G. GODDU AND F. L. MACKENZIE.

MACHINE FOR INSERTING FASTENINGS.

APPLICATION FILED JAN. 21, 1918.

1,372,685.

Patented Mar. 29, 1921.

2 SHEETS—SHEET 1.

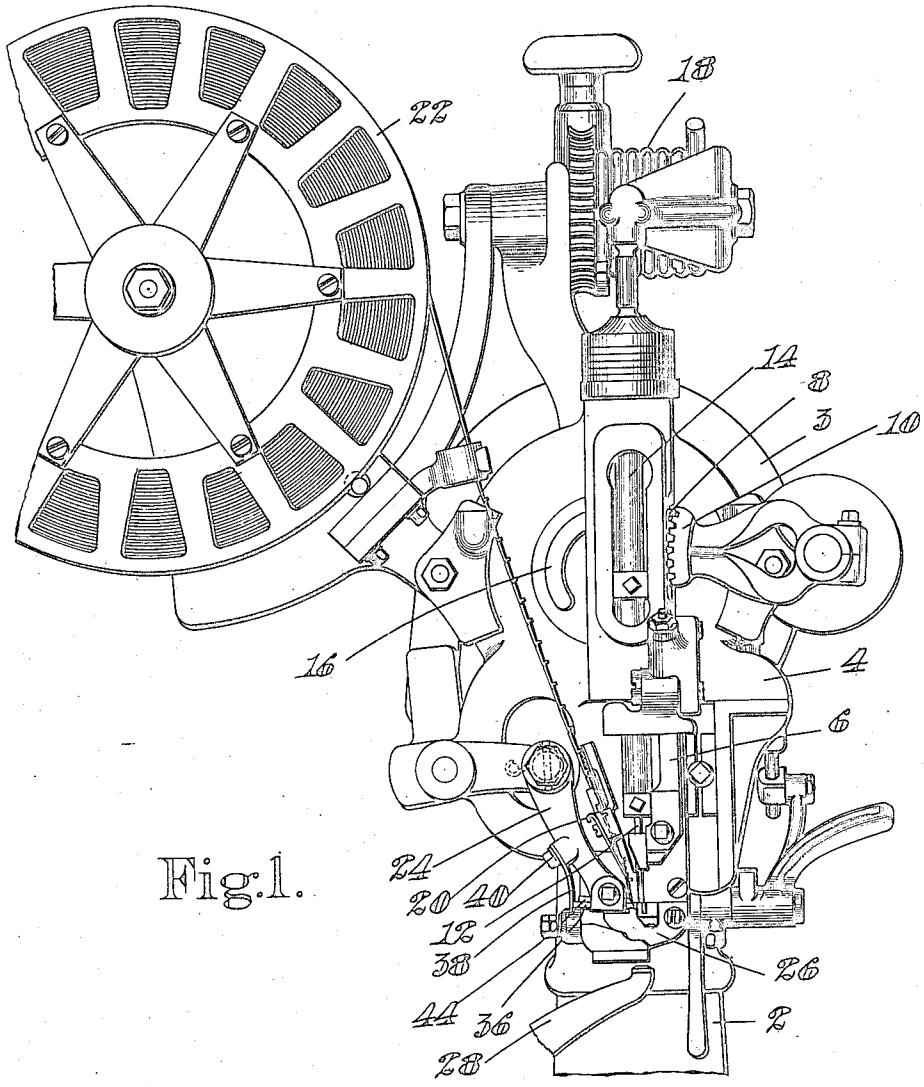


Fig. 1.

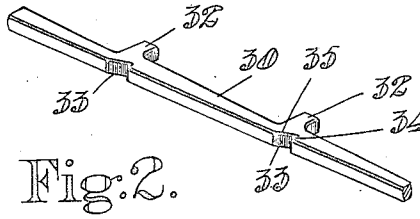


Fig. 2.

