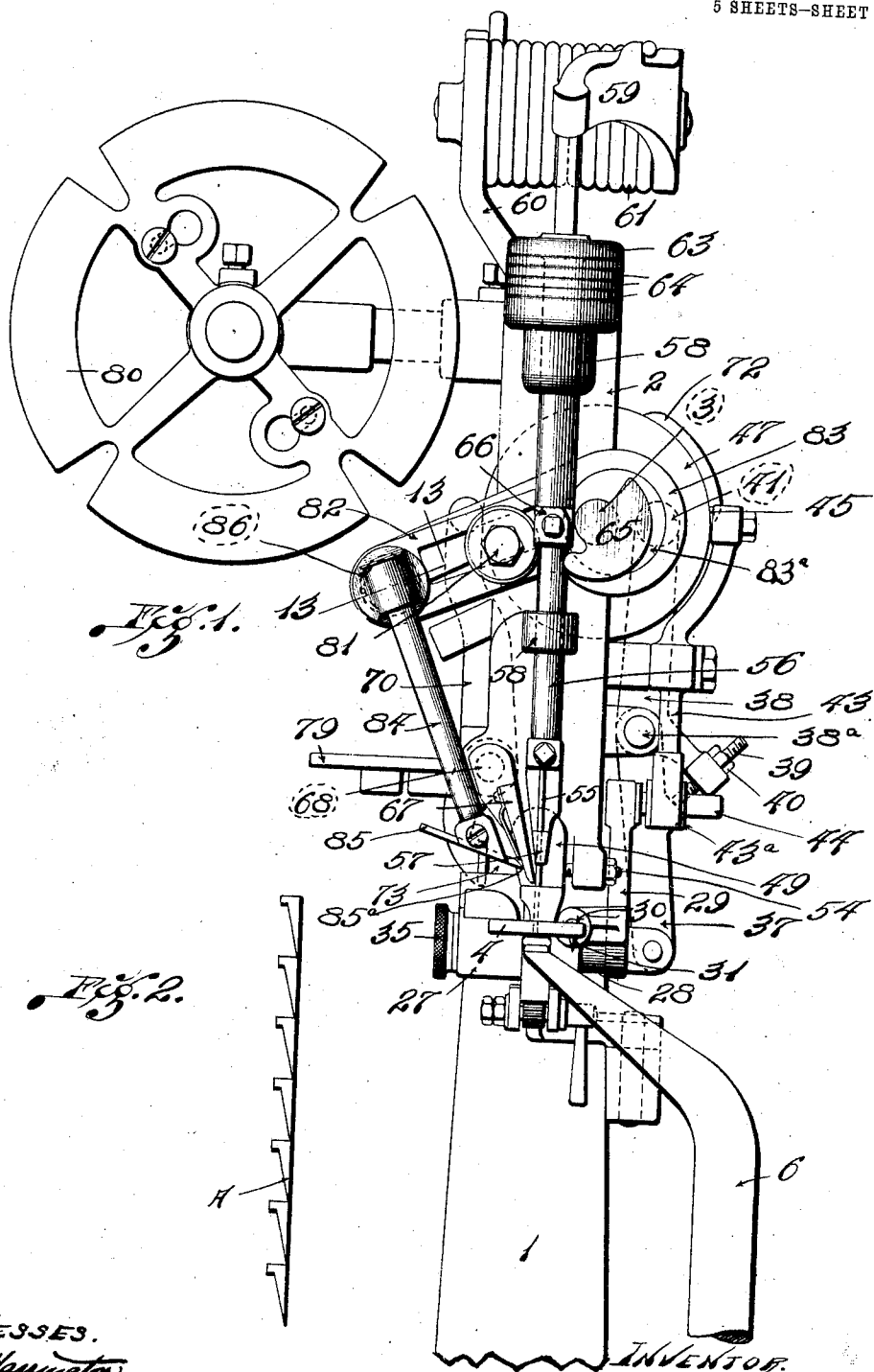


1,026,028.

J. B. FLINT.
STRING NAILING MACHINE.
APPLICATION FILED APR. 26, 1910.

Patented May 14, 1912.
5 SHEETS—SHEET 1.



WITNESSES.
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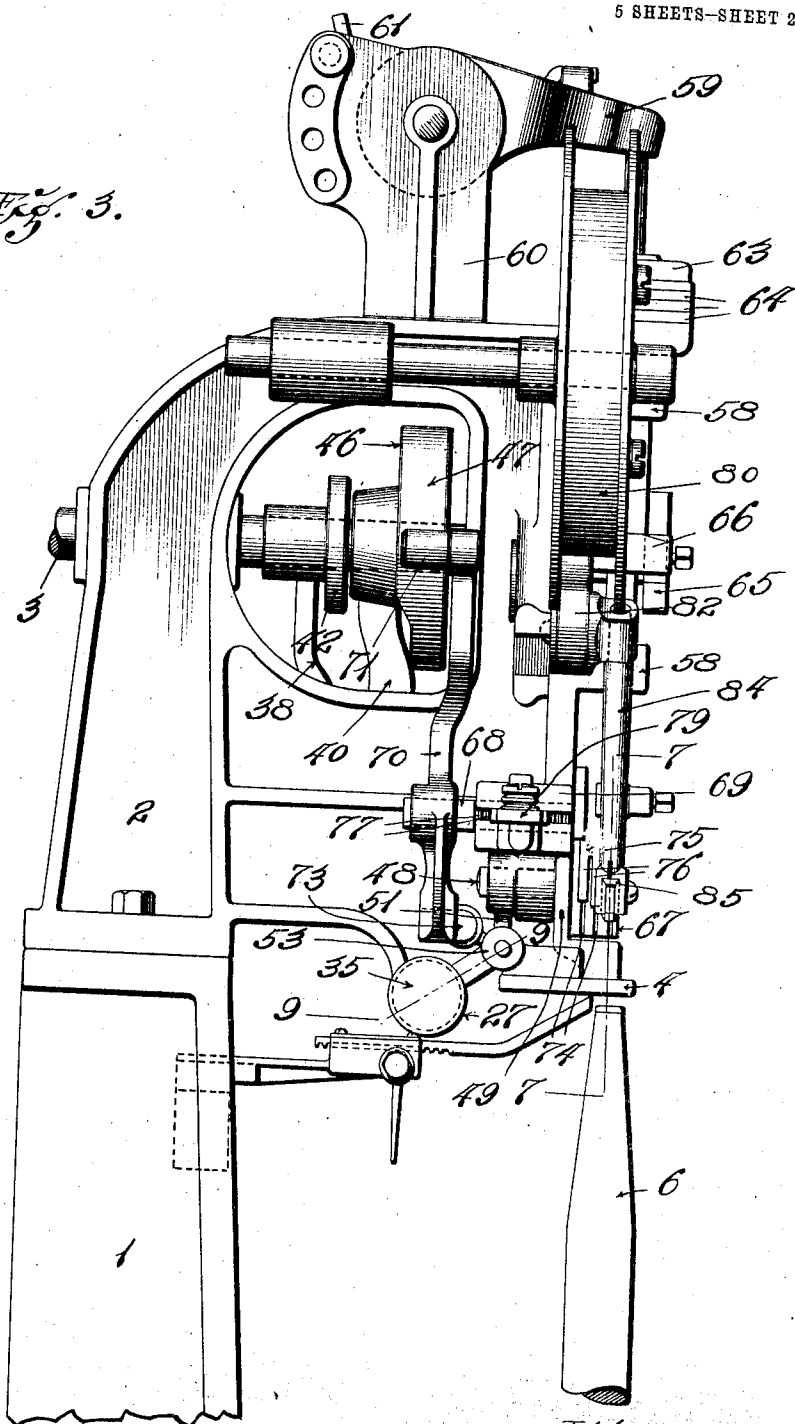
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5 SHEETS—SHEET 2.

