

1,058,661.

4 SHEETS--SHEET 1



George L. Anderson.  
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Inventor:  
Stephen A. Dobyne,  
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His Attorney.

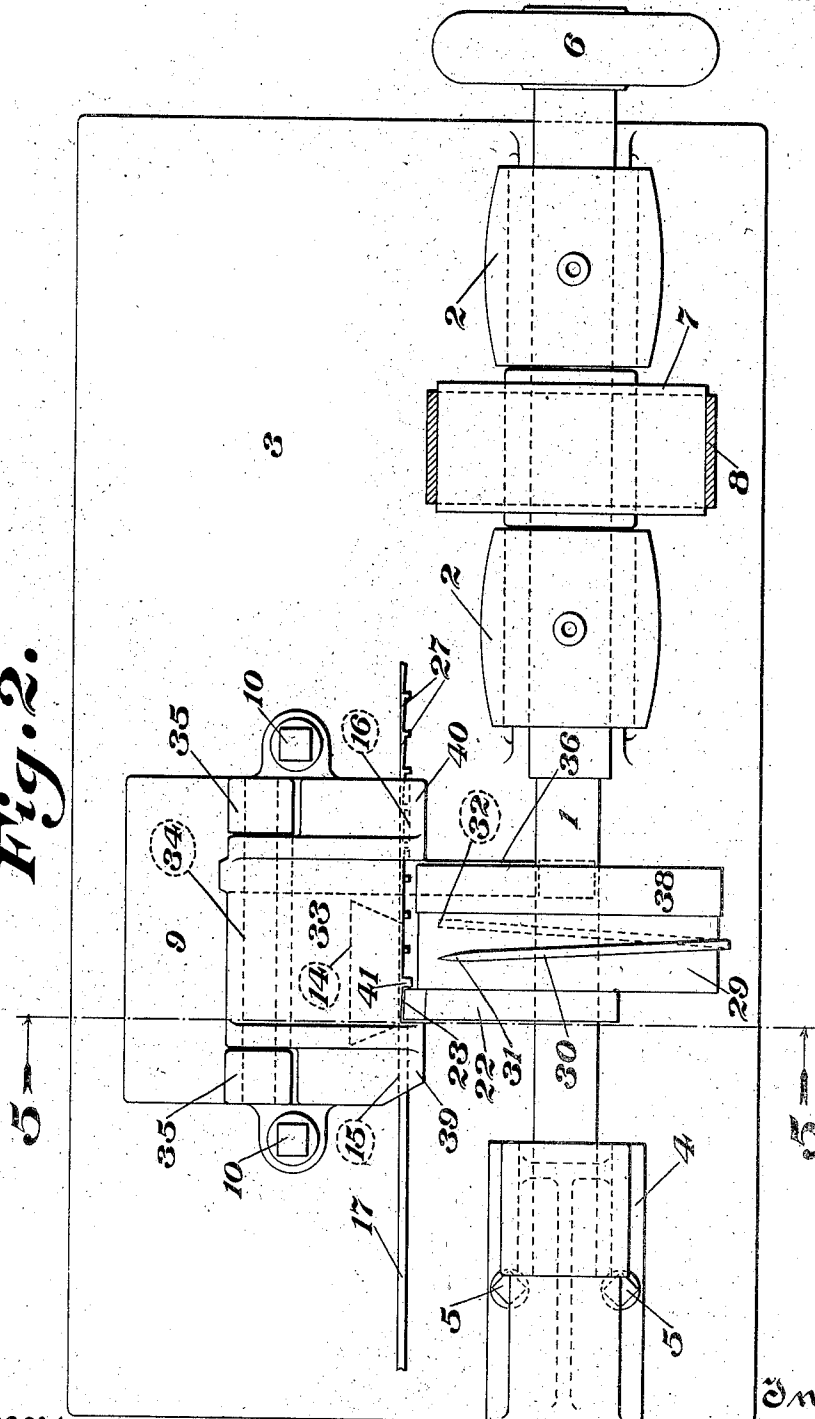
S. A. DOBYNE.  
NAIL MAKING MACHINE.  
APPLICATION FILED NOV. 21, 1910.

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Patented Apr. 8, 1913.

4 SHEETS—SHEET 2.

Fig. 2.



