No. 855,454. PATENTED JUNE 4, 1907.

J. M., J., A. J. & S. A. GIMSON.

NAILING OR RIVETING MACHINE.

APPLICATION FILED MAR. 3, 1902.

3 SHEETS—SHEET 1.

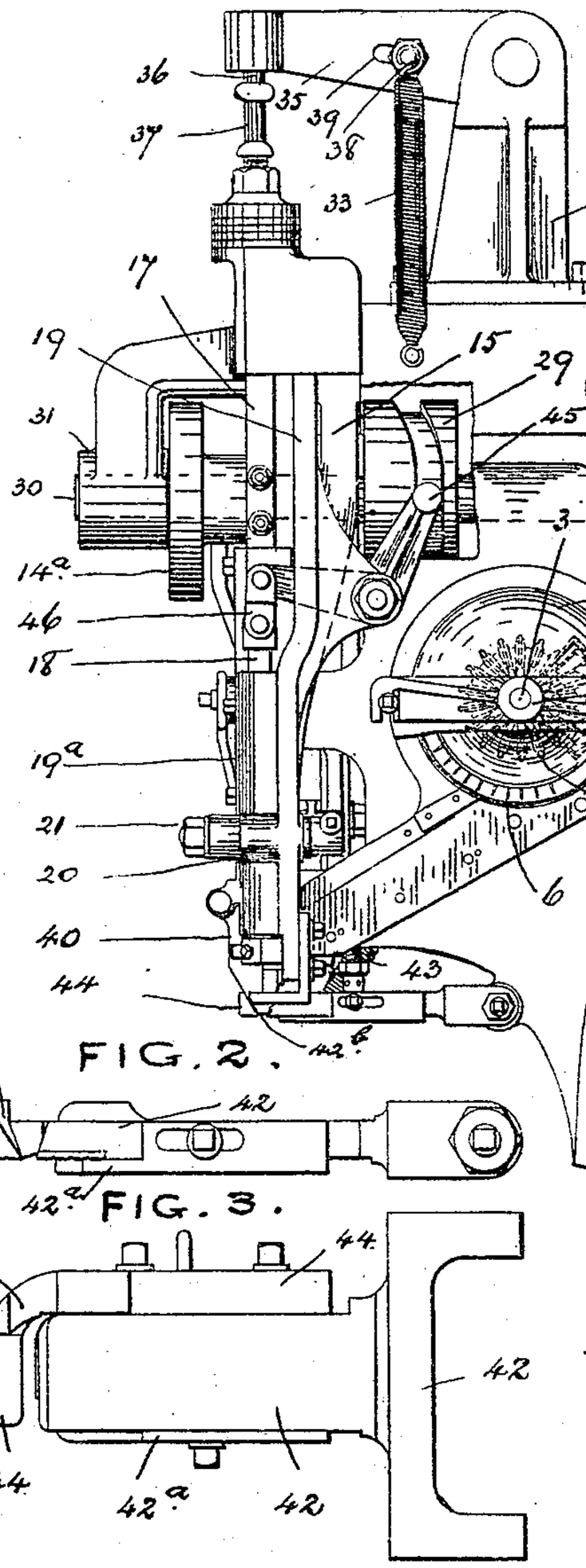
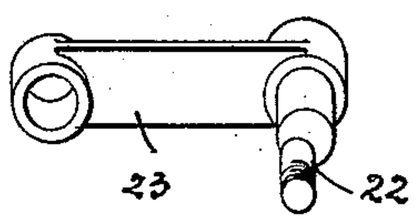


FIG. 1.

FIG. 2.

FIG. 3.

FIG. 4.



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3 SHEETS—SHEET 2.

FIG. 5.