Fig. 3.



WITNESSES.

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W. O. Smith

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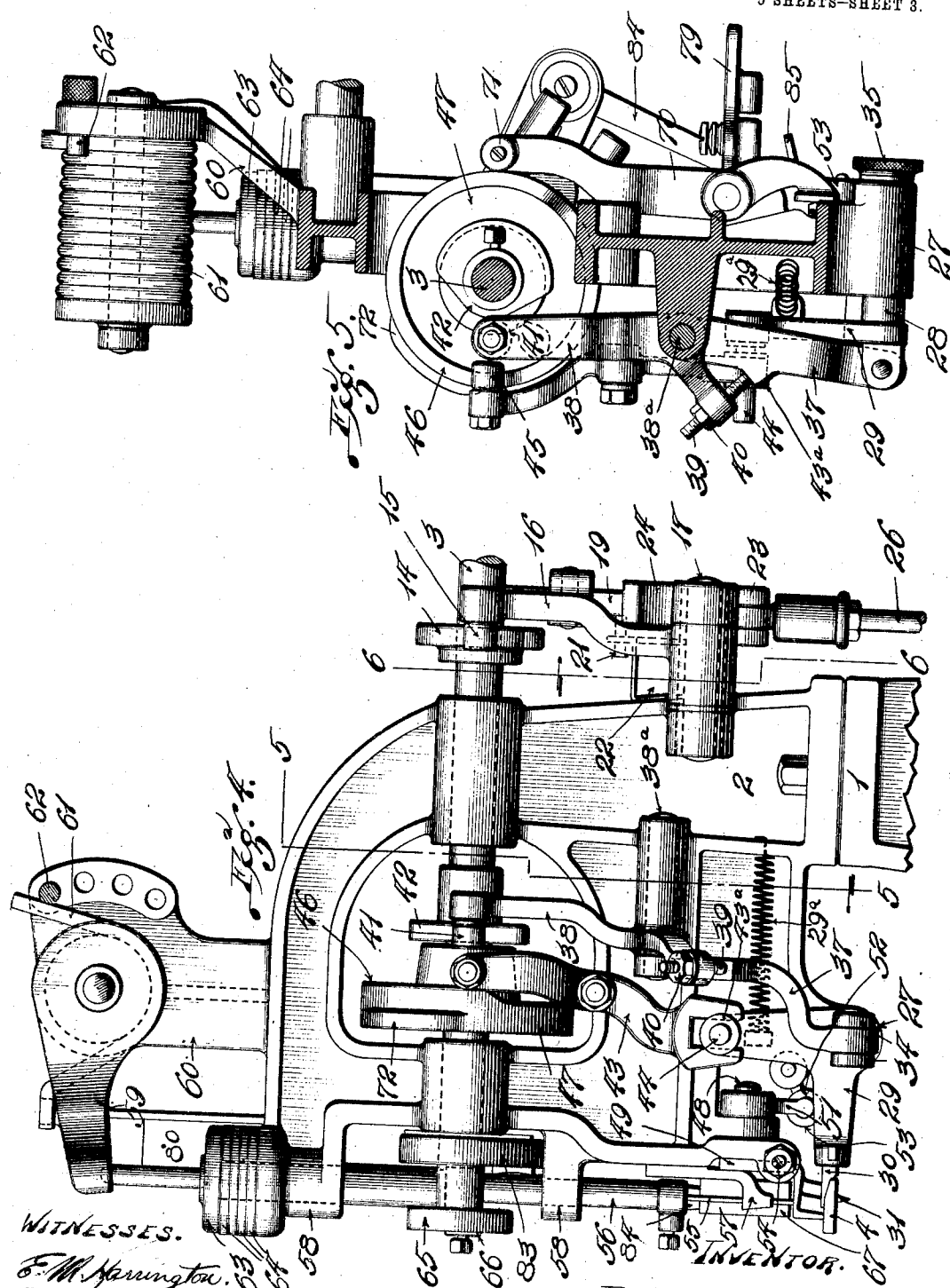
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5 SHEETS-SHEET 3.



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5 SHEETS—SHEET 4.

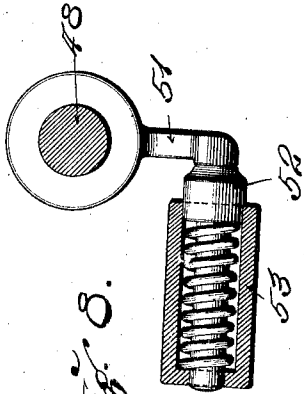


Fig. 8.

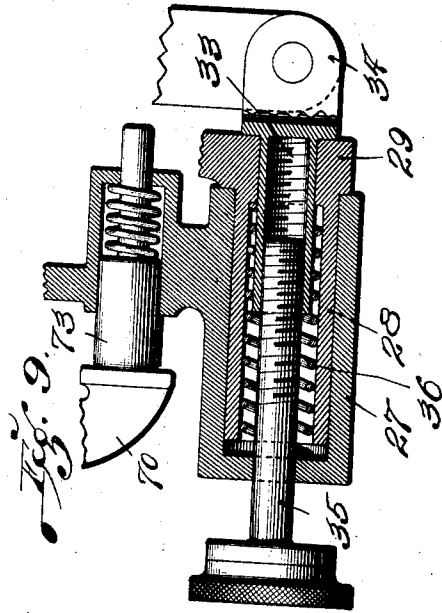


Fig. 9.

