E. T. FREEMAN.

MACHINE FOR INSERTING METALLIC FASTENINGS.

APPLICATION FILED JUNE 14, 1902.

970,908.

Patented Sept. 20, 1910.

3 SHEETS—SHEET 1.

Fig. 1.

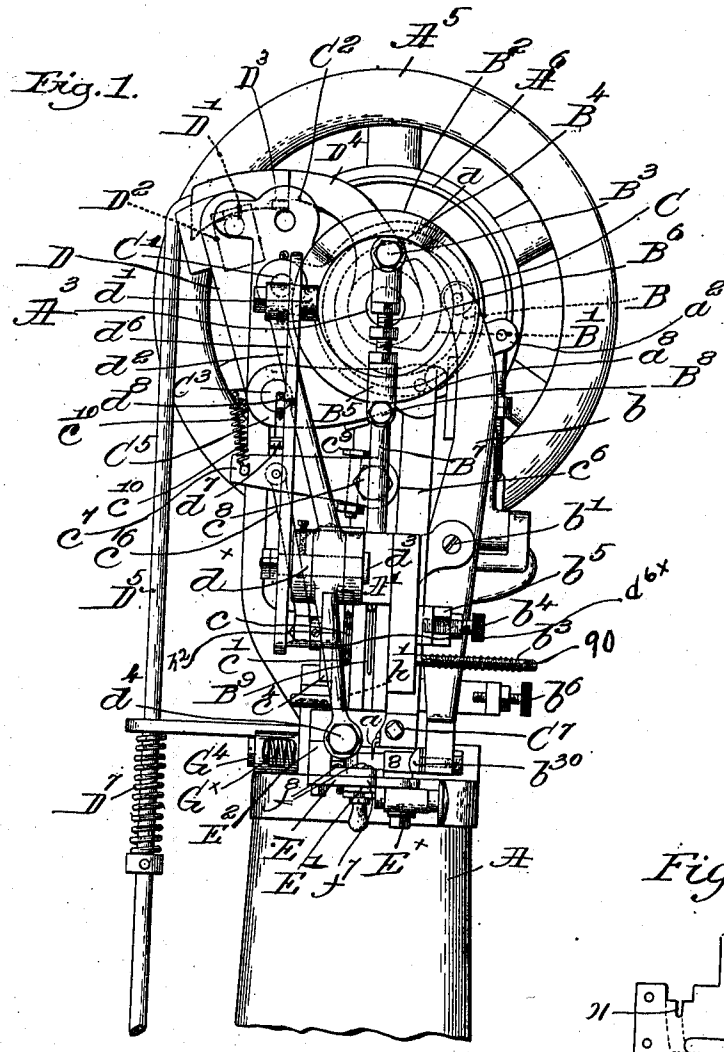


Fig. 2.

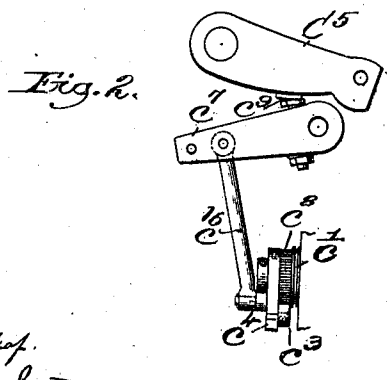


Fig. 2a.

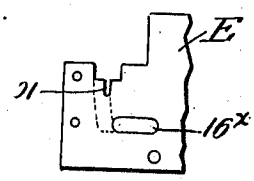
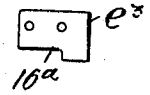


Fig. 2b.



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3 SHEETS—SHEET 2.

Fig. 3.