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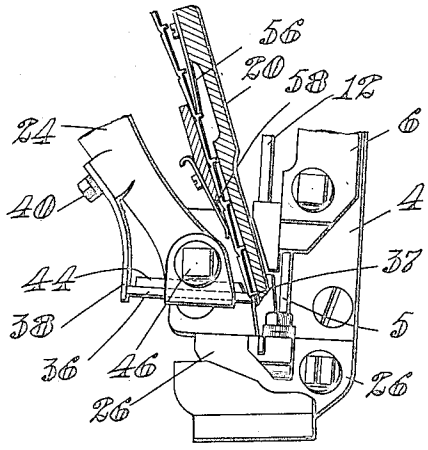


Fig. 3.

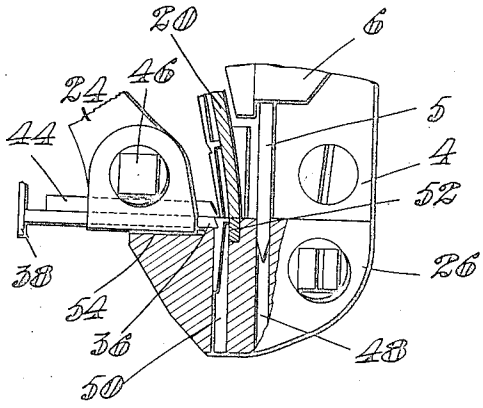


Fig. 4.

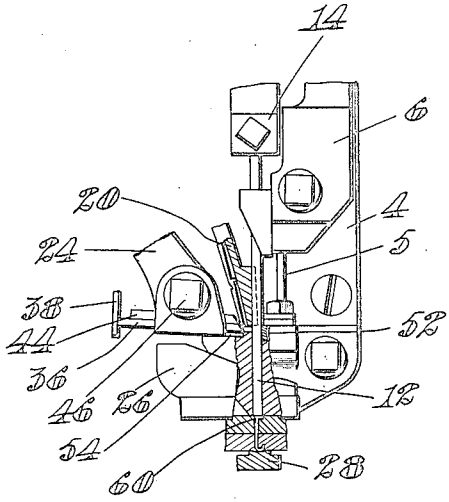


Fig. 5.

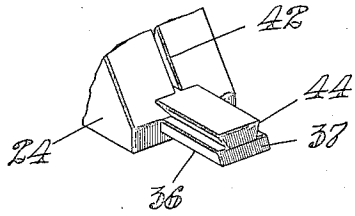


Fig. 6.

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GEORGE GODDU, OF WINCHESTER, AND FRED L. MACKENZIE, OF BEVERLY, MASSACHUSETTS, ASSIGNORS TO UNITED SHOE MACHINERY CORPORATION, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

MACHINE FOR INSERTING FASTENINGS.

1,372,685. Specification of Letters Patent. Patented Mar. 29, 1921.

Application filed January 21, 1918. Serial No. 212,963.

To all whom it may concern:

Be it known that we, GEORGE GODDU and FRED L. MACKENZIE, citizens of the United States, residing at Winchester, in the county of Middlesex, and Beverly, in the county of Essex, respectively, and State of Massachusetts, have invented certain Improvements in Machines for Inserting Fastenings, of which the following description, in connection with the accompanying drawings, is a specification, like reference characters on the drawings indicating like parts in the several figures.

This invention relates to machines used in the manufacture of boots and shoes and more particularly to machines for inserting metallic fastenings into shoe stock.

The machine illustrated as constituting one embodiment of the invention is designed to sever fastenings hereinafter sometimes denominated "nails" from a fastening strip hereinafter sometimes referred to as a "nail string" and to insert said fastenings, after being severed, into the shoe stock, said machine being of the type disclosed in the application of F. L. Mackenzie, Serial No. 137,152, filed December 15, 1916, to which application reference may be made for a complete description of parts not fully described herein.

Machines of the type to which this invention relates are commonly formed with a head provided with a fastening receiving member or throat having a passage to receive the nails to be driven and having mounted therein a driver which is reciprocated upwardly and downwardly in said passage. The nail string is fed to insert the endmost nail of the string into said passage, and the nail is then severed from the nail string and the driver operated downwardly in the passage to drive the nail into the work.