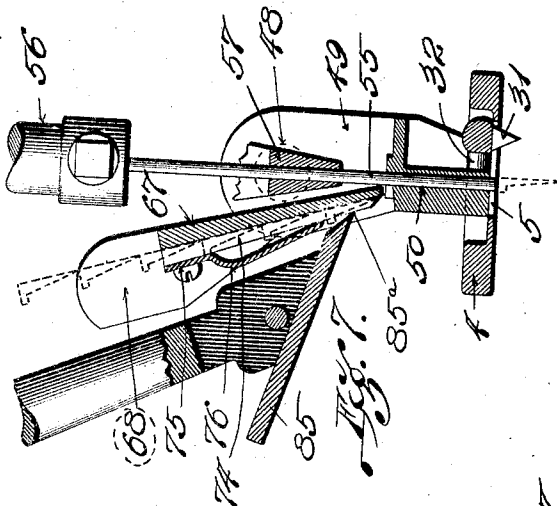


Fig. 7.

Fig. 10.

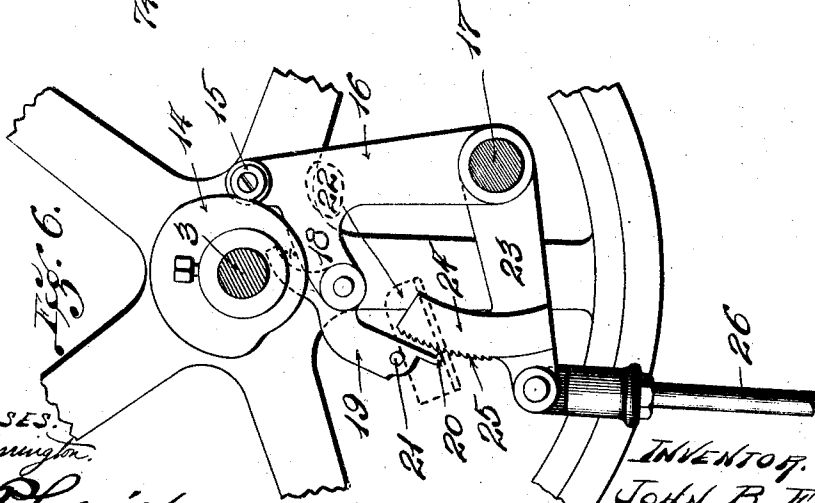
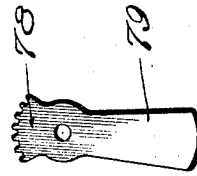


Fig. 6.

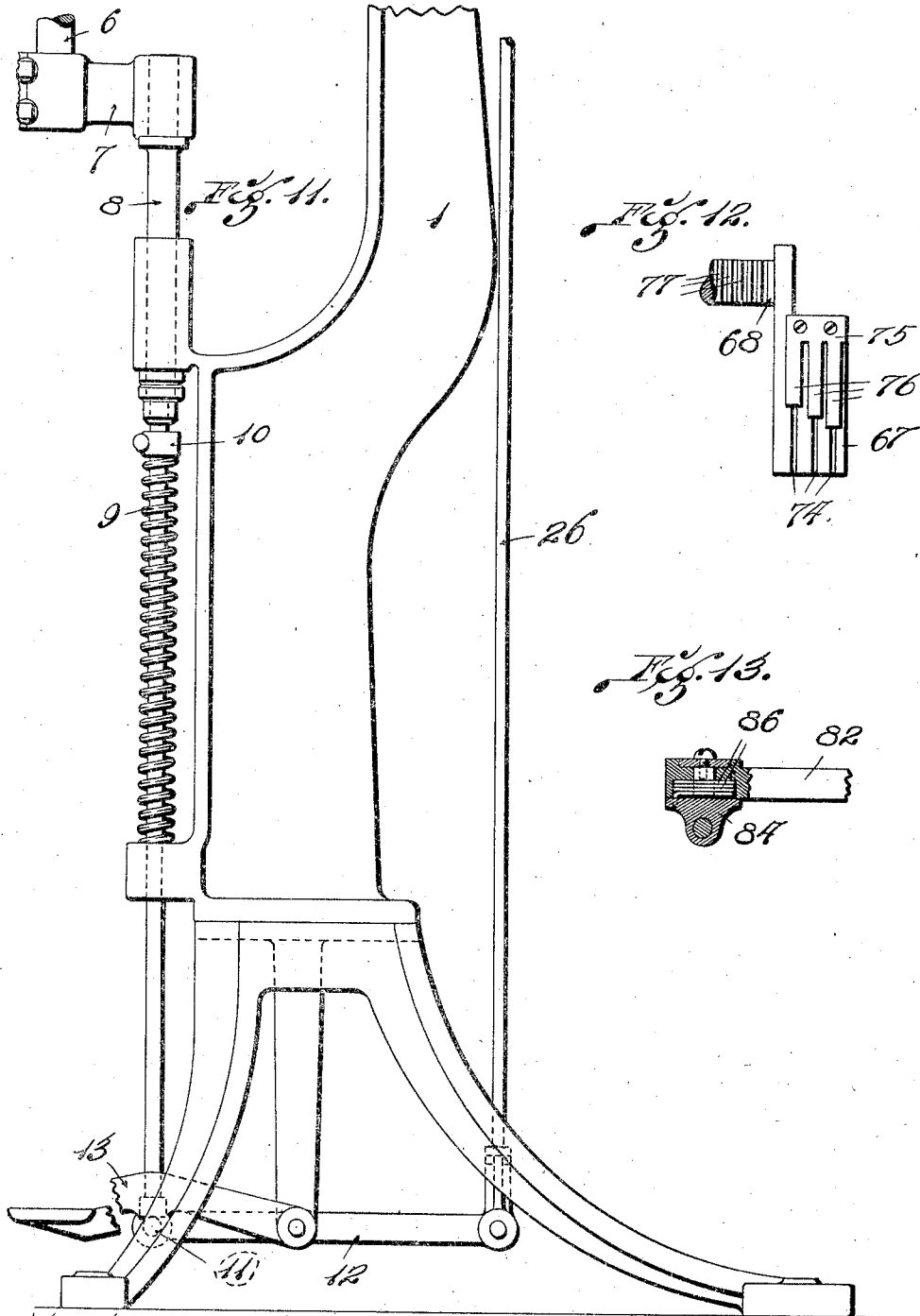
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 STRING NAILING MACHINE.
 APPLICATION FILED APR. 26, 1910.

1,026,028.

Patented May 14, 1912.
 5 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

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STRING-NAILING MACHINE.

1,026,028.

Specification of Letters Patent.

Patented May 14, 1912.

Application filed April 26, 1910. Serial No. 557,643.

To all whom it may concern:

Be it known that I, JOHN B. FLINT, a citizen of the United States, residing at St. Joseph, Missouri, have invented a certain new and useful improvement in String-Nailing Machines, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same. Reference being had to the accompanying drawings, forming part of this specification, in which—

This invention relates to fastener inserting or nailing machines, and more particularly to machines of the class known as "string nailing machines".

