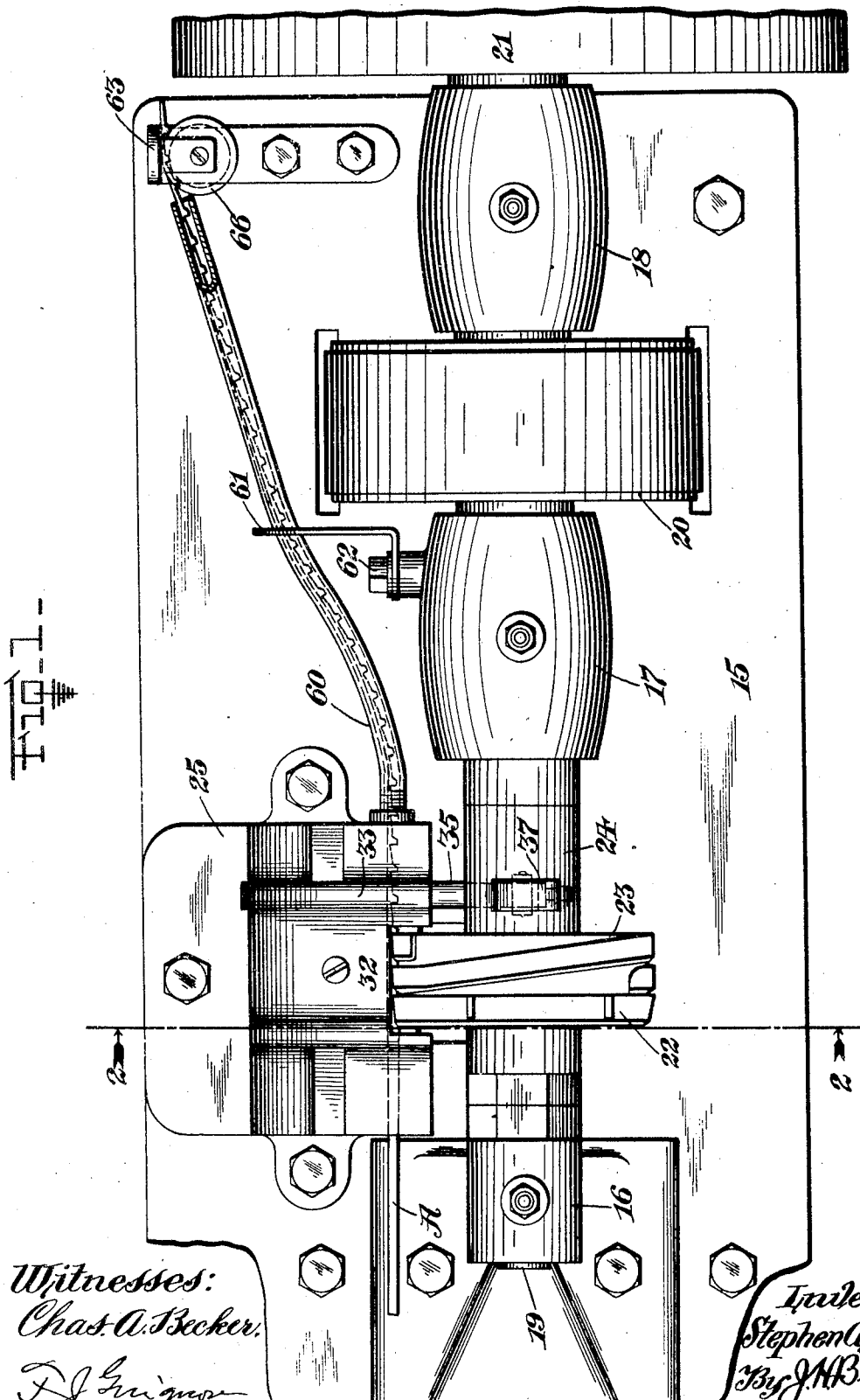


S. A. DOBYNE.
 STRING NAIL MAKING MACHINE.
 APPLICATION FILED DEC. 9, 1911.

1,058,662.