The illustrated machine like the machine of said application is designed to utilize for attaching together parts of shoe stock a nail string formed with alternating widened and reduced portions, said widened portions forming lateral projections on one side of the nail string and constituting the heads of the nails after the same are severed from the string by a cutting device which operates in the planes of the upper surfaces of said projections.

An object of the invention is to provide an improved mechanism for taking fastenings from a fastening strip or string and presenting them one by one to the fastening inserting means, which mechanism without sacrifice of other utility or advantage will be positive and certain in its operation.

An important feature of the invention consists in a novel construction and arrangement of means for controlling the fastening strip during the presentation of successive fastenings to the fastening inserting mechanism by engagement successively with notches or other formations in the strip preferably so shaped that when the fastenings are inserted into shoe stock, such formations will tend to resist the separation of the connected pieces of shoe stock. The illustrated mechanism is organized to feed a nail string step-by-step by engagement with notches formed in the back side of the nail string, that is, the side opposite to that from which the heads of the nails project, and to sever successive nails from the nail string between nail string feeding operations at points adjacent to the notches, the severing means, as shown, operating on the side of the nail string in which the notches are formed. An advantage of this construction and arrangement is that the nail string is not only positively controlled during each feeding movement but is positively retained against movement in either direction in the line of feed in position to insure proper severance of the nails from the string.

In the illustrated construction, the controlling means and severing means are mounted in a common carrier and the controlling means operates not only to feed the strip but also to guard the edge of the severing means from being dulled or injured.

A further feature of the invention resides in the provision of a throat, a wall of which is formed to receive the strip feeding means so that said means is movable beyond the plane of said wall. As illustrated, the strip feeding means is interposed between the throat and the severing means and a recess is formed in the top wall of the throat of a

depth to permit the severing means to move to a position in line with the upper surface of the throat. An advantage of this construction and of the positive control of the nail string is that the cutting of the nail in the plane of the upper surface of its head is insured. A further advantage is that the endmost nail of the nail string after being fed into the throat passage and severed from the body of the nail string is prevented from descending prematurely in said passage.

Although the invention is illustrated as embodied in a machine for severing nails from a nail string and inserting them into shoe stock, it is recognized that the invention in some of its aspects is not restricted to use in fastening inserting machines of this type but is applicable also to other kinds of fastening inserting machines. The scope of the invention is therefore intended to be limited only by the appended claims.

Other objects and features of the invention will be apparent as the description proceeds.

In the drawings:

Figure 1 is a front view of a fastening inserting machine embodying the invention:

Fig. 2 is a broken view of a nail string of a form such as may be employed in the illustrated machine;

Fig. 3 is a broken view partly in cross section showing the driver, the throat, the nail string guide, and the feeding and severing means for the nail string in one position of the parts;

Fig. 4 is a view of the parts shown in Fig. 3 at another point in the cycle of operations of the machine;

Fig. 5 shows said parts at a still different point in the machine cycles, and

Fig. 6 is a broken view in perspective showing the feeding and severing means for the nail string and the carrier for said means.

In the illustrated embodiment of the invention, as in the machine of said application, there is provided a column 2, supporting the stationary head 3 upon which is mounted the swinging head 4 which carries the fastening inserting mechanism. Said mechanism comprises the driver 12 and driver bar 14 operated by the cam 16 and spring 18 in the usual manner. The head 4 also carries the awl 5 and awl bar 6 operated by the rack 8 and the segment gear 10, the nail string guide 20 to which the nail string is led from the reel 22 on the stationary head 3, and the throat 26. The shoe stock is supported against the action of the fastening inserting mechanism by the horn 28.

A nail string of the form shown in Fig. 2 may be used in this machine. As shown, said nail string is composed of alternating reduced portions 30 and widened portions, the latter forming projections 32. Notches 33 having one wall 34 arranged substantially transversely of the axis of the nail string and a second wall 35 arranged at an acute angle relatively thereto are provided in the opposite edge of the string from that from which the projections 32 extend. When the nail string is in position in the machine the notches 33 lie somewhat below the projections 32 for a purpose to be hereinafter more specifically pointed out.