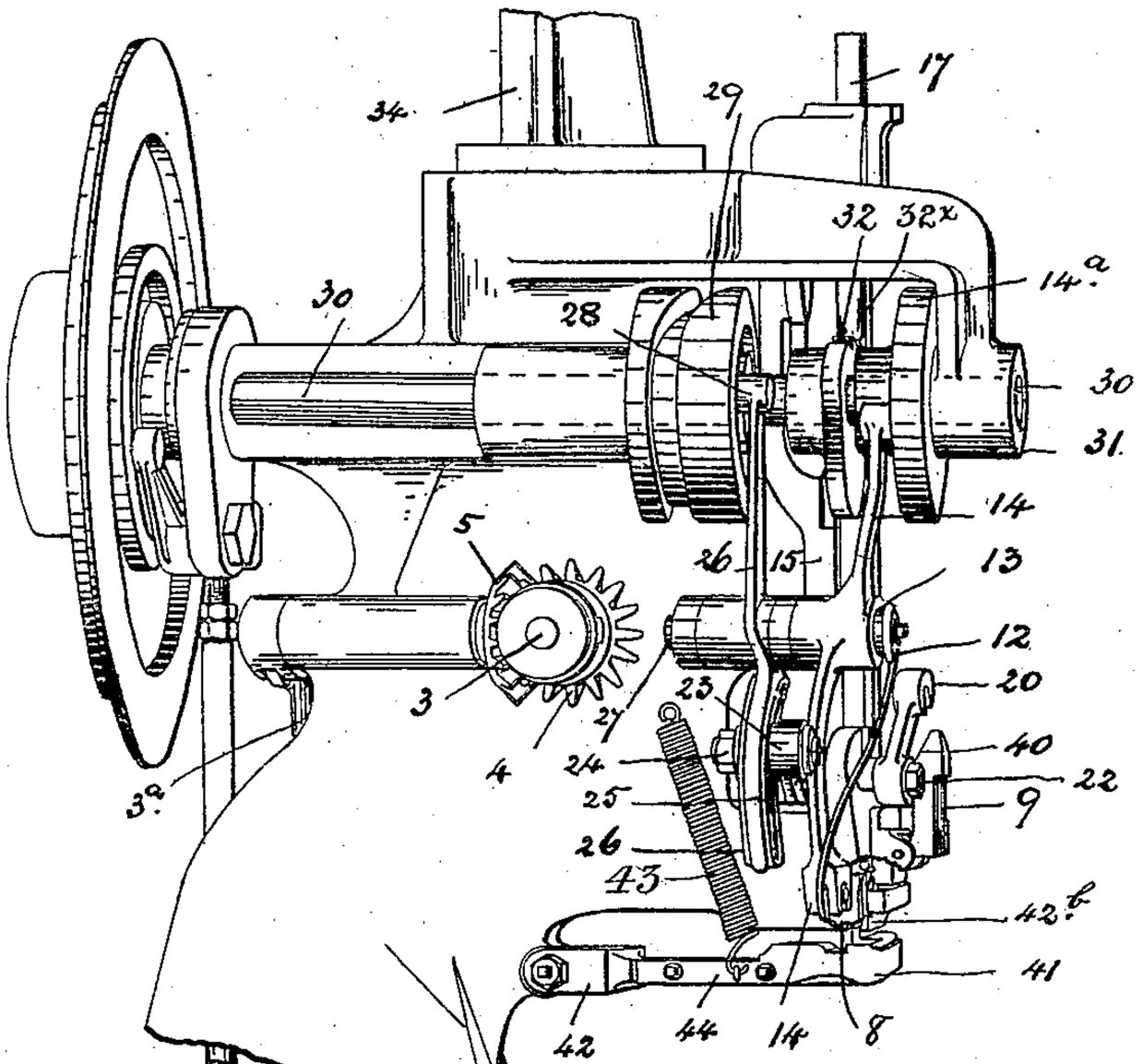
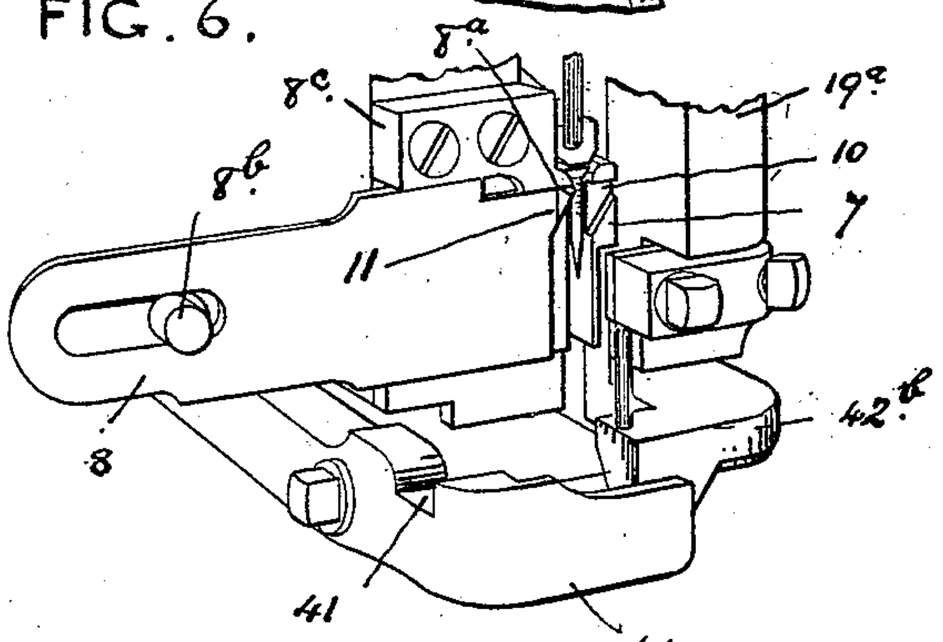