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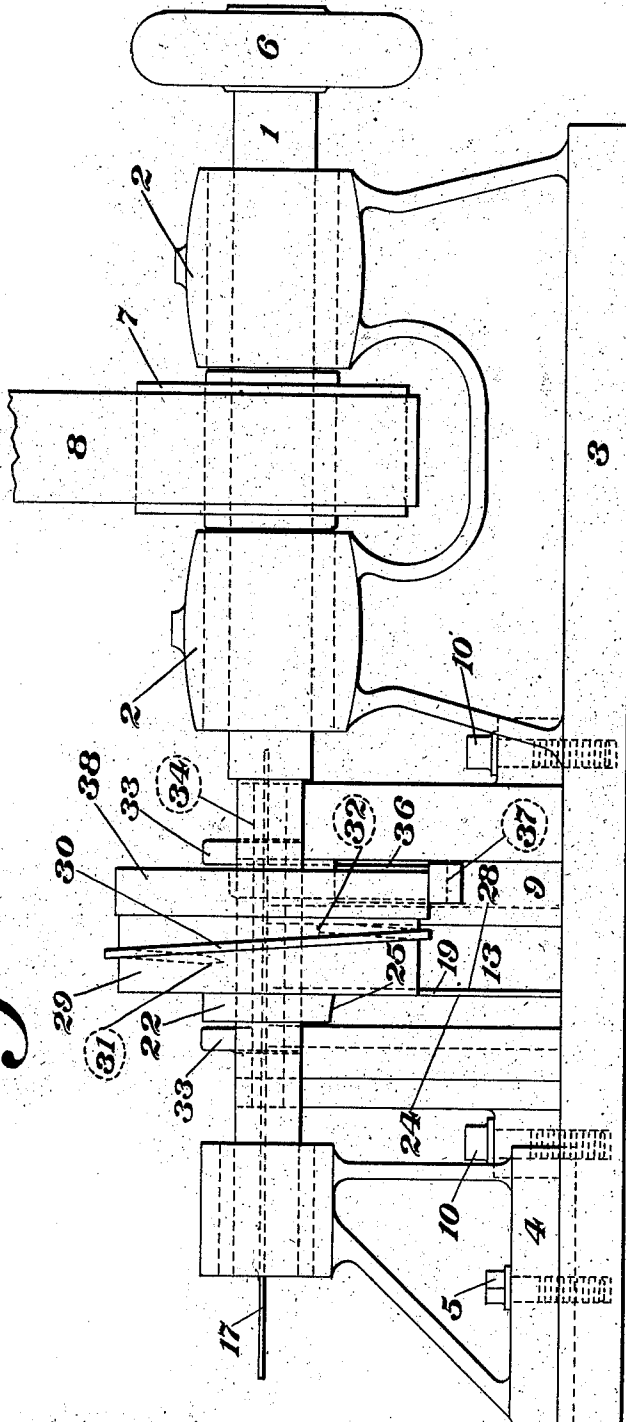
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4 SHEETS—SHEET 3.

Fig. 3.