Patented Apr. 8, 1913.

3 SHEETS-SHEET 1.

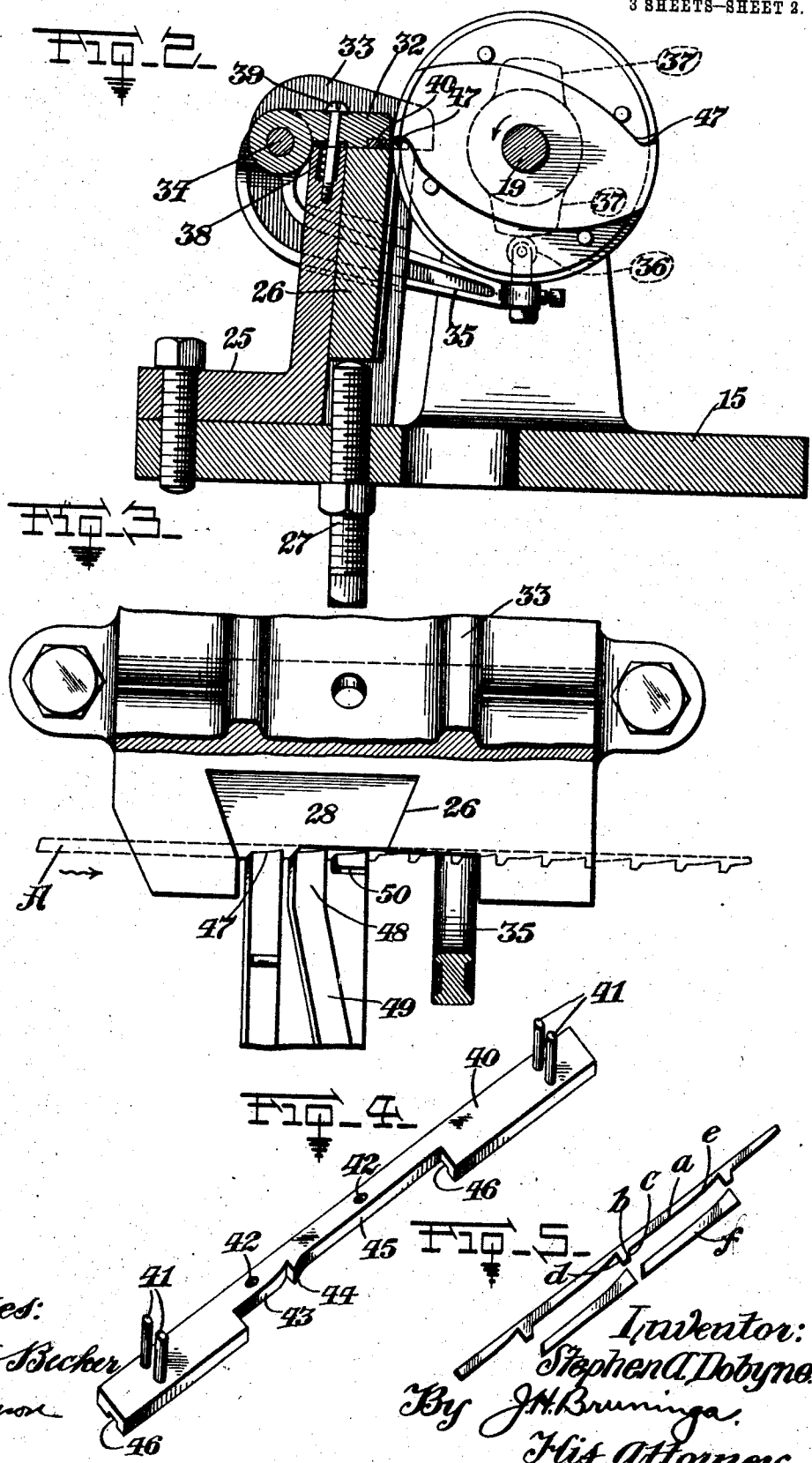


Witnesses:
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 D. J. Grignon

Inventor:
 Stephen A. Dobyne
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 3 SHEETS—SHEET 2.