FIG. 6.



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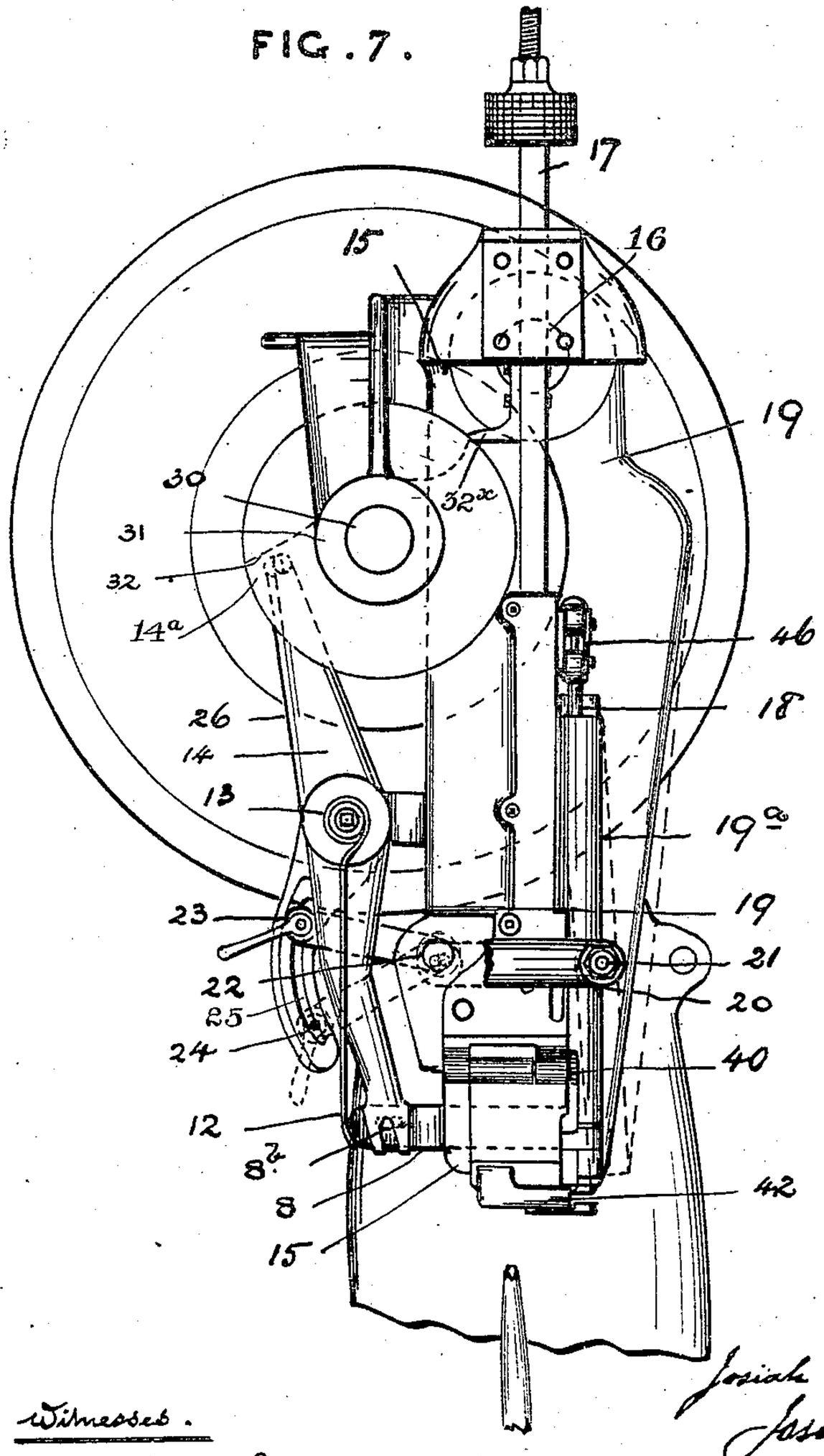
3 SHEETS—SHEET 3.