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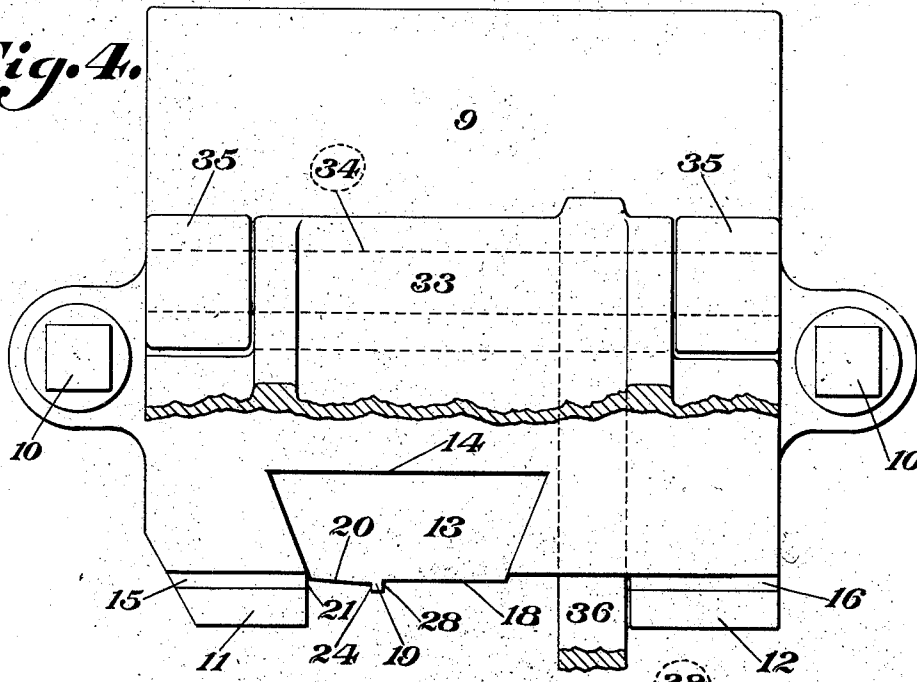
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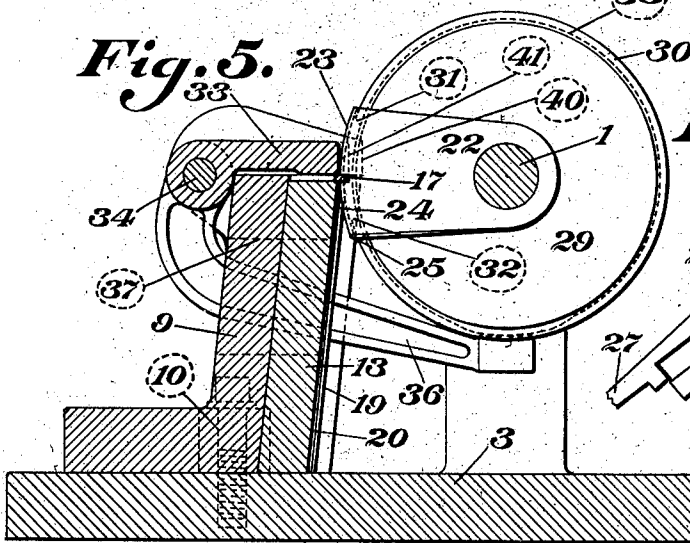
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4 SHEETS—SHEET 4.

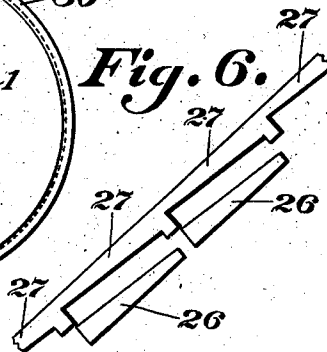
*Fig. 4.*



*Fig. 5.*



*Fig. 6.*



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# UNITED STATES PATENT OFFICE.

STEPHEN A. DOBYNE, OF ST. LOUIS, MISSOURI, ASSIGNOR TO CHAMPION SHOE MACHINERY COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION OF MISSOURI.

## NAIL-MAKING MACHINE.

1,058,661.

Specification of Letters Patent.

Patented Apr. 8, 1913.

Application filed November 21, 1910. Serial No. 593,329.

*To all whom it may concern:*

Be it known that I, STEPHEN A. DOBYNE, a citizen of the United States, residing at the city of St. Louis, State of Missouri, have invented certain new and useful Improvement in Nail-Making Machines, of which the following is a specification.

This invention relates to nail making machines and more particularly to machines for making nails of the type known as "string nails", that is, in the form of a string of connected headed nails.

The objects of this invention are to construct a nail making machine which is simple in construction, rapid in its operation and which will require little attention; and further objects will appear from the detail description taken in connection with the accompanying drawings, in which:

Figure 1 is a top plan view of a nail-making machine in conjunction with means for winding the finished nails; Fig. 2 is a top plan view, on an enlarged scale, of the nail-making machine; Fig. 3 is a side elevation of same; Fig. 4 is a top plan view, on an enlarged scale, of the stock-supporting member, the stock-clamping member being broken away; Fig. 5 is a sectional view on the line 5-5, Fig. 2; and Fig. 6 is a view, on an enlarged scale, showing several joined nails and pieces that are sheared from the metal band.

The shaft 1 is mounted in a pair of journal-boxes 2 supported on a suitable base 3. One end of said shaft is journaled in a pillow-block 4 secured to base 3 by means of bolts 5 or the like, and the other end of said shaft bears a hand-wheel 6 which affords a means for rotating said shaft by hand for the purpose hereinafter described. A pulley 7 rigidly mounted on shaft 1 is preferably located between journal-boxes 2 and is driven by belt 8, which receives its power from any suitable source.