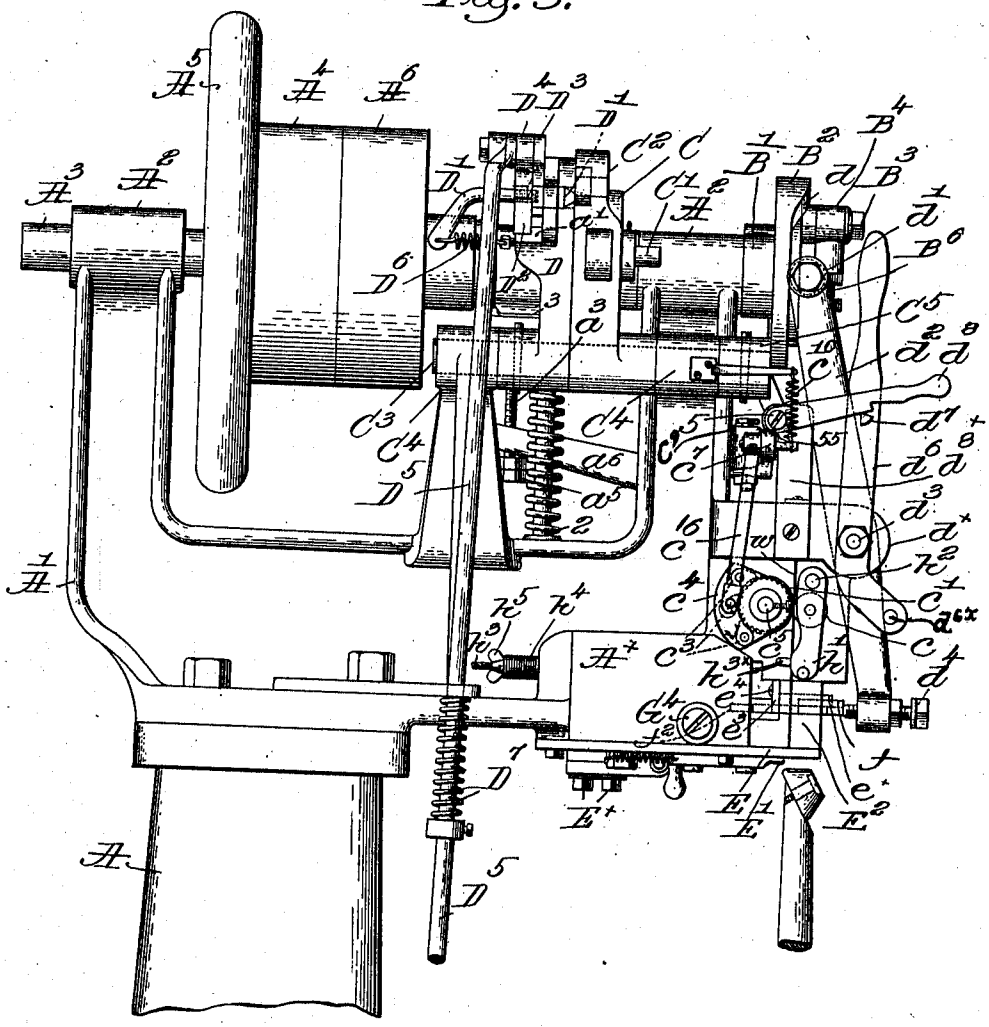


Fig. 3a

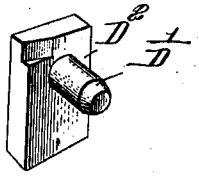
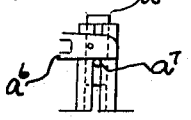


Fig. 3b



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3 SHEETS—SHEET 3.

Fig. 4.