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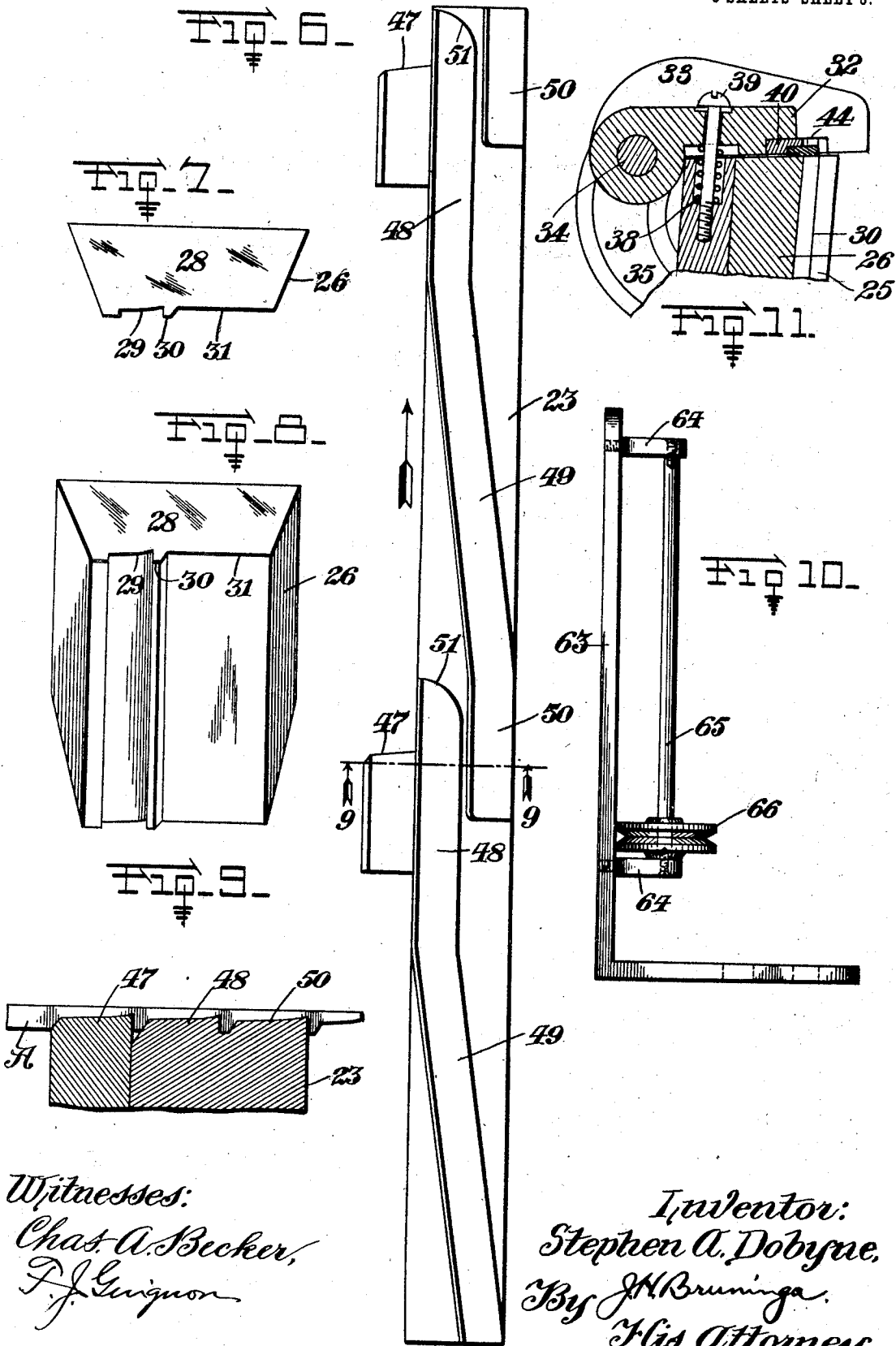
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UNITED STATES PATENT OFFICE.