The use of string nailing machines has heretofore been limited to "tacking" operations, *i. e.*, to operations where the nail is short and is not required to be clenched. Such tacking operations include for instance tacking rands to heels, and sole laying in which the nail is driven into the last to temporarily hold the sole in position. In such operations an awl was not used, since the short shank of the tacks were sufficiently stiff and solid so as not to cause bending of the tack when driven. The machine has not heretofore been used for sole attaching purposes, *i. e.*, for permanently securing the sole to the shoe by a line of nails. For such work the shank must necessarily be long to pass through the sole and clench on the insole. In the McKay shoe the nail must pass through the outsole, tap sole and insole. In such operations an awl is necessary to form a hole for receiving and guiding the nail.

One of the objects of this invention is to construct a string nailing machine provided with an awl constructed to pierce the work to receive the string nails, and to feed the work so that a line of nails may be driven; and to construct the machine so that it may be used for sole attaching by driving a line of nails to form a seam.

Another object is to improve the awl mechanism of such machines.

Another object is to improve the machine as to details of construction; and further objects will appear from the detail description taken in connection with the accompanying drawing in which:—

Figure 1 is a front elevation of a cut string nailing machine of my improved construction. Fig. 2 is an elevation of a string

or series of connected nails such as are used in my improved machine. Fig. 3 is an elevation of the left hand side of the machine. Fig. 4 is an elevation of the right hand side of the machine. Fig. 5 is a vertical section taken approximately on the line 5—5 of Fig. 4. Fig. 6 is a vertical section taken on the line 6—6 of Fig. 4. Fig. 7 is an enlarged vertical section taken approximately on the line 7—7 of Fig. 3, and illustrating the nail feeding, cutting off, and driving mechanism. Fig. 8 is a detail section of a tension device made use of in my improved machine. Fig. 9 is an enlarged section taken approximately on the line 9—9 of Fig. 3. Fig. 10 is a detail view of a lever utilized for shifting the nail chute backward and forward. Fig. 11 is an elevation of the lower portion of the machine and showing the controlling and actuating mechanism for the work supporting horn. Fig. 12 is an enlarged detail view of the nail chute. Fig. 13 is an enlarged cross section taken on the line 13—13 of Fig. 1, and showing the tension device for the nail feeding and cutting member.

Referring by numerals to the accompanying drawings 1 designates a standard which forms the body of my improved machine and arranged on the upper end of said standard is a forwardly projecting casting 2 upon which the greater portion of the operating parts of the machine are positioned.

Journaled for rotation in suitable bearings formed in the upper portion of the casting 2 is a horizontally disposed shaft 3 which is driven in any suitable manner, and the operation of which shaft is controlled by any suitable means, preferably the controlling mechanism shown and described in an application for patent on loose nailing machines, filed by me April 26, 1910 Serial No. 557,642.

Formed on or fixed to the front side of the casting 2 and at the lower end thereof is a small horizontally disposed plate 4 which forms a rigid work support, inasmuch as the work is positioned immediately against the under side of this plate and formed through said plate is a transversely disposed slot 5 through which the work feeding means operates.

6 designates a work supporting horn, the upper end of which is normally disposed immediately beneath the plate 4. This horn is adjustably seated in an arm 7 carried by

the upper end of a vertically disposed rod 8, which latter is arranged for movement in suitable bearings formed in the standard 1.

An expansive coil spring 9 is positioned on the rod 8 one end of which spring bears against a part of the standard 1, and the opposite end bearing against a nut 10 located on said rod, the normal tendency of which spring is to maintain said rod and the horn in elevated positions. The lower end of the rod 8 is pivotally connected to a horizontally disposed pin 11 seated in the forward end of the lever 12, which latter is fulcrumed at a point intermediate its ends in the base of the standard 1. The rear end of a foot lever 13 is pivotally mounted on the base of the standard 1, which foot lever bears on top of the pin 11.

The mechanism just described provides means for moving the rod 8 and horn 6 downward against the resistance offered by the spring 9, which movement is necessary when work is positioned on the horn and beneath the plate 4.

The means employed for automatically withdrawing the upper end of the horn from the plate 4 to permit the work to feed between said horn and plate comprises the following elements: A cam 14 is fixed on the shaft 3 and bearing against the periphery thereof is a roller 15 carried by the upper end of an arm 16, which latter is pivotally mounted on a pin 17 projecting from the rear portion of the casting 2. Pivotally mounted on a lug 18 projecting from the arm 16 is a spring pressed finger 19 having a hook 20 formed on its lower end and provided with a laterally projecting pin 21 which normally rides on the upper edge of an inclined plate 22 projecting from the rear side of the casting 2. Pivotally mounted on pin 17 is a horizontally disposed arm 23 provided with an upwardly projecting lug 24, the front face of which is provided with a series of teeth 25 adapted to be engaged by the hook 20. The free end of this arm 23 is pivotally connected to the upper end of a rod 26 the lower end of which is pivotally connected to the rear end of the lever 12 at the base of the standard 1. Formed on the under side of the casting 2 to the rear of the plate 4 is a cylindrical bearing 27 in which is journaled the tubular hub 28 of a bell crank 29, which performs the function of the awl carrier of my improved machine, and detachably seated in the forward end of the horizontal arm of this awl carrier is a pin 30 from the forward end of which depends an awl 31. This awl projects through the opening 5 in the plate 4, and formed on the under side of the pin 30 immediately adjacent the awl 31 is a lug 32. Loosely mounted in the tubular hub 28 is a tubular socket 33 on the outer end of which is formed a pair of ears 34. The tu-

bular socket 33 is interiorly screw threaded and seated therein is the threaded end of an adjusting screw 35 which projects through the end of the cylindrical bearing 27. An expansive coil spring 36 is positioned between the tubular hub 28 and the end of the bearing 27, and tends to normally force the awl carrier outwardly. The lower end of lever 37 is pivotally mounted between the ears 34, the upper end of said lever being journaled on a pin 38^a, which latter is mounted in a suitable bearing on the side of the casting 2. A lever 38 is journaled on the pin 38^a and passing through the lower end of this lever 38 is an adjusting screw 39, the point of which bears against the outer side of the lever 37, and positioned on said adjusting screw is a lock nut 40. The upper end of the lever 38 is provided with a roller 41 which bears against the periphery of a cam 42 carried by the shaft 3.

The mechanism just described provides means for shifting the awl carrier laterally and during this movement the tubular hub 28 slides backward and forward in the cylindrical bearing 27. The adjusting screws 35 and 39 provide means for accurately regulating the length of stroke of the laterally moving awl carrier. The means employed for rocking the awl carrier vertically to force the awl into the work and withdraw it therefrom comprises a vertically disposed lever 43 pivotally mounted at a point intermediate its ends on the sides of the casting 2, and the lower end of which lever is bifurcated and engages a roller 43^a, which slides upon a pin 44 seated in the vertical arm of the bell crank 29. The upper end of the lever 43 is provided with a roller 45, which bears against a cam face 46 formed on the rear side of a disk 47, which latter is carried by the shaft 3.

