Aug. 20, 1935. H. LANE ET AL 2,011,683

FASTENING INSERTING MACHINE

Filed Feb. 13, 1934

Fig. 1.

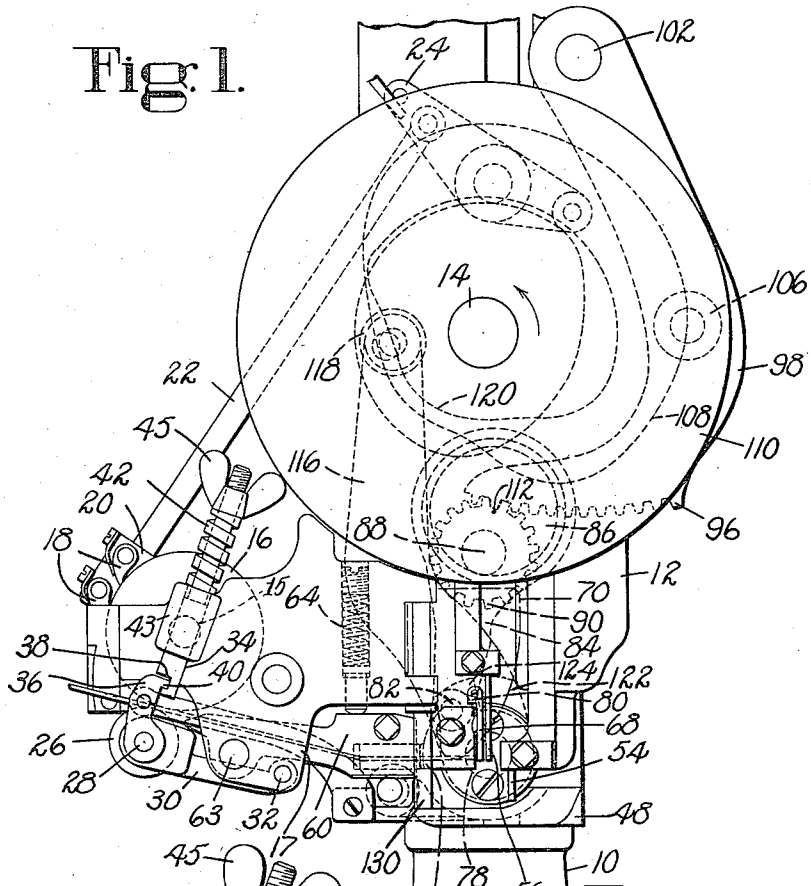

Fig. 2.

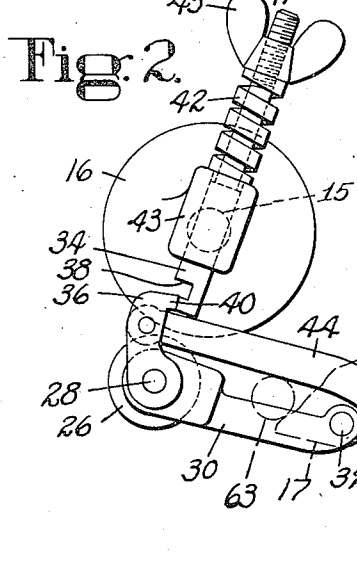

Fig. 4.

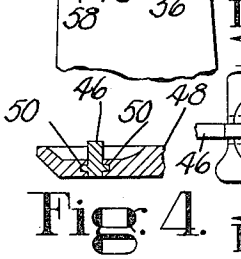

Fig. 3.

INVENTORS—
Harold Lane
George W. Gibson
By their Attorney
Harlow M. Davis

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FASTENING INSERTING MACHINE

Harold Lane and George William Gibson, Leicester, England, assignors to United Shoe Machinery Corporation, Paterson, N. J., a corporation of New Jersey

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10 Claims. (Cl. 1—29)

This invention relates to fastening forming and inserting machines and is illustrated herein as embodied in a machine for severing and inserting wire slugs in the bottoms of boots and shoes of the type disclosed in United States Letters Patent No. 786,190, granted March 28, 1905, on an application filed in the name of Louis A. Casgrain.