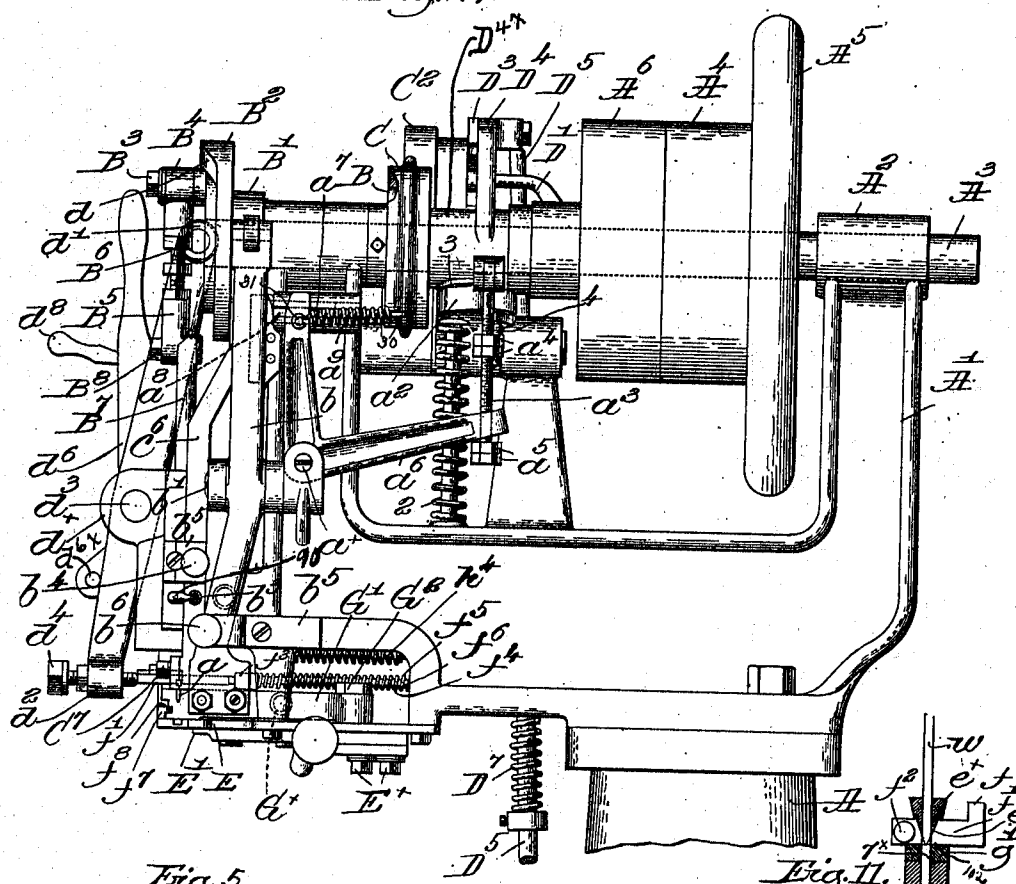


Fig. 11.

Fig. 5

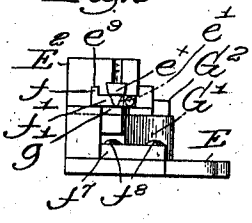


Fig. 6.

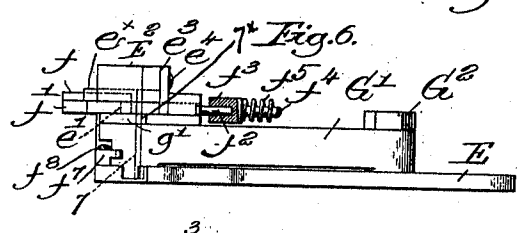


Fig. 7.

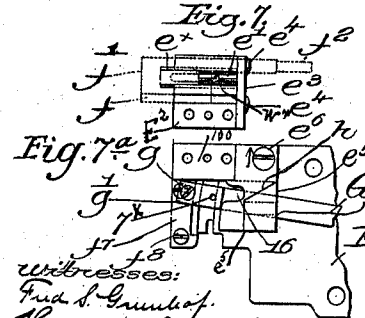


Fig. 7a.

Fig. 8.

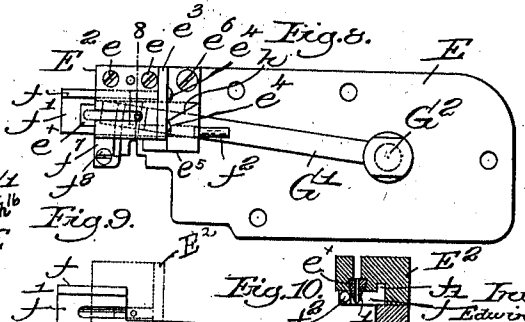


Fig. 12.

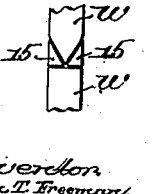
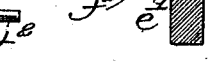


Fig. 9.

Fig. 10.



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UNITED STATES PATENT OFFICE.

EDWIN T. FREEMAN, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY COMPANY, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

MACHINE FOR INSERTING METALLIC FASTENINGS.

970,908. Specification of Letters Patent. Patented Sept. 20, 1910.

Application filed June 14, 1902. Serial No. 111,622.