A die-holder 9 is secured to base 3 by bolts 10 or other suitable means, and is provided with projections 11 and 12. A die 13 fits snugly in a groove 14 in die-holder 9 and rests upon base 3, said groove being preferably dovetailed to hold said die firmly in place. Said die is preferably arranged to incline from the perpendicular to base 3 and is located between projections 11 and 12. Grooves 15 and 16 are formed in the upper surfaces of projections 11 and 12, respectively,

in order to allow a ribbon band or strip of fastener stock to pass therethrough, and are preferably arranged to extend substantially parallel to the axis of shaft 1. This ribbon band or strip may be of steel or any other suitable material and may be of any desired cross-section; it is however preferably narrow so that the width will be equal to the width of the finished nail head. The top surface of die 13 is preferably arranged to extend at an acute angle to the face of said die and is disposed in the plane of the bottoms of grooves 15 and 16. Said grooves aline with the edge 18 of die 13 that forms the intersection of the top surface and the face of said die, in order to allow the band 17 to pass longitudinally over said edge, and are preferably shallower than the thickness of said band. The face of die 13 is provided with a projection or rib that extends longitudinally thereof and, also, with a bevel 20 which extends from said projection to a side edge of said face. Bevel 20 is preferably located adjacent the projection 11, so as to allow the upper end of said bevel to join approximately the middle part of the lower edge of the end 21 of groove 15. When the band 17 is fed through grooves 15 and 16 in the manner hereinafter described, one edge of said band projects over the upper end of bevel 20.

A plate or cutter 22 is rigidly mounted on shaft 1 and is provided with a curved end 23 that is adapted to pass between and closely to the end 21 of groove 15 and the edge 24 of projection 19. The end 23 of plate 22 is given the curvature of an arc that is preferably concentric to shaft 1 and is beveled so as to rotate closely to the upper end of bevel 20 of die 13 when shaft 1 is rotated. The edge 25 of the end 23 of plate 22 is preferably inclined to form a shearing edge. The shaft 1 is rotated counter-clockwise, Fig. 5, so that the shearing edge 25 is the foremost part of the end 23 to pass between the end 21 of groove 15 and the edge 24 of projection 19, whereby said shearing edge cuts or shears a piece 26 out of the exposed edge of band 17 that projects over the bevel 20 and forms a nail 27. The head of nails 27 rests upon projection 19, and the point of said nail is left connected to the end of band 17 that terminates at the end 21 of groove 15. When the end 23 of plate 22 moves away from the bevel 20, the

band 17 and the nail 2 attached thereto are moved toward the right, Fig. 4, in the manner hereinafter described, until the end of the band aligns with the edge 28 of projection 19 in order to allow the shearing edge 25 to cut another piece 26 from the edge of said band that projects over bevel 20 as just described, thereby forming another nail 27. The head of the second nail is left attached to the point of the first nail, and the point of the second nail is left attached to the end of ribbon 17 that terminates at the end 21 of groove 15. After the end 23 of plate 22 again moves away from the bevel 20, the band is moved toward the right, Fig. 4, until the end of the ribbon aligns with the edge 28 of projection 19. The shearing edge 25 again cuts a piece 26 from the edge of band 17 and forms a third nail 27 that is connected to the second nail and, also, to the end of the ribbon that terminates at the end 21 of groove 15.

A member 29 is rigidly mounted on shaft 1, and bears a helical thread or cam projection 30 that extends partly around same. The thread 30 is so arranged relative to the end 23 of plate 22 that, when said end 23 nearly releases the ribbon 17, the point 31 of said thread or cam moves into engagement with the left-hand side of the head of the first nail 27 to the right of projection 19, Fig. 2. After the end 23 of plate 22 releases the band 17, the thread 30 presses against the head of the first nail 27 to the right of projection 19 and thereby forces said nail and band 17 toward the right until the point of the next nail to the left of same reaches the edge 28 of projection 19. The end 32 of thread 30 then moves out of engagement with the head of said first nail and the shearing edge 25 of plate 22 cuts a piece 26 from the edge of the band, as hereinabove described. After the end 23 again releases the band 17, the thread 30 presses against the head of the first nail 27 to the right of projection 19 and thereby forces the nails and band 17 again toward the right, as hereinabove described.