Machines of the type referred to above have been successfully used for many years. In actual use, however, it was found that fastenings under some conditions might not be fully expelled from the severing and transferring die which cuts off the fastenings and transfers them to driving position or the driver might break, with the result that the fastenings or broken driver might project beyond the end of the die. Under such conditions parts of the machine might be broken or injured during return movement of the die to fastening receiving position. Accordingly, by an invention of W. T. B. Roberts disclosed in United States Letters Patent No. 1,651,469, granted Dec. 6, 1927, provision was made for stopping the feed of the wire if an improperly inserted fastening or a broken driver projected beyond the end of the fastening severing and transferring die during movement of the die to fastening receiving position.

The present invention provides a still further improved organization of the type referred to. In accordance with the present invention as herein illustrated there is provided in the mechanism which feeds wire to a fastening severing and transferring member a cooperating member constructed and arranged to be unfailingly detached, thereby interrupting the feed whenever even slight resistance to the return movement of the fastening severing and transferring member is encountered. As illustrated, the machine is provided with a feed wheel and a presser roll arranged to be held against the feed wheel by spring pressure. Pressure of the spring is transmitted to the presser roll through an arm and a rod which are held together by a hook connection arranged to be disengaged when a broken driver or projecting slug strikes a sliding block which is connected to the arm. When the arm and rod are disengaged the presser roll drops away from the feed wheel and remains in that position until the arm and rod are again connected manually.

These and other features of the invention will appear more fully from the following detailed description when read in connection with the accompanying drawing and will be pointed out in the appended claims.

In the drawing,

Fig. 1 is a view in front elevation of a fastening inserting machine embodying the present invention;

Fig. 2 is a view in front elevation on a larger scale of the wire feeding and wire severing mechanism;

Fig. 3 is a plan view on an enlarged scale of the presser plate; and

Fig. 4 is a sectional view taken along the line IV—IV of Fig. 3.

The illustrated machine is provided with a head 12 mounted on a column 10. A shaft 14 is mounted in suitable bearings in the head of the machine and carries cams which are arranged to actuate the operating instrumentalities of the machine. Wire feeding mechanism is situated at the left-hand side of the machine as viewed from the front. The wire passes from a suitable source of supply to a wire feed wheel 16 which is rotatably mounted on a shaft 15 in a bracket 17. The peripheral face of the feed wheel 16 is provided with ratchet teeth engaged by pawls 18 carried by an arm 20 which is oscillated by connections including a link 22 and a cam member 24 to rotate the feed wheel 16 in the manner disclosed in the above-mentioned Letters Patent No. 1,651,469.

The wire is held against the feed wheel 16 by a presser roll 26 which is rotatably mounted by a pin 28 on an arm 30 pivoted at 32 to the bracket 17. The roll 26 is held against the feed wheel 16 by a rod formed in two parts 34, 36. The upper part 34 of the rod, as viewed in Figs. 1 and 2, is provided with a notch or recess 38 which, in the normal operation of the machine, receives a hook 40 formed on the upper end of the lower part 36. The lower part 36 is in the form of a short arm loosely pivoted on the front end of the pin 28 on which the presser roll 26 is mounted. The short lower arm 36 extends upwardly from its pivot close to the left-hand side of the rod 34 and has the hook 40 formed on its upper end. In the normal operation of the machine a spring 42 surrounding the upper end of the rod 34 acts through the two parts 34, 36 of the rod which are connected together by the hook 40 on the lower part 36 and the notch 38 in the upper part 34 to hold the presser roll 26 against the wire and the wire against the wire feed roll 16. It is to be noted that the rod 34 is slidably mounted in a boss 43 formed in the bracket 17. The lower end of the spring 42 bears against the boss 43 and the upper end of the spring 42 bears against a wing nut 45 threaded to the upper end of the rod 34. The tension of the spring 42 may be varied by turning the wing nut 45. If the short arm 36 is swung