To all whom it may concern:

Be it known that I, EDWIN T. FREEMAN, a subject of the King of Great Britain, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Machines for Inserting Metallic Fastenings, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to the type of machine for inserting metallic fastenings shown in Reissued Letters Patent of the United States No. 11,962, granted January 21st, 1902, in which machine provision is made for suspending the operation of certain parts of the machine while the driving shaft continues in operation.

The machine which is herein shown as embodying my present invention is arranged to form slugs or fastenings from continuous wire and drive them.

One important feature of the invention consists in improvements whereby movement of the wire feeding mechanism in one direction is effected by the awl actuating mechanism so that the operation of the wire feeding mechanism is stopped and the feeding of the wire is suspended by the stopping of the awl-actuating mechanism.

Another feature of the invention consists in novel mechanism for cutting the wire.

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

Figure 1 in front elevation represents the head of a nailing machine embodying my invention in one of the best forms now known to me; Fig. 2 is a detail of the means for actuating the wire feeding mechanism; Fig. 2^a shows an underside view of the front end of the foot plate; Fig. 2^b a detail of the plate e^3 detached; Fig. 3 is a left hand side elevation of the parts shown in Fig. 1; Fig. 3^a shows the block and clutch pin detached; Fig. 3^b is a detail showing stud a^8 with its pin a^7 and the guide in which the stud may be moved; Fig. 4 is a right hand side elevation of the parts shown in Fig. 1; Figs. 5 and 6 are respectively front and side elevations of the foot plate and wire cutting and fastening carrying means; Fig. 7 is an underside view of the block E^2 and wire cutting means detached from Fig. 6, the movable cutter member being shown by dotted lines; Fig. 7^a is a plan view of the nose plate and its parts, Fig. 6, after the removal of the block E^2; Fig. 8 is a plan view of the parts shown in Fig. 6; Fig. 9 is a detail of the wire cutting means; Fig. 10 is a section in the line 8, Fig. 8; Fig. 11 is an enlarged vertical section through the carrier, showing a fastening therein and the cutting means acting to sever the wire to form said fastening, and Fig. 12 is a much enlarged detail of the wire and wire cutting mechanism showing how the wire is cut to remove portions therefrom in the production of the points and heads of fastenings.

The driving shaft A^3 is supported in bearings erected on the head A′, sustained on a column A, and carries a loose pulley A^6 and a fast pulley A^4 to which power can be transmitted in any well known manner. The driver bar B^7 carries at its lower end a driver B^9 and said bar is connected at its upper end by a link B^5, B^6, to a crank pin B^3 extending from the front side of a cam B^2 mounted on the driving shaft A^3, whereby the driver bar is reciprocated in its bearings in the frame or head A′. The awl a is connected to an awl bar c^6 operated as will be described. A spring b^3 connected at one end with the awl bar and secured at its other end to a stud 90, moves the awl backwardly over the stock after the stock has been fed.

When the awl is in the stock and the stock is to be fed, a projection b^{30} at the lower end of a lever b, having its fulcrum at b' on the head A′, and having at its upper end a cam roll, which is acted upon by the periphery of the cam B′, see dotted lines Fig. 1, engages the awl bar and moves it toward the driver. After the awl has fed the stock it is raised and immediately thereafter the lower end of the lever b is moved outwardly or to the right, viewing Fig. 1, by a spring G^x acting through carrier G′, to be described, and at the same time the awl bar c^6 is moved to the right by the spring b^3.

The awl bar is jointed at its upper end to a lever C^5 fast on a shaft C^3 having fixed to it a lever D. Close to the side of the lever D the shaft C^3 has mounted loosely upon it a lever C^2 that is moved constantly while the driving shaft A^3 is in operation by an eccentric strap C connected with said

lever and actuated by a cam or eccentric B on the shaft A^3. The lever D carries a clutch block D^2 having a clutch pin D′, and the constantly operated lever C^2 has a clutch hole, shown by dotted lines Fig. 3, and a spring D^6 operates, when permitted, to force the clutch pin toward the lever C^2, and into the clutch hole in the lever C^2. When the clutch pin is in engagement with the lever C^2 a positive connection is established between the driving shaft and the awl whereby the awl is given a positive movement in both directions, and the awl is thus operated by the driving shaft so long as the clutch pin continues in engagement with the lever C^2.

