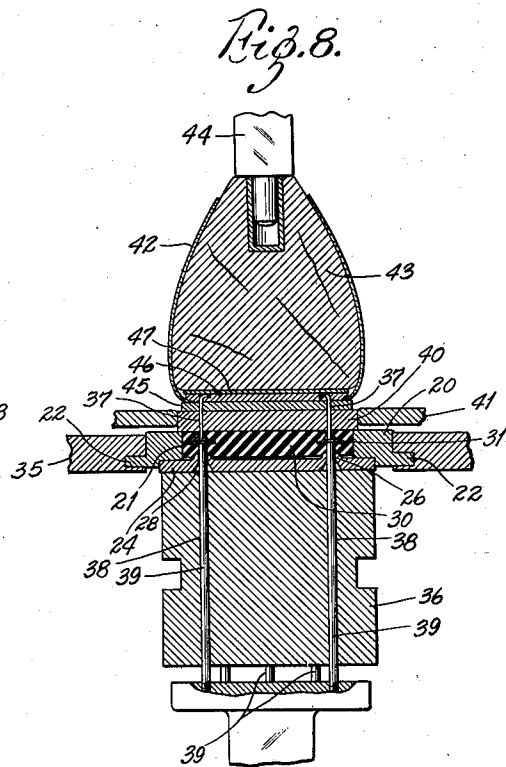
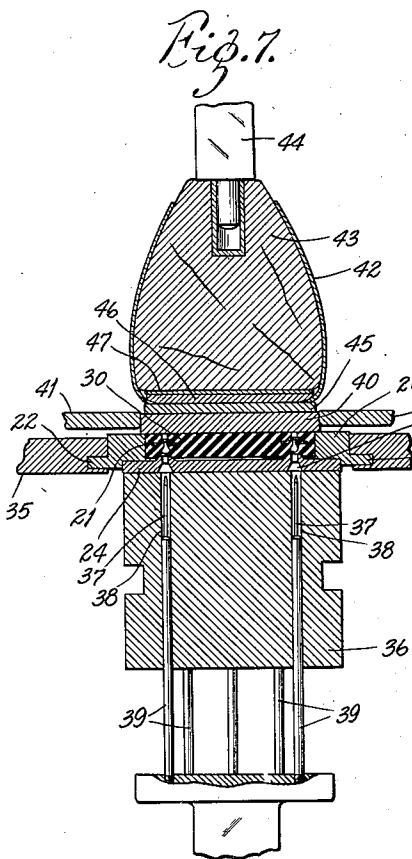
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METHOD OF ATTACHING SHOE HEELS

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,085,894

METHOD OF ATTACHING SHOE HEELS

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Application March 2, 1936, Serial No. 66,518

11 Claims. (Cl. 12-147)

The present invention relates to a method of nailing heels to shoes, and in particular blind nailing rubber heels. This application is a companion case to Serial No. 66,519, filed concurrently herewith.

In order to understand the invention, it may be observed that blind nailing is nailing to shoes heels having no holes or other guides or indications for the directing of the nails into their proper locations. It is understood that composition heels, such as rubber heels, have accurately located washers embedded therein, and that it is essential that the nails pass through these washers in order to obtain a satisfactory fixing of the heel to the shoe. The lack of visible guides or indications as to the location of the washers presents problems that are solved by the subject matter hereof.

In the ordinary open nailed heel, holes extend from the tread surface of the heel to these washers, so that the nails may enter these holes and be driven until the head abuts the washer. These holes not only indicate the location of the washers, but in automatic nailing machinery they guide the nails so that the points will pass through the holes in the washers. Furthermore, rims are provided that are upstanding from the tread surface of the heel around the holes and each of these rims has a chamfered crater, so that in case the nail is brought up to the heel slightly out of alignment the crater or chamfered inner surface of the rim will direct the nail into proper alignment so that it will pass through the hole in the washer.

In blind nailed heels, these rims and craters are not present. Prior to the present invention, there was no effective means of driving and directing the nail from the tread surface through the hole in the washer. Ordinarily the nail was simply forced to penetrate the heel directly with only as much accuracy as the necessarily free tolerances of the nailing machine would give. This proved unsatisfactory, since, in a prohibitive number of instances in production, buckling, or shooting of the nails, occurred, with the result that the heel attachment would be defective, necessitating the replacement of the heel, or at least replacement of the defectively driven nails.

It is an object of the present invention to provide a method for blind nailing heels and in particular rubber heels that secures accurate directing of the nails, so that they properly enter the washers.