in a counterclockwise direction, as viewed from the front of the machine, the hook 40 on the arm 36 is disengaged from the recess 38 in the upper part 34 of the rod and the presser roll 26 can then drop away from the wire feed wheel 16, thus releasing pressure on the wire to stop the feed of the wire. In order to move the short lower arm 36 in a counterclockwise direction, there is pivotally connected to the short arm 36 at its upper rear side a bar 44 which extends to the right and has a block 46 secured to its right-hand end.

The block 46 is slidably mounted in horizontal guide-ways 50 extending from left to right of the machine formed in a presser plate 48 secured to the head of the machine. The work piece to be operated upon is pressed upwardly against the lower side of said plate 48. The guideways 50 are formed in each wall of an open-ended slot 52 formed in the plate 48 through which the awl 54 and the driver 56 pass in their work feeding and slug driving operations. The right-hand end of the block 46 is located just to the left of the path of movement of the driver and the lower face of the block is level with the lower surface of the plate 48. Pivotal connection between the bar 44 and the short lower arm 36 is such as to allow the bar 44 to move horizontally while the arm 36 swings about its pivot.

In the event that a slug or broken end of a driver projects beyond the outer end of a rotatable shearing and transferring die 58 when the latter is rotated in a clockwise direction from a vertical slug driving position to a horizontal wire receiving position, the projecting slug or driver will engage the right-hand end of the block 46 and will move the bar 44 to the left. The hook 40 will be swung out of engagement with the notch 38 formed in the upper part 34 of the rod and allow the presser roll 26 to swing downwardly away from the wire feeding roll 16 into the position shown in Fig. 2. The feeding of the wire is thus stopped during subsequent cycles of the machine until the slug or broken driver has been removed and the hook 40 on the upper end of the short arm 36 has been replaced into the notch 38 in the upper part 34 of the rod.

The machine is also provided with a stationary shearing die 62 which co-operates with the rotatable shearing die 58 to sever the wire. The stationary shearing die 62 is mounted in an arm 60 which is pivotally secured to the bracket 17 by a horizontal shaft 63. In order to prevent damage to or breaking of the shearing and transferring die 58 by the engagement of a slug or broken driver projecting from that die with the stationary die 62 in the arm 60 the arm 60 is arranged for upward movement. The arm 60 is normally held in its lower position by the pressure of a spring 64 slidably mounted in the bracket 17.

The block 46 connected to the bar 44 is provided with an arcuate face 66 which is substantially concentric with the axis about which the shearing die 58 rotates when being moved from its wire receiving position to a position when a slug is being inserted into the work. The arcuate face 66 extends from a position just beneath the arm 60 supporting the normally stationary shearing die 62 to the right-hand end of the block 46 to a position located just to the left of the path of movement of the driver 56. The radius of the arcuate face 66 of the block 46 is slightly greater than the radius of the outer end of the shearing and transferring die 58 is being rotated in a die 58. When the shearing counter-clockwise direction and carrying a slug from the wire receiving position of the die to its slug driving position the arcuate face 66 prevents the slug from being thrown out of the shearing and transferring die 58. When the die 58 reaches its slug driving position the slug can drop on to the surface of the work piece into which it is to be driven.