A clamp 33 is pivotally attached to rod 34 that is supported by lugs 35 borne by die-holder 9. An arm 36 borne by clamp 33 extends through an opening 37 in die-holder 9 and projects into the path of rotation of the high side of a cam 38 borne by shaft 1. The ends 39 and 40 of clamp 33 extend over grooves 15 and 16, respectively, and a projection 41 extends over projection 19. Cam 38 is so arranged relative to the plate 22 that, while the shearing edge 25 of said plate cuts a piece 26 from the exposed edge of the band 17, the high side of cam 38 presses against the arm 36 of clamp 33 and thereby tends to rotate said clamp clockwise, Fig. 5, so that the end 39 holds the ribbon 17 in groove 15, the projection

41 holds the head of a nail 27 upon projection 19, and the end 40 holds the nails 27 in groove 16, whereby said band and nails are prevented from slipping. After the shearing edge 25 cuts a piece 26 from the edge of the band, the high side of cam 38 moves out of engagement with the arm 36, whereby the end 39 releases its pressure upon ribbon 17 and the end 40 and projection 41 release their pressure upon the nails 27 so as to allow said band and said nails to be moved toward the right, Fig. 2, as hereinabove described.

The ribbon 17 is preferably wound upon a reel or spool 42 that is journaled in suitable bearings 43. As the pieces 26 are cut from an edge of the band 17, as hereinabove described, a string of nails 27 is formed. For all practical purposes and convenience the string of nails is wound upon a reel or spool 44 by means of the following instrumentalities. The spool 44 is fastened upon a shaft 45 by a nut 46 or other suitable means, so as to rotate therewith, said shaft being mounted in journal-boxes 47. A pulley 48 is loosely mounted upon shaft 45 and is driven by belt 49 that receives its power from any suitable source. A spring 50 is preferably coiled about shaft 45 and is located between a pair of washers 51 that is loosely mounted on said shaft. Said spring presses one washer 51 against a collar 52 that is rigidly mounted on shaft 45 and holds the other washer in engagement with one side of the hub of pulley 48. A collar 53 is rigidly mounted on shaft 45 and is located adjacent the opposite side of the hub of pulley 48 in order to resist the pressure of spring 50. Said spring presses the hub of pulley 48 against collar 53 and thereby affords a frictional drive that causes shaft 45 to rotate with said pulley, in order to cause the string of nails to wind upon reel 44, while thread 30 feeds said nails toward said reel. While the shearing edge 25 of plate 22 cuts a piece 26 from an edge of band 17 the string of nails is prevented from moving toward reel 44, whereby said string of nails prevents said reel and shaft 45 from rotating, with the result that pulley 48 rotates loosely on said shaft. A miter-wheel 54 borne by shaft 45 meshes with and drives a miter-wheel 55 borne by shaft 56, said shaft 56 being mounted in a suitable journal-box 57. A shaft 58 is reciprocally mounted in supports 59, and bears a roller 60. A spring 61 holds roller 60 in engagement with an eccentric 62 borne by shaft 56, and, when said shaft 56 is rotated, said eccentric causes shaft 58 to reciprocate. The string of nails passes between the fingers 63 of a guide 64 borne by shaft 58, and, as said shaft reciprocates, the guide 64 reciprocates therewith and distributes the nails 27 uniformly upon reel 44. When the upper

end of bevel 20 or the upper end of projection 19 becomes worn, the top surface of die 13 can be ground and said die can be raised in groove 14 until the newly ground surface registers in the plane of the bottoms of grooves 15 and 16, it being necessary then to insert a wedge or filler (not shown in the drawings) beneath said die in order to support same.

10 The operation of the machine is as follows: The band 17 is passed through groove 15 until the end of same reaches the edge 28 of projection 19. Shaft 1 is then rotated by means of the hand-wheel 6, so as to  
15 cause the shearing edge 25 of plate 22 to cut a piece 26 from the exposed edge of the band 17, thereby forming a nail 27 that is left attached to said band. The band is moved toward groove 16 until the point of  
20 the first nail 27 reaches the edge 28 of projection 19 and the shaft 1 is again rotated by means of the hand-wheel 6, so as to cause the shearing edge 25 of plate 22 to cut another piece 26 from the edge of said  
25 band, whereby another nail 27 is formed and is left attached to the first nail and, also, to said band. The ribbon 17 is again shifted toward the groove 16 and another piece 26 is cut from the edge of said band, as  
30 hereinabove described, so as to form a third nail 27 that is attached to the second nail and, also, to said band. Shaft 1 is rotated by hand until a sufficient number of nails has been formed to extend into groove 16.  
35 Power is then applied to belt 8 which drives pulley 7 and shaft 1. After each operation of cutting a piece 26 from the edge of band 17 the helical thread 30 feeds the nails and band 17 toward the groove 16, as herein-  
40 above described, so as to allow the shearing edge 25 to cut another piece 26 from said band. After a sufficient number of nails 27 has been formed, the end of the string of nails is attached to a spool 44 upon which  
45 same is wound in the manner hereinabove described. The pieces 26 can be used for pegs, and for this reason none of the material is wasted, whereby the machine performs a twofold function.