Journaled in the lower portion of the casting 2 is a short shaft 48 to the forward end of which is fixed the upper end of a swinging throat piece or nail receiving member 49, the lower end of which moves backward and forward immediately over the slotted portion of the plate 4, and formed through the lower portion of this throat piece is a vertically disposed passage way 50 through which the nails are forced by the nail driver. This throat piece is mounted to swing in order that it can be moved laterally by the awl carrier when the same shifts sidewise during the feeding movement of the work.

To automatically return the throat piece to its normal or vertical position the rear end of the shaft 48 is provided with a downwardly pending arm 51 which is engaged by a spring pressed plug 52 mounted in a suitable housing 53. An adjusting screw 54 seated in a portion of the casting 2 acts as a stop against which the throat piece bears when in a vertical position thereby insuring

proper alinement of the passage way through the throat piece for the driver.

The driver 55 comprises a rod carried by the lower end of a driver bar 56, and which driver operates through a bearing 57 positioned on the casting 2 immediately above the throat piece 49, and the lower portion of this driver is adapted to pass through the passage way 50 in said throat piece. The driver bar 56 moves vertically through bearings 58 formed on the front end of the casting 2 and the upper end of said driver bar bears against the under side of an arm 59 which is pivotally mounted at its rear end to a bracket 60 projecting upward from the casting 2. The end of a stiff spring 61 bears against the upper side of the arm 59 and the opposite end of said spring bears against a pin 62 adjustably seated in the bracket 60. This spring provides means for moving the arm 59 and driver bar forcibly downward to effect driving of the nails. A disk 63 is carried by the upper portion of the driver bar 56, which disk strikes against the upper end of a series of leather or rubber washers 64 positioned on the casting 2 when the driver bar is forced downward, thereby eliminating the jar and noise incident to the sudden downward throw of said driver bar. The means for elevating the driver bar comprises a cam 65 carried by the forward end of the shaft 3 and adapted to engage against the under side of a block 66 adjustably positioned on said driver bar.

The nail chute or string-nail guide through which the nails are fed to the throat piece comprises a wedge-shaped plate 67, which is positioned immediately in front and slightly to the left hand of the throat piece 49 said plate being carried by the forward end of a shaft 68 which is journaled in a suitable bearing 69 formed on the side of the casting 2. Fixed on the rear portion of this shaft 68 is a vertically disposed lever 70 the upper end of which is provided with a roller 71 which travels upon the periphery of a cam 72 formed on the edge of the disk 47. This cam and lever are for the purpose of imparting a slight rocking movement to the shaft 68 thereby swinging the lower end of the plate 67 laterally above the passage way 50 formed in the throat piece, the purpose of which movement will be presently shown. To return the plate 67 to its normal position after having been moved through the medium of the cam and lever a spring pressed plug 73 is arranged in a suitable housing on the casting 2, and the lower end of the lever 70 bears against said plug 73. Formed in the rear side of the plate 67 is a plurality of vertically disposed nail grooves 74 through which the string nails feed before passing into the nail passage way 50.

To shift the plate 67 backward and forward so as to bring any one of the grooves 74 into alinement with the passage way 50, a series of teeth 77 are formed on the shaft 68, and engaging with these teeth are the teeth of a segment 78 formed on the inner end of a lever 79 which latter is pivotally mounted on the bearing 69. As this lever is manipulated the shaft 68 carrying the plate 67 is moved backward or forward to bring the proper groove 74 into alinement with the passage way 50. A reel 80 is journaled on an arm projecting from the upper portion of the casting 2 and the strings of connected nails A as shown in Fig. 2 are carried by this reel and unwind therefrom and pass downward through the grooves 74.

The nail feeding and severing means will now be described. Seated in the front side of the casting 2 to one side of the shaft 3 is a pin or projection 81, and arranged to slide thereon is a slotted arm 82 one end of which is provided with a ring 83 in which operates an eccentric 83^a carried by the shaft 3. Pivotally mounted on the outer end of the arm 82 is the upper end of an arm 84 which extends downward and terminates at a point immediately to the rear of the plate 67. A torsional spring 86 is arranged upon the pivot pin between the arms 82 and 84, said spring being so arranged and of such strength as to exert considerable pressure to move the lower end of the arm 84 toward the plate 67. Detachably positioned on the lower end of the arm 84 is an inclined plate 85 provided on its lower end with a cutting edge 85^a. This cutting edge 85^a normally bears against the outer side and lower portion of the plate 67, as shown in Figs. 1 and 7.

The operation of my improved string nailing machine is as follows: The operator stationed in front of the machine applies pressure of the foot to the forward end of the lever 13 thereby moving the rod 8 and work engaging horn 6 downward and the work is positioned on top of said horn after which the pressure of the foot upon the lever 13 is removed and the power stored in the coil spring 9 elevates the rod 8 and causes the horn 6 to hold the work against the under side of the plate 4 with yielding pressure. Rotary motion is now imparted to the shaft 3 and the following movements take place: The cam face 46 bearing upon the roller 45 actuates the lever 43 to swing the lever 43 upon its fulcrum which movement slightly rocks the awl carrier 29, thereby moving the forward end of said awl carrier downward and the awl 31 carried by the pin 30 passes through the slot 5 in the plate 4 and engages in the work. The high portion of the cam 42 now engages the roller 41 thereby swinging the lever 38 upon its fulcrum and causing the set screw 39 to

bear against the outer side of the lever 37. The lower end of this lever is moved inward, thereby moving the tubular hub 28 carrying the awl carrier 29 inward against the resistance offered by the spring 36. This action moves the awl through the slot 5 in the plate 4 and consequently the work in which the awl is embedded is moved beneath said plate 4. To permit the work to move freely beneath the plate 4 the work engaging horn 6 is slightly withdrawn from the plate 4 to relieve the pressure upon the work in the following manner: At an instant preceding the beginning of the lateral movement of the awl carrier the high portion of the cam 14 bears against the roller 15, thereby swinging the arm 16 upon the pin 17, which movement carries the spring pressed finger 19 laterally, and as the pin 21 rides along the upper edge of the plate 22 the hook 20 on the lower end of the finger 19 will engage between the teeth 25 of the lug 24, and the continued movement of the arm 16 and finger 19 will slightly raise the outer end of the arm 23. This movement draws the rod 26 upward a short distance thereby swinging the lever 12 upon its fulcrum and consequently drawing the rod 8 downward against the resistance offered by the spring 9 and in turn withdrawing the upper end of the horn 6 from the plate 4, thereby momentarily relieving the pressure against the under side of said work. This pressure is relieved only at such time as the awl is moving forward through the slot 5 and as soon as this feeding movement is accomplished the roller 15 rides onto the lower portion of the cam 14 and the spring 9 restores the various parts of the automatic horn withdrawing means to their normal positions. During this work feeding movement the cam 65 carried by the shaft 3 has engaged the block 66 and elevated the driver bar 56 and driver 55 carried thereby, thus withdrawing the lower portion of said driver from the throat piece 49. As the driver bar 56 is elevated the free end of the arm 59 is correspondingly elevated, thereby storing power in the spring 61. Immediately after the lower portion of the driver 56 leaves the passage way 50 in the throat piece 49 the lug 32 on the side of the pin 30 bears against the side of the throat piece 49, thereby slightly swinging said throat piece, and causing the shaft 48 to rock in its bearing. This rocking motion moves the spring pressed plug 52 a short distance into the housing 53 by reason of the engagement of the arm 51 against said spring pressed plug. Simultaneous with this laterally swinging movement of the throat piece 49 the lower end of the plate 67 is swung in the opposite direction in order to bring the groove 74 through which the string of nails is being fed into alinement with the passage way 50