In the illustrated embodiment of the invention there is provided a small plate 68 as shown in Fig. 1, which is secured to a cover 70, indicated in dot and dash lines in Fig. 1. The purpose of the plate 68 is to prevent a slug from being thrown out of or partly out of the right-hand end of the die 58 as a result of the shearing action and thereby interfering with the action of the driver. The plate 68 is positioned when the cover is closed just to the right of the end of the shearing and transferring die 58 when the die 58 is in its wire receiving position, as shown in Fig. 1, and prevents a cut off slug from passing through the slug receiving opening in the die 58 owing to the shearing action of the dies on the wire. The presence of the block 46 in the open end of the slot 52 in the presser plate 48 against which the work is held considerably reduces the length of the slot 52. The right-hand end of the block 46 is normally close to the path of movement of the driver and the slot is only just long enough to permit the awl 54 to enter and feed the work when the awl actuating mechanism is adjusted to give it its maximum feeding movement. The slot is, in this way, as small as possible and objectionable marking of the surface of the work into which the slugs are driven by the pressure of this surface against the under side of the plate is avoided or at least considerably reduced.

It may be well at this point, for a more clear understanding of the invention, to describe briefly the mechanism for rotating the fastening shearing and transferring die 58. The various parts of this mechanism will not be described in detail since they are clearly and fully described in the above-mentioned Letters Patent No. 1,651,469 to which reference may be had for a more complete disclosure of the construction and operation of these parts. The shearing die 58 is mounted on a shaft 78, shown in dotted lines in Figs. 1 and 2, to which is secured an arm 80. The arm 60 is pivotally connected at 82 to the lower end of a link 84, the upper end of which encircles an eccentric 86 on a horizontal shaft 88 rotatably mounted in bearings on the frame above and parallel to the shaft 78. Fixed on the shaft 88 at each side of the eccentric 86 are two pinions 90 which mesh with gear segments 96 formed on a cam lever 98 pivoted at 102 to the frame. The cam lever 98 has a cam roll 106 which enters a cam groove 108 formed in a cam 110 fixed on the main shaft 14 of the machine. By this mechanism the shaft 78 is moved through 90° to shear the wire and carry the severed slug to driving position and, since it is important that the die shall be accurately located both in its horizontal position in which it receives the wire and in its vertical position in which the driver passes through the passage in the die to drive the slug, the mechanism is so arranged that the center 112 of the eccentric 86, the axis of the shaft 88 on which it is fixed, and the pivotal point 82 on the lower end of the eccentric link 84 are substantially in line at each limiting position of the die. By this means any slackness between the teeth of the segments and the pinions has very little, if any, effect upon the position of the die.

To relieve the teeth of the segments and gears

of strain during the shearing of the wire a cam lever 116 is rotatably mounted on the die carrying shaft 78 and this cam lever has a roll 118 which enters a cam groove 120 formed on a cam fixed on the main shaft 14 of the machine. The cam lever 116 has formed on it a lug 122 which engages a lug 124 formed on the arm 80 which, as stated, is fixed on the shaft 78. The cam tracks 108, 120 are so formed that during the shearing the die shaft 78 is driven by both cams but the strain due to the shearing is taken by the second cam lever 116 through the engaging faces of the lugs 122, 124 and after the shearing of the wire these faces are disengaged and the shaft 78 is moved to the position in which the slug is driven by the first cam 110 through the segments 96 and the pinions 94. The cam roll 118 on the cam lever 116 is mounted on an eccentric stud fixed on the lever so that the roll may be adjusted properly to position the face of the lug 122 on the lever in relation to the face of the lug 124 on the arm 80.

In order to enable the operator to hold and position small work pieces such as a top lift on a high heel having a very small tread face, the plate 48 against which the work is pressed is cut away and rounded at its front left-hand corner in front of the open ended slot and plate and, to prevent the forward end of the plate from bending upwardly under the pressure of the work against it, its right-hand side is thickened somewhat and its left-hand corner is supported against upward pressure by a rod 130 which is conveniently an extension of the pivot of the cover 70. The operator is thus enabled conveniently to pass the fingers of his left hand beneath the plate 48 and hold, for example, a small top lift on its heel to which it is to be fastened by slugs driven through it.