FIG. 7.



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UNITED STATES PATENT OFFICE.

JOSIAH MENTOR GIMSON, JOSIAH GIMSON, ARTHUR JAMES GIMSON, AND SYDNEY ANSELL GIMSON, OF LEICESTER, ENGLAND.

NAILING OR RIVETING MACHINE.

No. 855,454. Specification of Letters Patent. Patented June 4, 1907.

Application filed March 3, 1902. Serial No. 96,522.

To all whom it may concern:

Be it known that we, JOSIAH MENTOR GIMSON, residing at No. 106 New Walk, JOSIAH GIMSON, at Stoneygate House, ARTHUR JAMES GIMSON, at White House, Clarendon Park, and SYDNEY ANSELL GIMSON, at No. 20 Glebe street, all in Leicester, in the county of Leicester, England, in the United Kingdom of Great Britain and Ireland, subjects of His Britannic Majesty King Edward the Seventh, have invented a new and useful Improvement in Nailing or Riveting Machines Employed in the Manufacture of Boots and Shoes.

Our invention relates to improvements in nailing machines for boots or shoes of the type known as "loose nailers" or machines in which loose nails or tacks are conveyed from a hopper along a raceway from which they are fed to the driving mechanism and driven successively into the stock. In machines of this type a common construction comprises a laterally oscillating head provided with guide ways in which the awl and driver bars, respectively, are vertically reciprocated, the arrangement being such that the awl is first depressed to penetrate the stock, the head is then moved laterally while the awl is still in engagement with the stock to feed the stock, the awl is then withdrawn and the head moved laterally back to its original position to bring the driver into position over the opening previously made in the stock by the awl, and finally a nail is fed and driven by the driver into the stock, thus completing the cycle of operation.

The objects of our improvement—are, first, to provide means whereby the length of the feeding stroke of the awl may be adjusted; second, to provide simple and effective mechanism for feeding, separating, and delivering the nails in regular order to be driven; and, third, to provide an improved stationary feed guide or work rest for properly positioning the edge of the work presented to the machine. We attain these objects by the mechanism illustrated in the accompanying drawings, in which:—

Figure 1, is an elevation of a machine embodying our invention, viewed from the right hand side thereof; Figs. 2 and 3, are views in elevation and plan, respectively, of the work rest or edge guide; Fig. 4, a detail view of the link or arm connecting the driver bar guide and its actuating lever; Fig. 5, a perspective view of the machine looking at the same from the left hand side thereof; Fig. 6, a detail view in perspective of the nail separating devices; and Fig. 7, a front elevation of the head of the machine.

Similar characters refer to similar parts throughout the several views.

The head of the machine is provided with bearings 31, 31 for a driving shaft 30, carrying the usual fly-wheel, and driving pulley. Upon the shaft 30 are fitted suitable cams 14^a, 32 and 29 for imparting the necessary movements to the various parts of the machine, as hereinafter described.

The mechanism for operating the awl and driver bars will first be described.

Referring to Figs. 1, 5, and 7, a stud or bolt 16 projects from the front of the machine head and is held in proper position in said head by nuts applied to its rear end, as shown in Fig. 1. Upon the stud 16 is mounted for rocking movement the two part oscillating head composed of the members 15 and 19. The members 15 and 19 are independently mounted on the stud 16, but are connected for movement in unison by the link 20, attached to the member 19 by a pin 21 and to the member 15 by the eccentric pin 22, hereinafter described. The member 19 is provided with a guide 19^a, in which reciprocates an awl bar 18, connected at its upper end by links 46, to a bell crank lever 45, fulcrumed on the machine head, and carrying at its opposite end a cam roller traveling in a peripheral groove in the cam 29, by means of which the awl bar derives its movement for causing the awl to penetrate the stock at the proper time. The member 15 as shown in Fig. 7, carries a guide, similar to the guide 19^a, in which is arranged for longitudinal reciprocatory movement a driver bar 17, operated by the following mechanism. To the top of the machine frame is bolted a bracket 34, in which is fulcrumed a lever 35, the free end of which is recessed and rests on the ball ended pin 36 of the block 37, the lower end of which rests upon the top of the driver bar 17. The lever 35 is drawn downwardly to impart to the driver bar its driving stroke by means of a spring 33, attached at its lower end to the machine frame and carrying at its upper end a bolt 38, adjustable in a slot 39 in the lever 35. It will be evident