It is a further object of the invention to correct any initial or early misalignment of the nails

produced by conditions in the die block or other means in which the nails are held.

It is a further object of the invention to correct or prevent any misalignment during the driving of the nails.

It is a further object of the invention to reduce the distance through which the nail must travel inside the heel.

It is a further object of the invention to provide a method of driving nails blindly in rubber heels in such wise that the cut through which the nail penetrates the tread surface of the heel will be automatically closed so as to leave no objectionable mar on the tread surface.

Other objects will appear in the course of the ensuing description, and from the drawings, wherein:

Fig. 1 is a rear elevation of a heel ring with the guide plate attached thereto.

Fig. 2 is a top view of the heel ring with a rubber heel shown in place thereon.

Fig. 3 is a front elevation of the heel ring with a guide plate in place.

Fig. 4 is a section on the line 4-4 of Fig. 2.

Fig. 5 is a bottom view of the device shown in Fig. 2 clearly disclosing the guide plate.

Fig. 6 is a view of the device in working relation with the nailing machine, in one stage of its operation.

Fig. 7 is a view similar to Fig. 6 in a subsequent stage of operation.

Fig. 8 is a view similar to Figs. 6 and 7 in the third stage of operation.

Fig. 9 is an enlarged section of a portion of the heel ring and guide plate with the heel thereon in the stage shown in Fig. 6.

Fig. 10 is a view similar to Fig. 9 but in the stage shown in Fig. 7.

Fig. 11 is a section of completely attached heel.

Referring to Figs. 1 to 5 inclusive, there is shown a heel ring 20. This ring is provided with an internal cut-out portion 21 accurately formed to the shape of the heel but sufficiently larger than the outside dimensions thereof to permit the heel to enter the cut-out with a smooth, sliding fit. The depth of the walls defining the cut-out is only slightly less than the thickness of the heel to be nailed. This heel ring is provided with ribs 22 on its opposite sides for a purpose to be described. A bevel 23 is provided in the forward end of the ring to accommodate the shank of a shoe on which a heel is being attached.

Inset into the bottom of the heel ring 20 is a guide plate 24. This guide plate is very ac-

curately fitted into the heel ring and is secured thereto by means of suitable attaching screws 25. This guide plate has upstanding from the inner surface thereof nipples 26 that are somewhat tapering on their outer surfaces. Holes 27 extend through these nipples. These holes terminate at the outer surface of the guide plate in chamfered cuts 28. It will be seen that the holes 27 with the chamfers 28 provide a funnel effect to guide the nails.

A rubber heel 30 is shown. This heel is provided with cupped metal washers 31, the tops of which normally are located about one-sixteenth of an inch, more or less, below the attaching surface of the heel. In the heel of the present invention, an extended hole 32 extends toward the tread surface below the hole of the washer and terminates some short distance, such as one-sixteenth of an inch, inward from the tread surface. It is preferable that the thickness of the rubber between the bottom of the hole 32 and the tread surface be no greater than the diameter of the hole. As is usual, a hole 33, somewhat larger than the hole 32, extends from the washer 31 to the attaching surface.

As previously described, the cut-out 21 in the heel ring is accurately shaped to the dimension of the heel. With the guide plate 24 in position on the heel ring, the holes 27 are accurately aligned with the holes in the washers 31 and also with the holes 32 in the heel. The heel ring is located in the ring carriage 35 of the nailing machine, as shown in Figs. 6 to 8, inclusive, the flanges 22 engaging in suitable channels in the carriage. The die block 36 of the nailing machine is then loaded with nails 37 that rest in suitable holes 38 and which are adapted to be ejected by drivers 39. The die block 36 fits closely up against the guide plate 24 and the holes 38 therein align with the chamfered flares of the holes 27 in the guide plate. The ring carriage is movable laterally for replacement of the ring, and for reloading of the die block with nails.

At this time, it will be understood that the heel 30 is duly placed in the heel ring 20. A leather heel base 40, somewhat larger than the heel, is placed over the heel and held in position by the base holder elements 41. The shoe being heeled is shown at 42 mounted on a last 43, which last is supported on a member 44 that controls its ascent and descent. The shoe includes an outsole 45 and an insole 46. A metal clinching plate 47 is located between the last and the insole.