50 The helical cam projection 30 operates to feed the stock by engagement with the head of the nail and this feeding member engages the stock at the completion of the cutting operation. The stock is therefore  
55 fed positively and accurately. The cutter moves and operates across the band and transversely of the line of feed to cut pieces out of and along one side of the band to form in this way a string of connected head-  
60 ed nails. The clamp extends across the band, and at the cutting point it extends only partially across the band to leave one edge thereof exposed, thereby supporting the band at the cutting point, on each side  
65 of the cutter however, the clamp extends

across the entire width of the band. In this way the stock will be supported firmly so as to result in an accurate formation of the nails on the string.

I claim:

1. In a nail-making machine, the combination of a revoluble member, a cutter carried thereby, a support adapted to hold the stock partly in the path of rotation of said cutter, and a helical member actuated by  
75 said revoluble member adapted to feed the stock intermittently.

2. In a nail-making machine, the combination of a die-holder having a groove through which a continuous band of material passes, a die supported by said die-holder and having an edge alining with  
80 said groove, a revoluble member, a cutter carried by said member and adapted to shear pieces from an edge of said band, a clamp pivoted to said die-holder and adapted to hold said band in said groove when  
85 same is cut, and a cam carried by said member and adapted to actuate said clamp.

3. In a nail-making machine, the combination of a die-holder having a pair of grooves through which a continuous band of material passes, a die disposed between  
90 said grooves and having an edge alining with same, a revoluble member, a cutter carried by said member and adapted to shear pieces from an edge of said band, a helical member carried by said revoluble member and adapted to feed said band intermit-  
95 tently through said grooves, a clamp pivoted to said die-holder and adapted to hold said band in said grooves when same is cut, and a cam carried by said revoluble member and adapted to actuate said clamp.

4. In a nail making machine, the combination of a die, a rotatable element having a helical projection to feed the stock, a cutter on one side of said element to shear the  
105 stock, a pivoted clamp to engage the stock and hold same in engagement with the die, and a cam on the opposite side of the rotatable element to actuate said clamp to successively move same to clamped and unclamped positions.

5. In a nail making machine, the combination of a die, a rotatable element having a helical projection to feed the stock, a cutter on one side of said element to shear the  
115 stock, a pivoted clamp to engage the stock and hold same in engagement with the die, an arm carried by the clamp and extending outwardly therefrom, and a cam carried by the rotatable element to actuate said arm to move the clamp successively to  
120 clamped and unclamped positions.

6. In a nail making machine, the combination of a die over which the stock passes, means to clamp the stock to the die, and a rotatable element having means thereon to  
125 successively act to cut the stock and to si-

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multaneously therewith actuate the clamp to clamped position and to move the clamp to released position and simultaneously therewith to feed the stock with respect to the die.

7. In a nail making machine, the combination of means for cutting the stock to form a continuous strip of connected nails, and a rotatable element having a helical projection to successively engage the heads of the nails to thereby feed the stock by moving the strip of connected nails.

8. In a nail making machine, the combination of a die to receive the stock thereon, a rotatable cutter adjacent the die, and means carried with the cutter and rotating therewith whereby on completion of the cutting movement to cut the stock said means will engage the stock and move the same with respect to the die and cutter.

9. In a nail making machine, the combination of a die to receive the stock thereon, a movable clamp to clamp the stock to the die, a rotatable cutter adjacent the die, means carried with the cutter and rotating therewith to actuate the clamp to clamping position, and second means carried with the cutter and rotating therewith to engage the stock and feed same with respect to the die and cutter.

10. In a nail making machine, the combination of a die, means to clamp the stock to the die, a movable member, and means on said member operating to successively actuate the clamp to locked position, shear the stock, unlock the clamp and positively feed the stock by engagement with a sheared portion thereof.

11. In a nail making machine, the combination of a die holder and a die carried thereby, a clamp pivoted to the holder and having an arm extending on the front side of the die, a rotatable cutter on the front side of the die cooperating therewith, and means rotatable with the cutter to engage said arm and thereby move the clamp to operative clamping position when the cutter acts on the work, and to release the arm at the completion of the cutting movement of the cutter.