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

STRING-NAIL-MAKING MACHINE.

1,058,662.

Specification of Letters Patent.

Patented Apr. 8, 1913.

Application filed December 9, 1911. Serial No. 664,817.

To all whom it may concern:

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

This invention relates to machines for making what is known as string-nails, *i. e.*, a string of connected nails which is adapted to be placed as a coil in a nailing machine, which feeds the string, and cuts off and drives the nails into the work.

The machine of this application is an improvement in a machine in my copending application Serial No. 593,329, filed Nov. 21, 1910.

The objects of this invention are to improve the construction of machines of the class described to cause a more accurate spacing of the nails on the string, a more positive action of the feeding, cutting and clamping means; to increase the output of such machines; to make the machine adjustable for nails of different sizes; and to improve the machine as to details.

Further objects will appear from the detail description taken in connection with the accompanying drawings in which:

Figure 1 is a plan view of a machine embodying this invention, Fig. 2 is a section on the line 2—2 Fig. 1, Fig. 3 is a detail plan view, Fig. 4 is a detail perspective view of the clamping plate, Fig. 5 is a view of the string of connected nails, Fig. 6 is a development of the cutter and of the feeding and positioning means, Fig. 7 is a detail plan view of the die, Fig. 8 is a detail perspective view of the die, Fig. 9 is a section on the line 9—9 Fig. 6 showing the strip of material in the machine, and Fig. 10 is a detail of the guide-wheel for the string as it leaves the machine, and Fig. 11 is an enlarged detail view of Fig. 2 with the cutter and feeder heads removed.

Referring to the accompanying drawings, 15 designates a bed plate having mounted thereon bearings 16, 17 and 18. A shaft 19 is mounted for rotation in these bearings, and is provided with a belt pulley 20 whereby the shaft may be driven from any suitable source of power, and with a hand wheel 21. The shaft 19 has also mounted thereon

to rotate therewith a cutter head 22, a feeder head 23, and a cam head 24, hereinafter to 55 be described.

A bracket 25 is bolted to the bed plate 15 and is provided with a vertical dove-tailed groove, as shown in Figs. 2 and 3, adapted to receive a removable die 26. This die is 60 vertically adjustable in the slot by means of a set screw 27. The die is provided with a hardened face 28 which can be ground as wear takes place, and after being ground down the wear can be compensated for by 65 the adjusting screw 27. The die is shown in detail in Figs. 7 and 8 and is provided with a cutaway portion 29 cooperating with the cutter, a rib 30, and with a cutaway portion 31. A clamping member cooperates with 70 the die to clamp the material on the die, and this clamping member comprises a jaw 32 ribbed as shown at 33 and pivoted at 34 upon the bracket 25. An arm 35 is connected to the jaw and extends underneath the 75 shaft 19 and is provided with a cam roll 36 adjustably mounted therein and engaged by cam rises 37 upon the head 24. These cam rises operate to move the jaw 32 toward the die, and a spring 38 is provided to separate 80 the jaw from the die. A stop screw 39 extends loosely through the jaw 32 and into the bracket 25 and is arranged to adjustably limit the movement of the jaw away from 85 the die. The lower face of the jaw is recessed as shown in Figs. 2 and 11 and is arranged to receive a detachable clamping plate 40 shown in detail in Fig. 4. This plate is provided with dowel pins 41 engaging corresponding holes in the jaw and with 90 holes 42 engaging corresponding pins in the jaw. The plate is provided with a cutaway portion 43, with a rib 44, and with a cutaway portion 45 corresponding to the parts 29, 30 and 31 respectively of the die. The lower 95 face of the plate is provided with a groove 46 extending along its whole length and adapted to receive and guide the stock operated upon.