The nail string is uncoiled from the reel 22 and passed through the guide 20, the projections 32 extending toward the driver and the notches 33 being therefore in the edge of the string away from the driver. Said notches are adapted to be engaged by the feeding member 36 mounted loosely in the lower end of the carrier 24 and yieldingly urged in the direction of the nail string by a leaf spring 38 detachably secured to the rear edge of the carrier at 40. Said carrier is split as shown at 42 (see Fig. 6) at its lower end and is provided with grooves to receive the cutter 44 and feeding member 36 respectively. As illustrated, a headed screw 46 passes through the sections of the carrier 24 and may be operated to move said sections together to clamp the cutter 44 in position or to move said sections apart to release the grip of said sections on the cutter 44. The two sides of the cutter 44 operate as stops to prevent sufficient movement of the sections of the carrier 24 in a direction toward each other to grip the sides of the feeding member 36, whereby said feeding member is permitted to slide freely in its groove in the carrier. The feeder 36 normally projects in advance of the edge of the cutter 44 thus operating to space the edge of the cutter from the nail string and to guard the edge of the cutter from being dulled or injured. The feeder 36 is adapted to be moved relatively to the cutter 44 against the action of the spring 38 by engagement with the nail string to expose the edge of the cutter to permit the operation of the cutter on the nail string.

The feeder 36 is beveled at 37, the beveled end of the feeder being of a size and shape to fit the notches 33 of the nail string (see Fig. 4). The beveled surface 37 of the feeder is thus caused to engage the inclined wall 35 of a notch 33 when the bottom surface of the end of the feeder engages the wall 34 of the notch to feed the string. The nail string is therefore locked against movement relatively to the feeder 36 in either direction in the line of feed of the string. The feed of the string is thus positively controlled, and the accurate alinement of the upper surfaces of the projections 32 of the string with the upper surface of the throat is insured. By reference

to Fig. 4 it will be seen that the interlocking of the feeder 36 and the notch 33 maintains the severed nail in the upper part of the throat passage for a short time subsequently to the severance of the nail and until the nail is released by the backward movement of the carrier 24. The completion of the movement of the swinging head 4 to aline the passage 50 with the opening made by the awl is thus made certain prior to the descent of the nail upon the work, preventing the injury to the work and the point of the nail which would result if the nail were dragged over the work by the swinging of the head.

The throat 26, as most clearly shown in Fig. 4, is provided with a passage 48 for the awl 5 and a passage 50 for the nail and the driver 12. The upper part of the wall of the passage 50 is provided with a wear plate 52 opposite the feeder 36 and cutter 44 to receive the pressure of the head of the nail in opposition to the feeder and cutter. The top wall of the throat is cut away to the rear of the nail passage 50 as indicated at 54. The recess thus formed is relatively shallow at a point adjacent to the passage 50 where it receives the feeder 36 only and relatively deep at points farther removed from the passage 50 where it receives the lower end of the carrier 24. The recess in the top wall of the throat permits the carrier 24 and feeder 36 to pass below the upper surface of the throat to bring the cutting edge of the cutter exactly in the plane of said surface. By making the depth of the shallow part of said recess which receives the feeder 36 equal to the thickness of the feeder and moving the cutter arm downwardly until the bottom of the feeder 36 contacts with the bottom of the recess, the edge of the cutter is caused to move in the plane of the upper surface of the throat. By forming the feeder 36 of a thickness equal to the distance between the upper surface of the projections 32 and the walls 34 of the adjacent notches of the nail string, the nails are caused to be invariably positioned in the nail passage with the upper surface of their head forming projections in the plane of the upper surface of the throat and the edge of the cutter.

A leaf spring 56 (see Fig. 3) acts as a pawl to prevent backward movement of the nail string in the guide 20, and springs 58 detachably connected to the rear wall of the guide assist in maintaining the nail string in proper position in said guide.