A lever D^4 having a wedge-shaped cam portion D^3 and with its hub $D^{4\times}$ mounted loosely on the shaft A^3 is connected by a rod D^5 with a starting treadle, not shown, pivoted at the floor, so that when said treadle is released by the operator the outer end of the lever D^4 is immediately lowered by the action of a spring D^7, so placing the wedge-shaped cam D^3 that as the upper end of the lever D is moved outwardly the wedge-shaped end of the cam engaging the block D^2 of the clutch pin moves said pin against the tension of the spring D^6 and withdraws it from the lever C^2, thus stopping the movement of the lever D and the shaft C^3, leaving the awl bar and awl in elevated position. Spring 2, shown in Figs. 3 and 4, surrounds a rod having at its upper end a head, see Fig. 4. This spring rests at its lower end on the frame of the machine and the head of the rod acted upon by the spring bears against the backwardly extended arm a^2 of the lever D. The function of this spring is to hold the awl bar and awl in elevated position when fastenings are not being inserted. The upward movement of arm a^2 is limited by stop screw 4 carried by the arm A^2, which engages the boss 3 forming part of hub $D^{4\times}$, the adjustment of said stop insuring the correct alinement of the clutch hole in lever C^2 with the pin D′.

The pin D′ constitutes a clutch to couple the constantly moving loose lever C^2 with the lever D to move the shaft C^3 and operate the awl, or to uncouple the levers to leave the awl bar and awl at rest in inoperative position.

The backwardly extended arm a^2 of the lever D is provided with a rod a^3 having adjustable nuts a^4 and a^5. The nut a^5 when said rod is lifted in the movement of the lever D engages and turns the lever a^6 into position to permit the spring a^9 to move a stud a^8 against the back side of lever b.

In the normal operation of the machine, when fastenings are being inserted, the stud a^8 does not get between lever b and its cam B′, for, before the upper end of lever b is moved outwardly sufficiently to allow stud a^8 to move between it and the cam, the stud is withdrawn. The nut a^4 on the rod a^3 engages lever a^6, turning its upper end to the right and engaging the pin a^7, extending from stud a^8, and moves it backwardly away from lever b. When, however, the insertion of fastenings is to be suspended, the lever D is stopped in position to leave the rod a^3 elevated, so that stud a^8 is allowed to remain in its forward position and when, in the rotation of cam B′, the upper end of lever b is moved to its extreme outward position, the stud a^8 is drawn by spring a^9 past the edge of lever b and holds that lever in its extreme outward position until the insertion of fastenings is to be resumed. The spring a^9 is shown as connected at one end with a projection 30 extending from the inner end of the stud a^8. The opposite end of the spring is connected with a stud 31 carried by the lever a^6. When lever D is again connected with the driving shaft and the rod a^3 is first moved downwardly, the nut a^4 will meet and move the lever a^6 and the upper end of that lever will engage the pin a^7 shown in the detached view Fig. 3^b on the stud a^8 and withdraw that stud from between the lever b and the cam B′, restoring that lever to the control of its cam.

The parts so far described, with the exceptions of the link connecting the driver bar with the crank pin B^3, and the addition of the nut a^4 to the rod a^3, are and may be substantially as shown in United States Letters Patent No. 714,572 granted to me November 25, 1902.

A stop b^4, adjustable in a lug b^5 of the head A′, limits the backward stroke of the awl bar, see Fig. 1. A stop b^6 may be used if desired to stop the outward movement of the lower end of the feeding bar b.

The wire to be cut into fastenings comes to the machine from a suitable reel, and is led through a guide in the head and between a pressure roller c, and a feed roller c'. The pressure roller c is mounted upon a lever h' pivoted at h^2 on the head of the machine, which lever has connected with it by link $h^{3\times}$ a rod h^3 extended through a portion $A^\times$ of the head and surrounded by a spring h^4 (see Figs. 3 and 4). The rod has applied to it a thumb screw h^5 by which to adjust the strength of the spring to vary the force with which the pressure roll is held against the feed wheel. The feed roller c' is mounted on a stud c^5, see Fig. 3, and has fixed to it a ratchet wheel that is engaged and moved intermittingly by a series of pawls c^3 pivoted on a pawl carrier c^4 mounted loosely on the stud carrying the feed wheel. The pawl carrier c^4 derives its movement from a link c^{16} connected with a lever c^7 having a hole at one end, see Fig. 2, through which is extended a stud screw c^8, see Fig. 1, by which

the lever is pivoted upon the head of the machine.