The operation of the mechanism for preventing feeding movement of the wire will now be briefly described. When the fastening receiving member or die 58 is in the position shown in Fig. 2 and a broken driver or improperly inserted slug projects from the lower end thereof the die 58 is in a position to be moved in a clockwise direction to the position shown in Fig. 1. When the broken driver or improperly inserted slug strikes the block 46 the block is moved to the left. The short lower arm 36, which is connected to the block 46, by the bar 44, is swung in a counterclockwise direction to move the hook 40 on the arm 36 out of engagement with the recess 38 in the upper part 34 of the rod. The presser roll 26 is then permitted to swing downwardly away from the feed wheel 16. Pressure on the wire against the feed wheel is released and further feed of the wire is prevented until the hook 40 on the arm 36 is again engaged with the recess or notch 38 in the upper part 34 of the rod. After the broken driver or improperly inserted slug is removed from the passage in the die 58 the hook 40 is manually replaced in the recess 38 by the operator. The parts of the machine are then in proper position and operation of the machine may be continued.

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

1. A fastening inserting machine having, in combination, a fastening receiving member, a feed wheel, a member arranged normally to cooperate with said feed wheel to feed fastenings to said fastening receiving member, a fastening inserting tool, and detachable means constructed and arranged to maintain said second-mentioned member normally in operative relation to said feed wheel, said means being constructed and arranged, upon failure of said tool properly to insert a fastening, to be rendered inoperative to disconnect said second-mentioned member.

2. A fastening inserting machine having, in combination, a feed wheel, a roll arranged normally to co-operate with said feed wheel to feed fastening material, means arranged normally to maintain said roll in operative relation to said feed wheel, a fastening receiving member arranged to sever fastenings from said fastening material and to transfer the severed fastenings to driving position, a fastening inserting driver, and means normally connected to said first-mentioned means and constructed and arranged, upon failure of the fastening inserting driver properly to insert a fastening, to disconnect said first-mentioned means, thereby preventing feeding of the fastening material.

3. A fastening inserting machine having, in combination, a feed wheel, a roll arranged normally to co-operate with said feed wheel to feed a strip of fastening material, means normally connected to said roll and arranged to maintain said roll in operative relation to said feed wheel, a fastening receiving member arranged to sever fastenings from said fastening material and to transfer the severed fastenings to driving position, a driver, and means arranged to be engaged by a broken driver or slug projecting from said fastening receiving means during return movement of said means to disconnect the first-mentioned means from the roll, thereby preventing feeding of the fastening material by maintaining the roll in inoperative relation to the feed wheel.

4. A fastening inserting machine having, in combination, a feed wheel, a presser roll arranged normally to cooperate with said feed wheel to feed a strip of fastening material, a bracket in which said wheel is mounted, spring means normally connecting said presser roll and said bracket for maintaining the roll in operative relation to the feed wheel, a fastening receiving member, a driver, and means connected to said spring means constructed and arranged, upon failure of the driver properly to insert a fastening, to disconnect the spring means, thereby permitting the presser roll to move into inoperative relation to the feed wheel.

5. A fastening inserting machine having, in combination, a feed wheel, a presser roll arranged normally to cooperate with said feed wheel to feed a strip of fastening material, a bracket in which said feed wheel is mounted, a two-part rod normally connecting said presser roll to said bracket, a spring surrounding said rod and arranged normally to maintain said presser roll in operative relation to said feed wheel, a fastening receiving member, and a driver, said two-part rod being arranged, upon failure of the driver properly to insert a fastening, to be disconnected, thereby permitting the presser roll to move into inoperative relation to the feed wheel.

6. A fastening inserting machine having, in combination, a feed wheel, a presser roll arranged normally to cooperate with said feed wheel to feed a strip of fastening material, a bracket on which said feed wheel is mounted, a rod slidably connected to said bracket, an arm connected to said roll having a portion arranged to engage a recess in said rod, a spring surround-

ing said rod arranged to maintain the presser roll in operative relation to the feed wheel, a fastening receiving member, a driver, and means connected to said arm and arranged, upon failure of the driver properly to insert a fastening, to move said arm out of engagement with the recess in said rod, thereby rendering said presser roll inoperative and preventing feeding of the fastening material.