that the force of the blow delivered by the driver may be varied by adjusting the position of the bolt 38 in the slot 39. The driver bar 17 is raised against the spring 33 by the cam 32, which engages a projection $32^{\times}$ on the driver bar. The member 19 carries at its lower end a relatively fixed awl nozzle 42^{b}, (see Fig. 6,) and the member 15 has hinged thereto at its lower end, for purposes hereinafter pointed out, a tack nozzle 40 having a groove 9 for the reception of tack and driver. The oscillating head members 15 and 19 are given their lateral feeding movement by means of the following mechanism. Fulcrumed on a pin 27, mounted in lugs projecting from the machine frame, is a lever 26, carrying at its upper end a cam roller 28, engaged in a groove in the face of the cam 29. The lower end of the lever 26 is slotted at 25 for the reception of an adjustable clamp screw 24. The clamp screw 24 is carried by the end of a link or arm 23, connected at its opposite end to the member 15. It will be obvious that oscillation of the lever 26 under the influence of the cam 29 will impart to the swinging head 15, 19 the lateral feeding movement above referred to, and also that the length of the feeding stroke may be varied by adjusting the position of the clamp screw 24 in the slot 25.

The operation of the parts thus far described is substantially as follows:—At the beginning of the cycle of operations the parts are in the position shown in Fig. 7, with the driver and awl bar in their elevated positions and the swinging head 15, 19 at the right hand limit of its path of oscillation. The awl bar now descends and causes the awl, operating through the nozzle 42^{b}, to penetrate the stock, after which, and while the awl bar is still held in its lowermost position, the swinging head is moved to the left into the position shown in dotted lines in Fig. 7, causing the awl to feed the stock. The awl bar is now raised and the swinging head moved back to its original position, bringing the driver directly over the opening made in the stock by the awl. Thereafter the driver bar descends and causes the driver to drive from the nozzle 40 a nail, previously fed thereto by means hereinafter described, into the opening in the stock. The driver bar is then raised, and the cycle of operations is completed. From the foregoing it will be seen that in order to drive the nail properly it is necessary that the driver bar, before its descent, be brought to a position directly over the opening last made in the stock by the awl. In other words the horizontal distance between the awl and the driver must be exactly equal to the length of the feeding stroke of the swinging head. If, therefore, the length of this feeding stroke be varied, as heretofore explained, it becomes necessary to adjust the relative positions of the awl and driver bars a corresponding amount. In the machine herein shown means are provided whereby this adjustment is made at the same time that the feeding stroke is adjusted, such means comprising an eccentric connection between the link 20 and member 15. As heretofore explained the relative positions of the members 15 and 19, and consequently of the awl and driver bars, is determined by the link 20. This link, instead of being connected directly to the member 15, is pivoted on an eccentric pin 22, projecting from the hub of the link or arm 23, as shown in Figs. 4 and 7. It will now be apparent that when the clamp screw 24, is adjusted in the slot 25 to vary the length of the feeding stroke, the position of the member 15, relative to the member 19, will be correspondingly adjusted.

Pivoted to the frame of the machine below the nailing mechanism heretofore described is a member 42, shown in detail in Figs. 2 and 3 and in position in the machine in Figs. 1 and 5, carrying an adjustable plate 44 and an adjustable edge guide 42^{a}. The member 42 acts as a work rest against which the work is held during the driving operation, and serves, in conjunction with the edge guide 42^{a}, properly to position the work for the receipt of the nails. The plate 44, is provided with a groove 41 in which the hinged nozzle 40 is guided in the lateral movement of the swinging head, a spring 43 holding the member 42 normally upward and the nozzle 40, in proper position in the groove 41. If however, a broken nail or other obstruction becomes lodged in the nozzle 40, the member 42 may be depressed, the nozzle 40 sprung upward, and the obstruction removed.

The nail feeding and separating mechanism will now be described.