The lever c^7 has an adjustable bunter c^9 which is struck at each descent of the awl by the awl actuating arm C^5, said arm causing the outer end of the lever c^7 to be depressed to move the pawl carrier and pawl backward into position to engage and feed the wire. The forward or feeding stroke of the pawl carrier is effected by the spring c^{10}, see Fig. 1, which, when permitted by upward movement of lever C^5, raises arm c^7 and operates pawl carrier c^4 and the pawls carried thereby to turn roller c' and feed the wire. Upward movement of arm c^7 is limited by the offset portion 55 on plate d^{8x}. By adjusting the bunter c^9 in the arm c^7 the length of the backward stroke of the pawl carrier and thereby the length of its forward stroke in feeding the wire may be controlled according to the requirements of the stock.

The cam disk B^2 has a cam portion d which in the rotation of the shaft A^3 meets a roller d' at the upper end of a cutter actuating lever d^2 pivoted on a stud d^3, sustained in an ear d^x forming part of the head of the machine. Said lever has at its lower end a cutter adjusting device shown as a screw d^4 that may be put in position to impart just the proper throw to the wire cutter f' to be described. The stud d^3 also sustains a hand lever d^6 having a projection d^7 which when the hand lever is turned toward the front of the machine, or to the right, viewing Fig. 3, may be engaged by a detent d^8 pivoted on a stud 5 on plate d^{8x} secured to the head of the machine. When the detent engages projection d^7 of the lever d^6 a pin d^{6x} at the lower end of said lever acts against the lower end of the cutter actuating lever so that said lever holds the cutting mechanism in its inoperative position and removes the roller d' of the cutting lever out of the path of movement of the cam d, this happening at the time when the action of the feeding mechanism is suspended.

The head of the machine has secured to it, in usual manner by screws E^x, a foot plate E having an attached edge gage E′ such for instance as fully shown and described in my said patents.

The foot plate E has connected with it by screws e a block E^2 having at one edge, see Figs. 5 and 10, a dove-tailed groove that receives the shank e^x, see Fig. 7, of a stationary wire guide and cutter e', in which is a hole through which the wire is led.

The wire guide and cutter e' is driven snugly into the dove-tailed groove of the block E^2, which is split for a portion of its length, as shown in Fig. 10, to enable it to clamp the guide in position. The rear end of said guide meets a plate e^3 connected with the block E^2 by screws e^4, see Fig. 7. The block E^2 has a groove e^9 that receives the flange f of the movable cutter f', having a finger f^2 extended backwardly through a raised portion shown as having an inclined edge h, Fig. 7^a, of a plate e^5 secured to block E^2 by a screw e^6. The finger enters loosely a block f^3, see Fig. 6, at the end of a rod f^4 surrounded by a spring f^5, the opposite end of which spring abuts against a shoulder f^6 forming part of the head of the machine. Said spring acts normally to keep the movable member of the cutter f' out in its inoperative position so that the wire may be fed through the hole in the stationary cutter member e' in position to enter the hole 7 in the wire carrier to be described. The movement of the cutter f' toward the front of the machine or to the left, viewing Figs. 4 and 7, is limited by screw d^4.

When the wire is fed the portion which is to form the slug or fastening passes into a hole 7 in a wire carrier G′ pivoted at G^2 on the nose plate E. The wire carrier, see Fig. 7^a, has connected with it by a screw g a steel block g' having a hole 7^x, see Fig. 11, said block constituting a cutter member coöperating with the lower edge of cutter f', to form a flat head for the slug. The shape of the acting edges of the movable cutter f' and stationary cutter e' are such, and they so coact with the block g' of the carrier G′, that when the movable cutter actuated by lever d^2, acts against stationary cutter e', it makes two diagonal cuts from the side of the wire toward the center, see Fig. 11, while the bottom of the cutter f', coacting with the block g', cuts the wire completely across, forming a flat head for the slug. In this way scraps 15 of the wire are removed, see Fig. 12, when each fastening is made.