12. In a nail making machine, the combination of the die, means to intermittently clamp the stock thereon, means to cut the stock, a reel on which the cut stock is wound, means to exert a rotating influence on the reel to thereby cause same to hold the stock between the reel and die under constant tension and to wind the stock on the reel by rotating the latter when said clamping means is released, and means engaging the cut stock and operated by the reel rotating means to move the stock back and forth across the reel during the rotation thereof.

13. In a nail making machine, the combi-

nation of the die, means to intermittently clamp the stock thereon, means to cut the stock, a reel on which the cut stock is wound, means to exert a rotating influence on the reel to thereby cause same to hold the stock between the reel and die under constant tension and to wind the stock on the reel by rotating the latter when said clamping means is released, and spring pressed cam actuated means engaging the cut stock and operated by the reel rotating means to move the stock back and forth across the reel during the rotation thereof.

14. In a nail making machine, the combination of a die, a cutter, and means connected with and movable with said cutter adapted to engage the stock at the completion of the cutting operation to intermittently and positively move the same with respect to the die.

15. In a nail making machine, the combination of a die, means adapted to guide and support a band of stock on said die, a projection extending from the face of said die and underneath said band, and a cutter and a feeding device operating on said band on opposite sides of said projection.

16. In a nail making machine, the combination of a die, means for intermittently feeding a band of stock across said die, and a cutter moving and operating across said band and transversely of the line of feed and adapted to cut pieces out of and along one side of said band to form a string of connected nails.

17. In a nail making machine, the combination of a die, means for intermittently feeding a band of stock across said die, a cutter moving and operating across said band and transversely of the line of feed and adapted to cut pieces out of and along the edge of said band to form a string of connected nails, and means for supporting said band on each side of said cutter for the entire width of said band.

18. In a nail making machine, the combination of a die, a clamp cooperating therewith to clamp a band of stock adapted to leave one edge thereof exposed, a cutter operating across said band to cut at each operation a piece out of the exposed edge of said band to form the head and point of one of a string of connected nails, means for intermittently feeding the band between said die and clamp, and means for operating said clamp to clamp the band while the cutter operates thereon and to unclamp the band while it is fed.

19. In a nail making machine, the combination of a die, a clamp cooperating therewith to clamp a band of stock adapted to leave one edge thereof exposed, a cutter operating across said band to cut at each operation a piece out of the exposed edge of said band to form the head and point

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of one of a string of connected nails, means for supporting said band on each side of said cutter for the entire width of said band, means for intermittently feeding the band  
 5 between said die and clamp, and means for operating said clamp to clamp the band while the cutter operates thereon and to unclamp the band while it is fed.

20. In a nail making machine, the combination of a die, a clamp cooperating therewith to clamp a band of stock adapted to leave one edge thereof exposed, a shaft, a cutter on said shaft operating across said band to cut at each operation, a piece out  
 15 of the exposed edge of said band to form one of a string of connected nails, means on said shaft for intermittently feeding the band between said die and clamp, and means on said shaft for operating said clamp to clamp the band while the cutter operates  
 20 thereon and to unclamp the band while it is fed.

21. In a nail making machine, the combination of a die, a clamp cooperating therewith to clamp a band of stock adapted to leave one edge thereof exposed, a shaft, a cutter on said shaft operating across said band to cut at each operation a piece out  
 25 of the exposed edge of said band to form one of a string of connected nails, and cams on said shaft, one of said cams operating to intermittently feed the band between said die and clamp, and the other operating said clamp to clamp the band while the cutter  
 30 operates thereon and to unclamp the band while it is fed.

22. In a nail making machine, the combination of a die for supporting a band of stock, a cutter adapted to cut at each operation a piece out of one edge of said band to form a string of connected headed nails,  
 40 and means operating in timed relation with said cutter adapted to engage the head of a nail so cut and positively feed the band.

23. In a nail making machine, the combination of a die for supporting a band of stock, a cutter adapted to cut at each operation a piece out of one edge of said band to form a string of connected headed nails,  
 50 and a cam device connected to and movable with said cutter adapted to engage the head of a nail so cut and positively feed the band.

24. In a nail making machine, the combination of a die for supporting a band of stock, a rotary cutter operating across the band and adapted to cut at each operation a piece out of one edge of said band to form a string of connected nails, and means rotating with said cutter adapted to engage  
 60 the head of a nail so cut and positively feed the band.