through the throat piece. This swinging movement of the plate 67 is accomplished by the engagement of the high portion of the cam 72 against the roller 71, thereby swinging the lever 70 and slightly rocking the shaft 68 in the bearing 69. The plate 67 is carried by the forward end of the shaft 68, and as said shaft is rocked the lower end of said plate is swung laterally in a direction opposite to the movement of the throat piece 49. Thus the one of the grooves 74 through which the nails are being fed is brought into alinement with the passage way 50 through the throat piece, and the lowermost one of the nails is fed into said passage way.

The nail feeding means comprises the plate 85, arm 84 and arm 82. As the eccentric 83^a rotates the corresponding end of the arm 82 is elevated, which moves the arm 84 and plate 85 carried thereby downward and the cutting edge on the lower end of said plate 85 rides over the lower portion of the slotted plate 67 on top of the head of the lowermost one of the nails. As the plate 85 moves downward the lowermost nail is forced into the upper portion of the passageway 50, and as the head of this lowermost nail passes beneath the lower edge of the plate 67 the lower portion of the arm 84 will be forced toward the plate 67 by the power stored in the torsional spring 86, and as a result the knife edge 85^a will sever the lowermost nail from the string which is being fed to the machine. The continued movement of the eccentric 83^a swings the arm 82 in such a manner as to elevate the arm 84 and the lower edge of the plate 85 rides upward over the lowermost one of the string of nails on the plate 67 until the knife edge 85^a is engaged on top of the head of said lowermost nail. Simultaneous with the upward movement of the arm 84 the plate 67 swings away from the throat piece and returns to its normal position by reason of the pressure exerted by the spring pressed plug 73 against the lower end of the lever 70 which action slightly rocks the shaft 68 carrying said plate 67. After the awl 31 has traveled forward to its limit of movement to feed the work beneath the plate 4 the roller 45 travels onto the lower portion of the cam 46, and the bell crank is now moved entirely upon its fulcrum by the power stored in a retractile coil spring 29^a connected to the upper portion of said bell crank, and to a fixed part of the machine, and this movement elevates the forward end of said bell crank, thereby withdrawing the awl from the work. After the awl carrier is thus elevated it is shifted laterally in a reverse direction to the feeding movement and this reverse movement is brought about by the pressure of the coil spring 36 which moves the tubular hub 28 and socket out-

wardly thus moving the lower end of the lever 37 outward. As this movement takes place the roller 41 rides onto the lower portion of the cam 42. As the awl carrying pin 30 and lug 32 formed thereon are thus moved laterally the throat piece 49 swings backward to its normal position, which swinging movement is brought about by the pressure exerted by the spring pressed plug 52 upon the arm 51 carried by the shaft 48 on which said throat piece is mounted.

When the movements just described are completed the throat piece 49 occupies its normal position and the nail severed from the string occupies a position within the passage way 50 which latter is in direct vertical alinement with the puncture formed by the awl on the preceding feeding movement of the work. At this point in the operation of the machine the block 66 rides off the cam 65 and the power stored in the spring 61 moves the free end of the arm 59, and the driver bar 56 forcibly downward. The driver 55 carried by the lower end of the driver bar moves through the passage way 50 in the throat piece, thereby forcing the nail through said passage way and into the work positioned against the under side of the plate 4. By driving the nails into the punctures or recesses formed by the awl during the feeding movement of the work the driving of the nails straight through the work is insured, and the lower ends of said nails are clenched in the lower layer of the work in a much better manner than if said nails were to pass through the work at an angle. The upper end of the work engaging horn is firmly held against the under side of the work at the time the driving operation takes place, and for this reason the lower ends of the nails will strike against the top surface of said horn and be clenched in the under surface of the work. The plate 67 is provided with a series of grooves 74 in order that nails of different lengths may be used on my improved machine and the plate 67 is readily shifted by means of the lever 79 to bring the desired groove 74 into alinement with the passage way 50 in the throat piece. Fixed on the upper portion of the plate 67, and on the rear side thereof is a plate 75 provided with tongues 76 which extend downward over the upper portions of the nail grooves 74. These tongues are of different lengths and the exposed portions of the grooves 74 below said tongues correspond to the different lengths of nails which can be used in my improved machine.

It will be noted that both the guide 67 for the fastener stock and the throat piece move toward and from each other to bring them into alinement or coöperative relation, and the fastener is cut off while these parts are in coöperative relation. The com-

bined feeding and cutting member 85 moves the fastener stock along the guide and into the throat piece and then moves laterally with respect to the throat piece to cut off a fastener, the feeding member coöperating with the end of the guide as a coacting die. The throat piece and the awl carrier are provided with independent stops arranged to independently locate said parts in one of their positions. The stop 54 is arranged to locate the throat piece with respect to the driver, and this stop is adjustable to accurately aline the driver passage with the driver. The knurled head on the screw 35 forms a stop for the awl carrier and coacts with the bearing 27 in which the shank 28 of the awl carrier slides and rocks. By means of this construction the positions of the awl and of the throat piece may be adjusted independently of each other and independent of the main actuator 37, 38. The feeding stroke of the awl and its position with respect to the driver and the driver passage in the throat may thus be adjusted. These adjustments may be made without disturbing the adjustment of the throat, and similarly the throat may be adjusted independently without disturbing the adjustment of the awl.

A machine of my improved construction is comparatively simple, can be operated with little power, and provides means whereby nails in string form are rapidly cut apart and driven into awl holes formed in the work.

I claim:

1. In a machine of the class described, a throat piece mounted for rocking movement and provided with a nail passage way, nail driving means arranged to move through said passage way, a spring held adjustable member mounted to slide and rock, an awl carried thereby for engaging the work and moving the same beneath the rocking throat piece, and means for feeding a string of cut nails to the driving means and detaching the lowermost one of the string of nails before the same is engaged by the driving means.