The operation of the machine will now be briefly described. If the parts be assumed to be in the positions indicated in Fig. 3, the awl 5 has just completed the feeding of the shoe by movement of the swinging head 4 to the left, the driver 12 is up, the carrier 24 is also up in engagement with a notch in the nail string prepared to feed the same, and the nail string guide is in a position to guide the nail string into the nail passage in the throat. The feeder will next be moved downwardly to feed the endmost nail of the nail string into the nail passage and to position it with the upper surface of its head flush with the upper surface of the throat. A further movement of the carrier causes the cutter to sever the endmost nail from the string, the spring 38 yielding to permit relative movements of the cutter and feeder whereby the edge of the cutter is exposed. The parts are then in the position shown in Fig. 4, the awl having meanwhile been lifted from engagement with the work, and the swinging head moved to the right to bring the nail passage into line with the opening made by the awl. The carrier and nail string guide will then be moved to the left and the driver forced downwardly to drive the nail (see Fig. 5) after which the parts will be returned to the positions shown in Fig. 3 completing the cycle of operations of the machine.

Nails of the usual form of string nails having heads extending from one side only of their shanks, when inserted into shoe stock, will effectively resist a force exerted along the sides of the nails from which the heads extend tending to rip the piece of shoe stock over the heads of the nails, but will not so effectively resist a force exerted along the opposite sides of the nails with the result that the piece of shoe stock may be ripped off over the backs of the nail heads. When a nail is severed from a nail string formed as herein illustrated and inserted into shoe stock, the interfitting of the stock and the notch 33, as shown at 60 (Fig. 5), imparts to the nail a firm grip on the shoe stock and prevents the easy ripping of the stock over the backs of the heads of the nails. In place of the notches 33, the nail string may be otherwise formed to prevent ripping of the shoe stock over the backs of the nails in which case the feeder 36 will preferably be shaped to correspond to the changed formation of the nail string.

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

1. In a machine of the class described, in combination, means for feeding a fastening strip by engagement with a notch formed therein, and means for severing the fastening strip at a point adjacent to said notch and spaced from the point of greatest penetration of the strip by the notch.

2. In a machine for operating on a fastening strip having notches formed therein with walls converging inwardly from the edge of the strip, in combination, means for feeding the fastening strip by engagement with one of said notches, means for severing

the endmost fastening from the strip at a point spaced from the point of greatest penetration of the strip by said notch, and means for inserting said fastening into the work.

3. In a machine of the class described, in combination, a fastening receiving member, and mechanism constructed and arranged to present to said fastening receiving member a fastening strip formed with projections constituting the heads of the fastenings when severed from the strip, said mechanism comprising means for engaging the endmost fastening of the fastening strip to feed it into said fastening receiving member, and means for severing said fastening from the strip, said means being movable simultaneously with the engaging means and being operable on the same side of the strip as said engaging means.

4. In a machine of the class described, in combination, a throat member having a passage to receive the endmost fastening of a fastening strip, a guide for the strip arranged to be alined with said passage and to conduct the endmost fastening of the fastening strip directly into said passage, means for effecting relative movements of the throat member and guide, means for feeding said strip through said guide thereby to insert the endmost fastening of the strip into the passage of the throat member, and means separate from the throat member for severing the endmost fastening from the strip.

5. In a machine of the class described, in combination, a driver, a fastening receiving member movable into and out of the line of drive and having a fastening receiving passage, and mechanism constructed and arranged to present to said fastening receiving member a fastening strip formed with projections constituting the heads of the fastenings when severed from the strip, said mechanism comprising a guide for conducting the strip to the fastening receiving member and disposed substantially in contact with the fastening receiving member, means for feeding the strip, and independent means for severing the fastenings from the strip.