Fig. 11 shows the inner end of the movable cutter, the end that meets the part of the wire extended through the hole of the stationary wire guide and cutter e', exposed, as shown by dotted lines 102, at the outer sides thereof, which removes the scraps 15 in severing the wire and forming the point for the slug. This cutter f moves the scraps 15 ahead of it, and they drop through the opening 16 in the block e^5, see Fig. 7^a, held by screws e^6 on the upwardly extended part 100 of the nose plate E, said figure showing a top view of said block e^5 and part of the nose plate, the block E^2 containing the movable cutter and the plate e^3 connected with said block being omitted. These scraps then drop to the floor through a space 16^x in the nose or foot plate E, see Fig. 2^a, where a part of said plate is shown together with the driver and fastening passage 101. Some scraps in the rapid movement of the cutter may be thrown through the space or notch 16^a, see Fig 2^b, of the plate e^3, and will contact with the inclined edge h of a raised portion h^{16} of the block e^5 through which the shank f^2 of the

movable cutter f is guided, said scraps crossing the plate e^5 in the direction of the arrow Fig. 7^a, and escaping from the machine. The carrier G′ is moved by spring G^x acting upon one side thereof near its outer end, see Fig. 1, adjusted as to its strength by screw G^4, see also Fig. 3, to place a slug or fastening in position under the driver to be driven. The carrier is moved in the opposite direction away from the driver by a toe 8 carried by the lower end of the lever b, shown in Fig. 1 as locked out of operative connection with its cam B′, said figure also showing the carrier G′ locked in position to place the holes 7 and 7^x and the hole w^x of the stationary cutter in line, said parts being locked in the position described when the insertion of fastenings is suspended.

In the operation of the machine the treadle (not shown) is depressed, raising the rod D^5 against the tension of spring D^7, lifting the wedge-shaped cam D^3 out of engagement with the block D^2, permitting spring D^6 to force the clutch pin D′ into the clutch hole in lever C^2, which is continuously operated by the driving shaft. Lever D is thereupon moved with lever C^2 to the right, viewing Fig. 1, causing a downward movement of lever C^5 which forces the awl down into the stock. As lever D moves to the right the lever a^6 is freed and is turned to the right by nut a^4 and its upper arm engages pin a^7, withdrawing the stud a^8 and restoring the lever b to the control of its cam B′. The awl bar is then moved by the lever b to the left, bringing the awl into the path of the driver. While the stock is in this position the awl fully penetrates the stock and then lever C^5 moves upwardly, withdrawing the awl from the stock. In the first part of the upward movement of lever C^5 the arm c^7 is raised by spring c^{10}, thus actuating the wire feeding mechanism to feed the end of the wire through the wire passage w^x in the stationary wire and cutter guide e', into the hole 7^x of the block g' and into hole 7 in wire carrier G′, this movement of arm c^7 being limited by stop 55. Immediately upon the completion of the feeding of the wire, lever d^2 is actuated to move the wire cutter f' to sever the portion of the wire in the carrier G′ and form a point on the portion of the wire remaining in the guide e'. After the fastening is severed thus forming a slug and during the latter part of the upward movement of the awl, the spring G^x moves the carrier G′ to the right to place the fastening then in the hole 7, in line with the driver, and the driver is then actuated to drive the fastening from the carrier through the foot plate E into the stock. The driver is then withdrawn from the carrier and the foregoing operations are repeated so long as it is desired to insert fastenings. When the insertion of fastening is to be suspended, the operator removes his foot from the treadle and spring D^7 lowers the lever D^4, placing the wedge-shaped cam portion D^3 of lever D^4 in position to engage the block D^2 and withdraw the clutch pin D′ from the hole in lever C^2, thus suspending the operation of the awl and, since the wire feeding mechanism is actuated by the mechanism which actuates the awl, also suspending the operation of the wire feeding mechanism. The stopping of the lever D leaves the lever a^6 in such position that when the broad end of lever b is forced to its extreme outward position the stud a^8 is forced by spring a^9 past the edge of lever b and holds it in its extreme outward position, in which position it remains until the insertion of fastenings is resumed.

Having described my invention what I claim as new and desire to secure by Letters Patent is:—

1. In a machine for inserting fastenings, a constantly rotating cam, an awl, independently controllable mechanism operated by said cam for actuating the awl to cause it to form a fastening receiving opening in the work, wire feeding mechanism and means whereby said wire feeding mechanism is moved by the awl actuating mechanism.