2. In a machine of the class described, a member mounted for rocking movement and provided with a nail passage way, driving means operating through said passage way, a spring held adjustable member mounted to slide and rock, an awl carried thereby for engaging in the work and moving the same beneath the rocking member, and means whereby a continuous string of cut nails is fed into the passage way.

3. In a machine of the class described, a member mounted for rocking movement and provided with a nail passage way, driving means operating through said passage way, means whereby a continuous string of cut nails is fed into said passage way, a spring

- held adjustable member mounted to slide and rock, an awl carried thereby for engaging in the work and moving the same beneath the rocking member, and means for severing the lowermost one of the string of nails after the same is positioned in the passage way.
4. In a machine of the class described, a throat piece mounted for rocking movement, a driver operating therethrough, a rigid work support provided with an opening beneath the throat piece, and a vertically and laterally moving awl operating through the opening in the work support, an awl carrier bearing against the throat piece during its lateral movement in one direction, a nail chute, and means for intermittently moving a string of cut nails through said chute and delivering the lowermost nail of the string into the throat piece.
5. In a machine of the class described, the combination with nail driving means, of a spring held adjustable member mounted to slide and rock, an awl carried thereby for intermittently engaging and moving the work beneath the driving means, and means for feeding a string of cut nails to the driving means and detaching the lowermost nail of the string before the same is engaged by the driving means.
6. In a machine of the class described, a member mounted for rocking movement and having a nail passage way, a driver operating therethrough, a chute provided with a groove adapted to register with the nail passage way, a spring held adjustable member mounted to slide and rock, an awl carried thereby for engaging in the work and moving the same beneath the rocking member and nail feeding and severing means adapted to move a string of cut nails through the groove and detaching the lowermost one of said string of nails when the same is positioned in the nail passage way.
7. In a machine of the class described, a member arranged for rocking movement and provided with a passage way, a driver operating therethrough, a spring held adjustable member mounted to slide and rock, an awl carried thereby for engaging in the work and moving the same beneath the rocking member, a nail chute provided with a series of grooves, which chute is adjustable to permit the alinement of any one of the grooves with the nail passage way, and nail feeding and severing means for moving a string of cut nails through any one of the grooves in the chute, and detaching the lowermost one of the string of nails when the same is positioned in the nail passage way.
8. In a machine of the class described, a work engaging member, a spring held adjustable member mounted to slide and rock, an awl carried thereby for engaging the work and moving the same beneath the work engaging member, and means for severing the lowermost one of a string of cut nails and driving the same into the recess formed by the awl in the work.
9. In a machine of the class described, nail driving means, an awl adapted to engage in the work and feed the same beneath the driving means, a spring held adjustable member mounted to slide and rock and in which member the awl is seated, and means for feeding a string of cut nails to the driving means and severing the lowermost one of said string of nails before the same is engaged by the driving means.
10. In a machine of the class described the combination with a swinging throat piece, having a nail passage way, of driving means adapted to move through said passage way, a slotted work support beneath said swinging throat piece, a spring held adjustable member mounted to slide and rock, the forward end of which member is normally positioned above the slot in the work support, an awl carried by the forward end of said member which awl extends through the slot in the work support, and means for feeding the lowermost one of a string of cut nails into the passage way in the throat piece and severing said lowermost nail from the string.
11. In a machine of the class described, a driver, means whereby the lowermost one of a string of cut nails is severed from the string and moved into the path of travel of the driver, a spring held adjustable bell crank mounted to slide and rock, and an awl carried by the forward end of the horizontal arm of said bell crank for engaging and feeding work beneath the driver.
12. In a machine of the class described, a spring held throat piece mounted to rock and provided with a nail passage way, a driver operating through said passage-way, means whereby the lowermost one of a string of cut nails is severed from the string and moved into the passage way in the throat piece and in the path of travel of the driver, and work feeding and supporting means arranged beneath the driver.
13. In a machine of the class described, a work engaging member, a spring held adjustable bell crank mounted to slide and rock, an awl carried by the forward end of the horizontal arm of said bell crank for engaging and moving work beneath said member, a driver, a nail chute, means whereby a continuous string of cut nails is fed through said chute, and means for severing the lowermost one of the string of nails after the same is in position to be engaged by the driver.
14. In a machine of the class described the combination with severing and driving means, of a throat piece mounted for swinging movement, yielding pressure means for

resisting the swinging movement of said throat piece in one direction, an adjustable member mounted to slide and rock, an awl carried thereby said adjustable member bearing against and moving said throat piece, and a spring connected to the adjustable member for normally tending to elevate the forward end thereof, and withdraw the awl from the work.

15. In a machine of the class described the combination with nail severing and driving means, of a throat piece mounted to rock and through which throat piece the driving means operates, an adjustable bell crank mounted to slide and rock, means whereby sliding movement is imparted to said bell crank, a spring for imparting rocking movement to said bell crank, said bell crank bearing against and moving said throat piece, and an awl carried by said bell crank.

16. In a machine of the class described the combination with nail severing and driving means, of a throat piece mounted to rock, and through which throat piece the driving means operates, an adjustable bell crank mounted to slide and rock, means whereby sliding movement is imparted to said bell crank, a spring for imparting rocking movement to said bell crank, said bell crank bearing against and moving said throat piece, an awl carried by said bell crank and a slotted work support arranged beneath the swinging throat piece and through which the awl operates.

17. In a machine of the class described, the combination with a throat piece and a cooperating guide for fastener stock, of means for moving both said throat piece and guide toward and from each other to permit the stock to be fed to said throat piece, and means for severing a fastener from the fastener stock.

18. In a machine of the class described, the combination with a throat piece and a cooperating guide for fastener stock, of means for moving both said throat piece and guide toward and from each other into and out of cooperative relation, means for feeding the stock into the throat piece while said members are in cooperative relation, and means for severing a fastener from the fastener stock.

19. In a machine of the class described, the combination with a throat piece and a cooperating guide for fastener stock, of means for moving both said throat piece and guide toward and from each other into and out of cooperative relation, and means for feeding the stock into the throat piece and for severing a fastener from the stock while the throat piece and guide are in cooperative relation.

20. In a machine of the class described, the combination with a throat piece and a

guide for fastener stock, of means for moving both said throat piece and guide toward and from each other into and out of cooperative relation, and a feeding and cutting member for feeding the stock into the throat piece and for severing a fastener therefrom while the throat piece and guide are in cooperative relation.

21. In a machine of the class described, the combination with a throat piece and a guide for fastener stock, of a feeding and cutting member, and means for operating said member to feed the stock into the throat piece and to cooperate with said guide as a coacting die to cut off a fastener from the stock.

22. In a machine of the class described, the combination with a throat piece and a guide for fastener stock, of a feeding and cutting member, and means for operating said member to move the stock along the guide and into the throat piece, and at the end to its movement move it toward the guide to cooperate therewith as a coacting die and sever a fastener.