6. In a machine of the class described, in combination, a driver, a throat movable into and out of the line of drive, and mechanism constructed and arranged to deliver into said throat the endmost fastening of a fastening strip formed with alternating projections and depressions, said mechanism comprising a guide disposed to engage the endmost fastening of the strip during its movement into the throat passage and formed with a passage through which the strip is conducted to said throat, said passage being open at one side, feeding means for the strip operable along the open side of the guide and constructed to engage said projections in feeding the strip, and means separate from the feeding means and movable relatively to said guide for severing the endmost fastening from the strip after it is delivered into said throat.

7. In a machine of the class described, in combination, a fastening receiving member, means with respect to which said member is relatively movable for guiding to said member a fastening strip formed with projections constituting the heads of the fastenings when severed from the strip, said guiding means being disposed for engagement with the endmost fastening of the strip during movement of the fastening into the fastening receiving member, means for engaging the strip opposite from the guiding means and for feeding the strip through said guiding means to said receiving member, and means separate from said engaging means and movable relatively to said fastening receiving member and said guiding means for severing the fastenings from the strip.

8. In a machine for operating upon a fastening strip formed with projections on one side thereof constituting the heads of the fastenings when severed from the strip, feeding means constructed and arranged to operate on another side of the fastening strip, and means for severing the fastenings from the strip.

9. In a machine for operating upon a fastening strip formed with projections on one side thereof constituting the heads of the fastenings when severed from the strip, feeding means constructed and arranged to engage a notch formed in a side of the fastening strip other than that from which the heads of the fastenings project, and means for severing the fastenings from the strip.

10. In a machine of the class described, in combination, a driver for inserting nails into shoe stock, means for feeding a nail string by engagement with the side thereof remote from the line of drive of the nails, and means separate from said feeding means for severing nails from the nail string constructed to operate on the side of the nail string engaged by said feeding means.

11. In a machine of the class described, in combination, controlling means constructed and arranged to engage a notch formed in a fastening strip and means for severing the fastening strip at a point adjacent to said notch but spaced from the point of greatest penetration of the strip by the notch.

12. In a machine of the class described, in combination, controlling means for a fastening strip constructed to engage a notch formed in the endmost fastening of the fastening strip, and means for operating on the

side of the strip in which the notch is formed during the engagement of the controlling means in the notch.

13. In a machine for operating on a nail string having depressed portions in one of its sides, in combination, means constructed to engage a depressed portion of the nail string to retain the nail string positively from movement in either direction in the line of feed of the nail string in position to have the endmost nail severed therefrom, and means for severing the endmost nail from the nail string.

14. In a machine of the class described, in combination, a member having a passage to receive the endmost fastening of a fastening strip, means with respect to which the fastening receiving member is relatively movable for guiding the strip to the fastening receiving member, and feeding means for the strip constructed and arranged to coact with the fastening receiving member after the completion of the feeding movement of the strip to retain the strip positively from movement in the direction of the feed of the strip.

15. In a machine of the class described, a driver, a fastening receiving member movable into and out of the line of drive, and power-operated means coacting with said fastening receiving member for retaining the fastening against movement relatively to the fastening receiving member.

16. In a machine of the class described, in combination, means for inserting fastenings severed successively from a nail string, means operated in timed relation with said inserting means for positively retaining the nail string from movement in the direction of the line of feed of the nail string in position to have the endmost nail severed therefrom, and means for severing the endmost nail from the nail string.

17. In a machine of the class described, in combination, means for guiding a nail string, feeding means for the nail string operating positively to retain the nail string by engagement with the side of the string opposite that from which the nail heads project from movement in either direction in position to have the endmost nail severed therefrom, and means for severing the endmost nail from the nail string.

18. In a machine of the class described, a throat, mechanism for feeding the endmost nail of a nail string into said throat, and means for severing the endmost nail from the nail string, said feeding mechanism being constructed and arranged to retain the severed nail against premature downward movement in the throat subsequently to the severance of the nail from the nail string.

19. In a machine of the class described, a throat, an awl, a driver, means for moving the throat and awl alternately into and out of the line of drive of the driver, mechanism for feeding the endmost nail of a nail string into said throat, and means for severing the endmost nail from the nail string, said means being constructed and arranged to retain the severed nail against premature downward movement in the throat subsequently to the severance of the nail from the nail string to insure the movement of the throat passage into alinement with the opening in the work made by the awl prior to the descent of the severed nail upon the work.