7. A fastening inserting machine having, in combination, a feed wheel, a presser roll arranged normally to cooperate with said feed wheel to feed a strip of fastening material, a bracket on which said feed wheel is mounted, a rod slidably connected to said bracket, an arm connected to said roll having a portion arranged to engage said rod, a spring surrounding said rod arranged to maintain the presser roll in operative relation to the feed wheel, a driver, and means connected to said arm arranged, upon failure of the driver properly to insert a fastening, to move said arm out of engagement with said rod, thereby moving said presser roll into inoperative position and preventing feeding movement of the fastening material.

8. A fastening inserting machine having, in combination, a feed wheel, a presser roll arranged normally to cooperate with said feed wheel to feed a strip of fastening material, a bracket on which said feed wheel is mounted, a rod slidably mounted in said bracket, an arm connected to said roll, a hook formed on said arm for engaging a recess in said rod, a spring surrounding said rod arranged to operate through the rod and through the arm to maintain the presser roll in operative relation to the feed wheel, a driver, a fastening receiving member arranged to sever fastenings from the strip of fastening material and transfer the fastenings to driving position, and a member connected to said arm and arranged to operate said arm to move the hook on the arm out of engagement with the recess in said rod to permit the presser roll to be moved to an inoperative position, thereby preventing feeding of the fastening material in the event that a broken driver projects beyond the end of the fastening receiving member during its movement to fastening severing position.

9. A fastening inserting machine having, in combination, a feed wheel, a bracket on which said feed wheel is mounted, a member pivotally secured to said bracket, a presser roll mounted on said member, a rod slidably mounted in said bracket, an arm pivotally connected to said member, a hook on said arm arranged to engage a recess in said rod, a spring surrounding said rod and arranged when the arm is connected to the rod to maintain the presser roll in operative relation to the feed wheel to feed a strip of fastening material, a driver, a fastening receiving member arranged to sever fastenings from the strip of fastening material and to transfer the fastenings to driving position, and a member connected to said arm and arranged to break the connection between said arm and said rod to disconnect the spring from the presser roll, thereby permitting the presser roll to move to an inoperative position relatively to the feed wheel in the event that the driver breaks and projects beyond the end of the fastening receiving member during its movement to fastening severing position.

10. A fastening inserting machine having, in combination, a feed wheel, a bracket on which said feed wheel is mounted, a member pivotally secured to said bracket, a presser roll mounted on said member, a rod slidably mounted in said bracket, an arm pivotally connected to said member, a hook on said arm arranged to engage a recess in said rod, a spring surrounding said rod and arranged when the arm is connected to the rod to maintain the presser roll in operative relation to the feed wheel to feed a strip of fastening material, a driver, a fastening receiving member arranged to sever fastenings from the strip of fastening material and to transfer the fastenings to driving position, a presser plate having a slot therein, a member slidably mounted in said slot arranged to be moved when a broken driver or an improperly inserted fastening projects from the end of the fastening receiving member during its movement to fastening severing position, and means connecting said slidably mounted member to said arm arranged to impart movement of said member to said arm to disengage the hook on said arm from the recess in the rod, thereby permitting the presser roll to be moved into inoperative relation to the feed wheel.

HAROLD LANE.
GEORGE WILLIAM GIBSON.

CERTIFICATE OF CORRECTION.

Patent No. 2,011,683.

August 20, 1935.

HAROLD LANE, ET AL.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, first column, lines 73 and 74, for the words "and transferring die 58 is being rotated in a die 58. When the shearing" read die 58. When the shearing and transferring die 58 is being rotated in a; and page 3, first column, line 55, for "36" read 26; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 5th day of November, A. D. 1935.

(Seal)

Leslie Frazer

Acting Commissioner of Patents.