2. In a machine for inserting fastenings, wire feeding mechanism, an awl, mechanism for actuating the awl to cause it to form a fastening receiving opening in the work, operating means for said actuating mechanism, means under the control of the operator for interrupting the connection between said awl actuating mechanism and its operating means, and means operated through the awl actuating mechanism to move said wire feeding mechanism whereby the operation of said feeding mechanism is interrupted when the operation of said awl actuating mechanism is interrupted.

3. In a machine for inserting fastenings, the combination with means for inserting fastenings, of an awl, mechanism for operating the awl to cause it to form a fastening receiving opening in the work, wire feeding mechanism, means for actuating one of said last-named two mechanisms, means whereby an operative movement of one of said mechanisms is effected by transmission to it of a movement of an element of the other mechanism, and means for interrupting the actuation of said mechanisms without interrupting the actuation of the means for inserting fastenings.

4. In a machine for inserting fastenings, the combination with fastening inserting mechanism, of an awl, mechanism for operating the awl to cause it to form a fastening receiving opening in the work, wire feeding mechanism comprising a member arranged to engage a member of said awl operating mechanism whereby one of said mechanisms

is actuated through the other, means for actuating one of said last named two mechanisms constructed and arranged to be brought into inoperative relation to said mechanism without interrupting the operation of the fastening inserting mechanism.

5. In a machine for inserting fastenings, the combination with a driving shaft, an awl, a vertically reciprocating awl bar and wire feeding mechanism, of means for suspending the vertical reciprocation of the awl bar and awl while the driving shaft continues in operation, and means whereby the stopping of the vertical reciprocation of the awl bar effects an immediate discontinuance of the operation of the wire feeding mechanism.

6. In a machine for inserting fastenings, a driving shaft, an awl, mechanism for operating the awl to cause it to form a fastening receiving opening in the work, wire feeding mechanism, a spring for moving said feeding mechanism in one direction, connections whereby said feeding mechanism is moved in the other direction by the said awl actuating mechanism, and means arranged to be operated without stopping the driving shaft for suspending the operation of the awl actuating mechanism and thereby suspending the operation of the wire feeding mechanism while the driving shaft continues in operation.

7. In a machine of the class described, a foot-plate, a block fixed to said foot-plate to leave a space between said block and foot-plate, a stationary and a movable cutter for the wire, a spring acting normally to place the movable cutter in its inoperative position, a lever to actuate said movable cutter to cut the wire, a wire carrier pivoted above said foot-plate, and a lever and a spring to move said wire carrier in the space between said block and foot-plate to transfer a fastening into driving position.

8. In a machine of the class described, a stationary and a movable cutter, a spring acting normally to place the movable cutter in its inoperative position, a lever, means for moving said lever to actuate the cutter, and means for bringing said lever into inoperative relation to its actuating means.

9. In a machine for inserting fastenings, a source of power, an awl, fastening feeding means, separate trains of operating mechanisms for effecting vertical reciprocation of said awl and for operating said feeding means arranged to be engaged one by the other, and means for effecting and for interrupting the operating connection between one only of said trains of mechanism and the source of power whereby the interruption of the operation of said mechanism effects an immediate interruption of the operation of the mechanism controlled by it.

10. In a machine for inserting fastenings, an awl-bar having an awl, a lever connected therewith, means to move said lever to actuate said awl-bar and awl, wire-feeding mechanism, and means including a lever lying in the path of said first named lever and moved thereby to actuate said wire-feeding mechanism.

11. In a machine for inserting fastenings, an awl-bar having an awl, actuating mechanism therefor, wire-feeding rolls, a pawl-carrier and pawl, combined with a lever, and a link interposed between the awl-bar-actuating mechanism and said pawl-carrier.

12. In a machine for inserting fastenings, an awl, actuating mechanism therefor, wire-feeding rolls, mechanism including a spring for turning said rolls yieldingly in a direction to feed the wire, said two mechanisms being so positioned with relation to each other that the awl-actuating mechanism operates to restore to initial position, against the resistance of the spring, the mechanism for actuating the rolls.

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

EDWIN T. FREEMAN.

Witnesses:
NELSON W. HOWARD,
JULIA M. POND.