20. In a machine of the class described, in combination, means for severing the endmost nail from a nail string, each of the nails of which has a portion of the side thereof opposite that from which the heads project shaped to resist ripping of the shoe stock over the back of the head, and nail string controlling means constructed to engage said portions.

21. In a machine of the class described, in combination, means for severing the endmost nail from a nail string comprising nails having portions of the sides thereof opposite those from which the heads project shaped to resist ripping of the piece of shoe stock over the backs of the nail heads, and nail string controlling means constructed to engage said portions and operating to aline the top of the head of the endmost nail of the nail string with said severing means.

22. In a machine of the class described, means for guiding a fastening strip, a carrier coöperating therewith, strip severing means supported in said carrier for operation thereby, and a strip controlling member mounted in said carrier adjacent to said severing means.

23. In a machine of the class described, means for guiding a nail string, a carrier coöperating therewith, a cutter mounted in said carrier, and a feeding member mounted in said carrier constructed and arranged to guard the edge of said cutter and to be moved by engagement with the nail string to expose the edge of the cutter to permit the operation of the cutter.

24. In a machine of the class described, means for guiding a fastening strip, a carrier coöperating therewith having a cutter mounted therein and a feeding member also mounted therein underlying said cutter, and means for maintaining said feeding member normally in position to guard the cutting edge of said cutter.

25. In a machine of the class described, means for feeding a nail string, means for severing the string, and means for yieldingly urging said feeding means toward said nail string constructed and arranged to

cause said feeding means normally to space said severing means from the nail string and to be moved by the pressure of the nail string to permit the operation of the severing means.

26. In a machine of the class described, means for guiding a nail string, a carrier coöperating therewith, feeding means for the nail string loosely mounted therein, severing means for the nail string fixedly mounted therein, said feeding means underlying said severing means, and yielding means for urging said feeding means toward said nail string whereby to space said severing means therefrom, said feeding means being movable relatively to said severing means against the pressure of said yielding means upon movement of the carrier to bring the severing means into engagement with the nail string.

27. In a machine of the class described, in combination, a carrier having a cutter mounted therein, means for maintaining said cutter in fixed relation relatively to said carrier, and a feeding member loosely mounted in said carrier for movement relatively to said carrier and cutter.

28. In a machine of the class described, in combination, a head having a throat provided with a substantially vertical passage to receive the endmost fastening of a fastening strip and formed with a recess in its upper part having one end communicating with said passage, feeding means for the strip constructed and arranged to move below the upper surface of said throat into said recess, and cutting means constructed and arranged to sever the strip at a point substantially in the plane of the upper surface of the throat.

29. In a machine of the class described, a carrier, a cutter fixedly mounted therein, a feeding member loosely mounted therein, and yielding means tending to move said feeding member relatively to said carrier and cutter.

30. In a machine of the class described, in combination, a head having a throat provided with a passage to receive the endmost nail of a nail string, means for severing the nail string, and means for feeding the nail string, said throat and said feeding means having coöperating parts operating to position said severing means relatively to said throat.

31. In a machine of the class described, in combination, a head having a throat provided with a passage to receive the endmost nail of a nail string, means for severing the nail string, and means for feeding the nail string located adjacent to said severing means and between said severing means and the wall of the throat in which the mouth of said passage is formed, said feeding means and said throat being so constructed and arranged as to permit said feeding means to move beyond and said severing means to operate in the plane of said wall of the throat.

32. In a machine of the class described, in combination, a head having a throat provided with a passage to receive the endmost fastening of a fastening strip, feeding means for the strip, and means for operating said feeding means toward and from said throat to feed the strip, the wall of said throat toward which the feeding means moves to feed the strip being formed to receive said feeding means whereby the same is movable beyond the plane of said wall.

In testimony whereof we have signed our names to this specification.

GEORGE GODDU.
FRED L. MACKENZIE.