23. In a machine of the class described, the combination with a swinging guide for fastener stock, of a throat piece mounted to swing in a vertical plane toward and from said guide, and means for feeding the stock into the throat piece and for severing a fastener.

24. In a machine of the class described, the combination with fastener stock guiding and feeding mechanism and a throat piece movable toward and from said guiding and feeding mechanism, of work feeding awl mechanism including an awl carrier adapted to engage and move said throat piece.

25. In a machine of the class described, the combination with a guide for fastener stock, and a driver, of a throat piece movable toward and from said guide, and work feeding awl mechanism including an awl carrier adapted to engage and move said throat piece.

26. In a machine of the class described, the combination with a guide for fastener stock, and a driver, of a throat piece movable toward and from said guide, work feeding awl mechanism including an awl carrier adapted to engage and move said throat piece toward the guide, and a spring to return said throat piece.

27. In a machine of the class described, the combination with a frame and a driver thereon, of a throat piece mounted for movement on said frame, an actuator for moving said throat piece in one direction, a spring for returning said throat piece, and a stop mounted on said frame and independent of said actuator for arresting said throat piece.

28. In a machine of the class described, the combination with a frame and a driver thereon, of a throat piece and an awl mount-

ed for movement on said frame, actuating means for said throat piece and said awl, and stops on said frame independent of said actuating means for arresting said throat piece and said awl.

29. In a machine of the class described, the combination with a frame and a driver thereon, of a throat piece mounted for movement on said frame, means for moving the throat piece in one direction, a spring for returning the throat piece, and an adjustable stop for said throat piece.

30. In a machine of the class described, the combination with a frame and a driver thereon, of a throat piece and awl mechanism including an awl mounted on said frame for movement beneath the driver, means operating through the awl mechanism for moving the throat piece in one direction, means for moving the throat piece in the opposite direction, and a stop for said throat piece mounted on said frame independent of said operating means.

31. In a machine of the class described, the combination with a frame and a driver thereon, of a throat piece and awl mechanism including an awl mounted on said frame for movement beneath the driver, a spring engaging the throat piece for moving it in one direction, means operating through the awl mechanism for moving the throat piece in the other direction against the tension of said spring, and an adjustable stop for limiting the movement of said throat piece by said spring.

32. In a machine of the class described, the combination with a frame and a driver thereon, of a throat piece mounted for movement on said frame, awl mechanism for feeding the work and adapted to move the throat piece, and means for independently adjusting the throat piece and awl mechanism including an adjustable stop on the frame.

33. In a machine of the class described, the combination with a support, of work feeding awl mechanism including an awl carrier having a shank on which it is adapted to swing and slide, a spring for sliding said carrier in one direction, a stop for said carrier having an adjusting head, and means for operating said awl carrier.

34. In a machine of the class described, the combination with a support, of work feeding awl mechanism including an awl carrier, a bearing in said frame, and a shank on said awl carrier slidably and rotatably mounted in said bearing, a spring in said bearing for moving said awl carrier, and adjusting means for said awl carrier extending outside and accessible outside of said bearing.

35. In a machine of the class described, the combination with a support, of awl mechanism including an awl carrier, a bearing for said carrier adapted to permit it to

swing and slide thereon, yielding means for moving said carrier, and an adjustable stop for said carrier.

36. In a machine of the class described, the combination with a support, of awl mechanism including an awl carrier having a shank on which it is adapted to swing and slide, a spring for sliding said carrier, and an adjustable stop on said shank.

37. In a machine of the class described, the combination with a frame having a transverse bearing therein, of awl mechanism including an awl carrier having a shank slidably mounted in said bearing, an adjusting screw mounted in said shank and extending through said bearing, and an adjusting head on said screw forming a stop and engaging said bearing.

38. In a machine of the class described, the combination with a frame and a driver thereon, of a movable throat piece thereon, awl feed mechanism including an awl, an actuator constructed to move said throat piece and awl together in one direction, means to return said parts to independent positions, and means independent of said actuator for independently adjusting said throat piece and awl mechanism.

39. In a machine of the class described, the combination with a frame and a driver thereon, of a movable throat piece thereon, awl feed mechanism including an awl, operating means constructed to move said throat piece and awl together in one direction, and to return said parts to independent positions, and independent stops for independently adjusting said throat piece and awl mechanism.

40. In a machine of the class described, the combination with a frame and a driver thereon, of a movable throat piece thereon, awl feed mechanism including an awl carrier, operating means for moving said throat piece and awl carrier together in one direction, means for independently returning said throat piece and awl, and stops for said throat piece and awl carrier mounted independently on said frame and independent of said operating means.

41. In a machine of the class described, the combination with a frame and a driver thereon, of a movable throat piece thereon, awl feed mechanism including an awl, and means for operating said awl constructed to engage and move said throat piece in one direction, said means becoming disengaged from said throat piece when it returns to normal position.

42. In a string-nailing machine, the combination with a frame and a driver thereon, of a guide for a string of connected nails, a movable nail guiding throat, feeding and cutting means constructed and arranged to feed the string by engagement with the head of a nail on the string, and constructed and

arranged to cut a nail from the string, to position a cut nail in said throat, a work feeding awl, and means for moving said throat and awl alternately into the line of

5 drive.

43. In a string-nailing machine, the combination with a frame and a driver thereon, of a guide for a string of connected nails, a movable nail guiding throat, a feeding and cutting member constructed and arranged to engage the head of a nail on the string and feed the string into said throat, and then cut the string to position a cut nail in said throat, a work feeding awl, and means for moving said throat and awl alternately into the line of drive.

44. In a string-nailing machine, the combination with a frame and a driver thereon, of a guide for a string of connected nails, a nail guiding throat movable into and out of alinement with said driver and into and out of alinement with said guide, feeding and cutting means for feeding the string by engagement with the head of a nail on the string, and for cutting a nail from the string, constructed and arranged to position a cut nail in said throat when said throat is in alinement with said guide, and an inde-

pendently mounted work feeding awl movable transversely with respect to said driver to position the awl hole in alinement therewith.

45. In a string-nailing machine, the combination with a frame and a driver thereon, of a guide for a string of connected nails, a movable nail receiving member, feeding and cutting means constructed and arranged to engage the head of a nail on the string and feed the string into said nail receiving member, and constructed and arranged to cut the string to position a cut nail in said nail receiving member, means for moving said nail receiving member to position the nail therein in the line of drive, and work feeding and puncturing means including an awl cooperating with said other elements to feed the work and place the puncture formed therein in the line of drive.

In testimony whereof I hereunto affix my signature in the presence of two witnesses, this 16th day of April, 1910.

JOHN B. FLINT.

Witnesses:

W. K. AMICK,
H. L. WALKER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."