The method of the present invention comprises thus locating the above described heel in position within the ring and on the guide plate 24. This is the first step, as shown in Fig. 6. It will be understood that the driving head is loaded, as shown. In the second step, as shown in Fig. 7, the last is lowered until it contacts with the heel base. A certain amount of pressure is applied to the last which compresses the heel until the heel base 40, previously noted as being somewhat larger than the heel, strikes the heel ring 20. This compression is called "preliminary pressure." The depth of the heel ring relative to the depth of the heel itself determines what portion of this preliminary pressure is applied to the heel itself, since when the heel base comes into contact with the heel ring, any additional pressure, while available for steadying the last, is not transmitted to the heel, but is absorbed by the

heel base and ring. Thus the pressure actually applied to the heel itself is limited, and independent of the maximum limits of the total "preliminary pressure" beyond that minimum required to seat the heel base onto the ring.

However, another and perhaps more vital feature of this relatively deep heel ring and its operation is that the heel, when thus compressed, cannot deform laterally, being confined by the walls of the heel ring. Consequently, the entire force applied to the heel is employed in forcing the heel down over the nipples 26. Any lateral deformation would cause displacement of the washers, destroying their alignment with the holes 27 and the nails.

In this preliminary pressure stage, as is shown in Fig. 10, the nipple penetrates the tread surface of the heel with a wedging action, although preferably it does not cut this surface. As the apex of the nipple and the hole 27 are in alignment with the hole 32 in the heel, the penetration of the nipple will tend to bring the hole 27 near to the hole 22, thereby reducing the unguided travel of the nail point. While it is not precisely understood what internal distortion takes place, it is believed that the following occurs: The rubber, in being forced over each nipple 26, tends to stretch or flow downwardly and outwardly along the surface of the nipple, this being the normal action to be expected from such a conical wedge. As the thickness of rubber between the top of each nipple and the hole 32 is small, the tendency is for this thin wall of rubber to be distended across the top of the opening 27 in the nipple 26, producing something of a membranous effect. Furthermore, it is believed that the bottom portion of the hole 32 in this action is widened and stretched across the opening 27 so that the walls of the holes 32 above the nipple downwardly diverge from the axis of the hole. This causes the hole 32 to approximate, at least, the size of the hole 27 in the guide plate. It furthermore seems likely that the portion of the hole 32 above this distended portion and near to the washer 31 is reduced in dimension so that possibly it may be nearly closed. This causes the hole to be funnel-shaped, to guide the nail as will be disclosed. This condition is shown in Fig. 10 and is the status of the heel and the nailing apparatus in the stage shown in Fig. 7.

In the next stage of operation, as shown in Fig. 7, the driver block is raised so that the driving pins 39 eject the nails 37 and force them upwardly. The holes 38 in the die block are necessarily larger than the nails, since they must accommodate the heads of the nails with sufficient freedom to permit unrestricted action of the machine. As a consequence, the nails may be ejected out of proper alignment with the washers in the heel. However, with the present method, the chamfered portions 28 of the holes 27 will receive these misdirected nail points and redirect them into the holes 27. The nails will then pass through the holes 27 and the nipples 26 and into the distended and thinned membranous portion of the heel between the tops of the nipples 26 and the hole 32. The nails then pass into the hole 32. Should they be somewhat deflected when they reach the holes 32, they will be realigned because of the converging of the walls of these holes, it being less resistant for the nails to be thus redirected than to penetrate the walls of the holes 32. The nails then will pass up through the top part of the holes 32 and through the

washers in proper alignment. They penetrate the leather heel base 40, the outer sole 45, the inner sole 46 and, upon striking the clinching plate 47, are bent over, as shown in Fig. 8, and secured in position.

The driving pins 39 are then withdrawn. Owing to the fact that the portion of the rubber heel penetrated by the nails and driving pins was under a spreading tension, as soon as the pins are withdrawn and the heel removed from the nipples 26 on the guide plate, this tension will be relieved. This relieving of the tension causes the holes produced by the nails and the driving pins automatically to close up and leave only an almost invisible cut in the tread surface of the heel.

The above method is the preferred one. However, very satisfactory results may be obtained by the guide plate without the upstanding nipples, the chamfered openings 28, and the narrower holes 27 serving to redirect and guide the nails. The preliminary pressure, of course, cooperates to secure a tight bond of heel to shoe, as it does in the preferred process.

It will be seen that this method provides accurate blind nailing of heels, and in addition attains the advantage of substantially closing the nail hole after the operation is completed.