Within a recess in the machine head is fitted the circular two part hopper 1, formed of two dished out cups, set face to face with their edges a distance apart from each other substantially equal to the thickness of a nail, upon a shaft 3, fitted to oscillate in a bearing 2, carried by the frame of the machine. The shaft 3 carries a bevel gear 4, in mesh with a second bevel gear 5, carried by a rock shaft $2^{\times}$, journaled in the frame of the machine. The rock shaft $2^{\times}$ has fixed thereto on its end opposite to the gear 5 an arm to which is pivotally connected a rod 3^{a}, which may be reciprocated by any suitable means, as by an eccentric on a shaft at the base of the machine. The inner faces of the said cups of the two part hopper 1, are serrated at 6 in order to assist in arranging the nails in proper position in the groove in the raceway 7 into which the nails drop from the oscillating hopper. The nails are thus arranged in a line in the raceway 7 down which they are conveyed to the devices for separating and

delivering them to the driving mechanism. These devices comprise essentially the hinged nozzle 40, heretofore described, and a separator plate 8, shown in detail in Fig. 6. The plate 8 is mounted to slide in a guide way 8^c, in the frame of the machine, and is formed at its forward end with a nose 11, beveled at 8^a, and adapted to enter a recess 10 at the lower end of the raceway 7. The separator plate 8 is reciprocated in its guideway 8^c, by mechanism now to be described. On a pin 13 carried by a lug on the machine head is fulcrumed a lever 14, carrying at its upper end a cam roller adapted to co-operate with the cam 14^a, on the main shaft of the machine. The lower end of the lever 14 is forked to straddle the plate 8, and engages a pin 8^b arranged in a slot in the said plate. A spring 12 surrounds the pin 13 and engages the rear end of the plate 8, tending normally to force the plate forwardly or toward the right in Figs. 6 and 7. By this construction it will be seen that a yielding connection is provided between the plate 8 and its actuating lever to the end that if the nose 11 of the plate 8 strikes a misplaced nail or other obstruction, the parts will yield, and breakage will thus be prevented.

The operation of the above described nail feeding mechanism is substantially as follows:—The nails in the raceway 7 will slide down the said raceway until arrested by the endmost nail coming in contact with the separator plate 8 or the nose 11 thereof. At a proper point, however, in the cycle of operations of the machine, namely, at a time when a groove 9 in the nozzle 40 is out of alinement with the raceway 7, the separator plate 8, is withdrawn or moved to the left, Figs. 6 and 7, and the line of nails in the raceway will descend further until arrested by the endmost nail coming in contact with the plane or ungrooved portion of the nozzle 40. The distance between the plate 8 and the plane rear surface of the nozzle is substantially equal to the thickness of a nail, so that the further descent of the line of nails, above referred to, is substantially equal in amount to the thickness of one nail. The plate 8 is immediately returned to its forward position causing the beveled nose 11, to enter between the endmost nail and the one next succeeding, thus separating the endmost nail which, when the nozzle 40 is moved laterally by the swinging member 15, as above described, drops into the groove 9, in advance of the still elevated driver in position to be driven upon the next descent of the latter.

We claim:

1. In a shoe nailing machine the combination with a circular, two-part hopper composed of two similar cups, and a shaft on which said cups are fixed face to face with their edges separated a distance substantially equal to the thickness of a nail to be operated upon, of a slotted race-way below said hopper, a bevel gear on said shaft, a second bevel gear arranged to mesh with said first named gear, and a rock shaft on which said last named gear is mounted.

2. In a shoe nailing machine the combination with a swinging head composed of two independently mounted members, a common pivot on which said members are mounted, an awl bar and driver bar respectively reciprocally mounted in said members, and a link connecting and fixing the relative positions of said members, of a hub rotatably mounted in one of said members, a pin eccentrically mounted on said hub upon which pin said link is pivoted, an arm rigidly connected to said hub, a clamp screw carried by the outer end of said arm, a lever having a slotted end in which said clamp screw is adjustably carried, and means for oscillating said lever.

3. In a shoe nailing machine the combination with a laterally oscillating head, and a tack nozzle pivotally mounted on the lower end of said head, of a work rest pivotally mounted for movement in a vertical plane and provided with a groove adapted to receive the lower end of said nozzle, an adjustable edge guide carried by said work rest, and a spring for normally elevating said work rest.

4. In a shoe nailing machine the combination with a laterally movable tack nozzle having a plane rear face provided with a tack receiving groove, and means for laterally reciprocating said nozzle, of a race way having its end located opposite said rear face of said nozzle, a separator plate arranged to reciprocate across the lower end of said race way, a lever yieldingly connected to said separator plate, and means for oscillating said lever.

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

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ARTHUR JAMES GIMSON.
SYDNEY ANSELL GIMSON.

Witnesses:
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