25. In a nail making machine, the combination of a die for supporting a band of stock, a rotary shaft extending parallel with  
 65 said band as supported, a cutter on said

shaft operating across the band and adapted to cut at each operation a piece out of one edge of said band to form a string of connected nails, and means rotating with said shaft adapted to engage the head of a nail  
 70 so cut and positively feed the band.

26. In a nail making machine, the combination of a die for supporting a band of stock, a rotary shaft extending parallel with said band as supported, a cutter on said shaft operating across the band and adapted  
 75 to cut at each operation a piece out of one edge of said band to form a string of connected nails, means rotating with said shaft adapted to engage the head of a nail so cut and feed the band, and means operated from  
 80 said shaft adapted to clamp the band while cut and to unclamp the same while fed.

27. In a nail making machine, the combination of a support having a guide for a band of stock, a separate die member mounted on said support, said guide extending on opposite sides of said die member, and said die member having its die face on a line with said guide, means for  
 85 feeding the band through said guide and over said die, and a cutter cooperating with said die to cut at each operation a piece out of and along one edge of the band to form a string of connected nails.  
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28. In a nail making machine, the combination of a support having a guide for a band of stock, a separate die member having a band engaging face and removably mounted on said support, said guide extending  
 100 on opposite sides of said die member, and said die member having its die face on a line with said guide, means for feeding the band through said guide and over said die, and a cutter cooperating with said die to cut at each operation a piece out of and along one edge of the band to form a string of connected nails.  
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29. In a nail making machine, the combination of a die, means for guiding a band of fastener stock across said die, a cutter operating across said band and transversely of the line of feed and adapted to cut at each operation a piece out of one side of said band to form at each operation the  
 110 head and point of one of a string of connected nails, and means engaging the head of a nail so cut constructed to positively feed said band.  
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30. In a nail making machine, the combination of a die, means for guiding a band of fastener stock across said die, a rotary cutter operating across said band and transversely of the line of feed and adapted to cut at each operation a piece out of one side of said band to form at each operation the  
 120 head and point of one of a string of connected nails, and means rotating with said cutter constructed to engage the head of a nail so cut and positively feed the band.  
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31. In a nail making machine, the combination of a die, means for feeding a band of stock across said die, a cutter moving and operating across the band and transversely of the line of feed and adapted to cut pieces out of the edge of the band to form a series of connected nails, and means extending partially across the band for guiding the band constructed to support the band rearwardly of the cutter and at the cutting point.

32. In a nail making machine, the combination of a die, means for feeding a band of stock across said die, a cutter moving and operating across the band and transversely of the line of feed and adapted to cut pieces out of the edge of the band to form a series of connected nails, and means for guiding the band constructed to support the band on each side of the cutter for the entire width of the band and extending partially across the band at a point opposite the cutter to support the band at the cutting point.

33. In a nail making machine, the combination of a die, a clamp cooperating therewith to clamp a band of stock adapted to leave one edge thereof exposed, a cutter operating across said band to cut at each operation a piece out of the exposed edge of said band to form the head and point of one of a string of connected nails, said die extending partially across the band to support the band at the cutting point, means for intermittently feeding the band between said die and clamp, and means for operating said clamp to clamp the band while the cutter operates thereon and to unclamp the band while it is fed.

34. In a nail making machine, the com-

bination of a die, a clamp cooperating therewith to clamp a band of stock adapted to leave one edge thereof exposed, a cutter operating across said band to cut at each operation a piece out of the exposed edge of said band to form the head and point of one of a string of connected nails, said die and clamp extending partially across the band to support the band at the cutting point, means for intermittently feeding the band between said die and clamp, and means for operating said clamp to clamp the band while the cutter operates thereon and to unclamp the band while it is fed.

35. In a nail making machine, the combination of a die, a clamp cooperating therewith to clamp a band of stock adapted to leave one edge thereof exposed, a cutter operating across said band to cut at each operation a piece out of the exposed edge of said band to form the head and point of one of a string of connected nails, means for supporting said band on each side of said cutter for the entire width of said band, means extending partially across the band to support the band at the cutting point, means for intermittently feeding the band between said die and clamp, and means for operating said clamp to clamp the band while the cutter operates thereon and to unclamp the band while it is fed.

In testimony whereof I have hereunto affixed my signature in the presence of two witnesses.

STEPHEN A. DOBYNE.

Witnesses:

GLADYS WALTON,  
GEORGE G. ANDERSON.