The invention having been described, what is claimed is:

1. In the method of nailing heels having washers therein to shoes, the steps of providing a hole in the heel extending downwardly from the washer hole to adjacent the tread surface of the heel, forcing the heel over a guide element having a hole therein which guide element projects into the heel with a wedging action toward said heel hole, and thereby stretching the heel material below said heel hole so that it is under tension, forcing the nail through said guide element hole to be directed thereby, said heel material at said zone of tension, and into the hole in the heel, and ultimately removing said guide element to permit relief of the tension.

2. In the method of nailing to shoes heels having washers therein spaced from the tread surface thereof, the steps of forcing the heel over a projecting guide element to reduce the distance between the tread surface and the washer hole, and passing a nail through said guide element, and by its guidance through the hole in the washer.

3. In the method of nailing to shoes heels having washers therein spaced from the tread surface thereof, the steps of deforming the heel material to reduce the distance between the tread surface and the washer, driving the nail from the tread surface through the deformation zone and through the washer, and ultimately relieving the deformation to permit the heel to return to normal shape.

4. In the method of nailing to shoes elastic heels having washers therein spaced from the tread surface thereof, the steps of deforming the heel material to reduce the distance between the tread surface and the washer, and also to place the heel material under spreading tension in said portion between the washer and the tread surface, then driving a nail through said deformed portion, said washer and into the shoe, and finally relieving said deformation.

5. In the method of nailing to shoes elastic heels having washers spaced from the tread surface thereof, and having holes projecting toward the tread surface from the holes in the washers, but terminating short of the tread surface, the

steps of deforming said heel by a wedging action applied to the tread surface in substantial alignment with the holes in the heel, and thereby reducing the distance between the tread surface and the heel hole, and also deforming the hole so that the walls thereof diverge toward said tread surface and converge toward the washer hole, then driving a nail through the tread surface at the point of deformation, to said hole, guiding the nail by the converging walls of the hole through the washer hole and into the shoe, and finally relieving said deformation.

6. In the method of nailing to shoes elastic heels having washers therein spaced from the tread surface thereof, the steps of locating the heel with the tread surface over a guide element through which the nails may be projected, forcing the shoe down against the attaching surface of the heel to press the heel onto said guide element, and by said pressure deforming the heel to reduce the distance between the washer and the tread surface of the heel, and driving nails through said guide element, said reduced portion of the heel, and into the shoe.

7. In the method of nailing to shoes elastic heels having washers therein spaced from the tread surface thereof, the steps of locating the heel with the tread surface over a guide element through which the nails may be projected, placing a heel base over the attaching surface of the heel, forcing a shoe down against the heel base, and pressing the shoe thereagainst to deform the heel, and thereby deforming the heel to reduce the distance between the tread surfaces and the washers, and placing the portion of the heel between the tread surface and washers under tension radiating from an axial line drawn through the holes in the washer, driving nails through the tread surface, the deformed portion, the washer and into the shoe, and ultimately relieving the deformation to permit the heel to resume normal position and at least substantially close the opening produced by the passage of the nail.

8. In a method of nailing heels to shoes, which heels are provided with washers therein spaced from the tread surface thereof, the steps of holding the heel with the tread surface over nails, compressing the heel but limiting the straining thereof to prevent lateral deformation, driving the nails toward said tread surface, and redirecting and guiding said nails immediately adjacent said tread surface so that they are aligned with said washers.

9. In a method of nailing rubber heels having washers therein to shoes, the steps of confining the heel to be nailed to prevent such lateral deformation thereof as to displace the washers in said heel, applying pressure against the upper surface of said heel to compress the same while thus confined, determining the amount of said pressure, directing nails toward the bottom surface of said heel, and guiding them into said heel and toward the washers.

10. In a method of nailing to a shoe a heel provided with washers spaced from a substantially flat tread surface, the steps of inserting said heel into a heel locator to position said substantially flat tread against projecting holed nail guide elements on a guide plate, pressing said heel against said elements to press the main area of the tread against the plate and the elements into the heel to place those portions of the heel thereabout under tension, driving nails through said elements and through said tensioned portions and

through said washers, and withdrawing said heel from said plate and elements to relieve the tensioned areas to close the holes made by the nails.

11. In a method of nailing to a shoe a heel provided with washers spaced from a substantially flat tread surface, the steps of pressing said heel against projecting holed nail guide elements of a guide plate to stretch those portions of the heel tread immediately above and in the vicinity of the projections and to reduce the free distance between the heel tread and the washers, driving

securing means through said elements and through said stretched portions and through and into engaging relation with said washers, and releasing the pressure on said heel to withdraw the same from engagement with the elements and the guide plate to relieve the tension set up by the stretching action to substantially close the holes made in the heel tread by the passage of the securing means.

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