The cutter head is provided with cutting 100 edges 47, and these cutting edges are inclined as shown in Figs. 2 and 6 so as to operate upon the stock with a draw cut. The feeding head 23 is provided with cam projections or ribs extending helically around 105 the head 23. In this particular instance

each rib extends a little over half way around the head so that one rib overlaps the other. Each rib comprises a portion 48 located and extending in a plane at right angles to the shaft, a portion 49 extending in a plane at an acute angle to the shaft, and a portion 50 extending in a plane at right angles to the shaft. The portion 48 of one rib overlaps the portion 50 of the other rib, and these portions form the low or holding portions of the cam while the portions 49 form the rise or cam portions. As shown in Figs. 6 and 9 the right edges of the ribs are square while the left edges are beveled, and the ends of the portions 48 are also rounded as shown at 51.

A tube 60 is secured to and extends from the bracket 26 at the point where the groove 46 terminates. This tube is supported by a vertical slot in a bracket 61 secured to the bracket 17 by means of a bolt 62. A bracket 63, shown in detail in Fig. 10, is provided with lugs 64 supporting a vertical shaft 65 upon which is loosely mounted a grooved guide-wheel 66 so that this guide-wheel has a limited free movement vertically. The strip of stock as discharged from the die and cutter is guided by the tube 60 and guide wheel 66 and from there passes to the usual reel as shown in my copending application. The tube 60 has a limited vertical movement with the guide-wheel 66 so as to adjust itself automatically as the stock is wound on the reel. The tube is flexible enough to permit such a limited movement.

The operation of the machine is as follows: Assuming the parts to be slightly back from the position shown in Fig. 2 so that the clamping jaw will be unclamped, but so that the portion 48 of the cam rib will still be opposite the groove 46. The strip A can now be inserted in the groove until it abuts against the left hand face of 48. If the shaft is now rotated in the direction of the arrow Fig. 2, (by the hand wheel 21) the jaw 32 will first be moved to clamping position to firmly clamp the strip on the die, and the cutter will then descend to cut a piece *f* (Fig. 5) out of the edge of the strip. As soon as the cutter has passed the strip and the jaw is unclamped, the strip can be moved in the direction of the arrow Fig. 3 and held in engagement with the left edge of the rib. In this way the strip can be fed a distance equal to the length of one nail, so that when the next cutting edge comes down a fresh edge of the strip will be presented to the cutter, and the strip will be clamped before and while the cutting edge operates to cut another piece out of the edge of the strip. After the first nail has thus been formed, the shaft can be started by power and the cam ribs will operate automatically to feed the strip through the machine by engagement with the heads of the cut nails.

At each revolution two complete nails will be formed.

It will be noted that at the time that the cutter operates on the strip, this strip will not only be firmly clamped by the jaw and the die, but the head of the previously cut nail will be embraced and supported on both sides by the cam portions 48 and 50 against endwise movement in view of the fact that these cam portions are straight. This support continues as long as the cutter is in engagement with the strip. This construction therefore insures not only accuracy in the forming of the nails, but also absolute accuracy in their spacing, since the strip is held firmly against all endwise movement while being cut, and is also prevented from over-feeding as is the case with other feeding mechanisms. This is due to the fact that the strip is supported against endwise movement in both directions at the time that the cutting takes place and at the time that the feed takes place.

The string as formed by this machine is shown in Figs. 1 and 5. Each nail comprises a shank *a*, a head *b* having one beveled face *c* and a square end *d*, and the die and cutter are so constructed as to form a well defined point *e*. By forming such a defined point the desired strength of the shank is maintained, at the same time forming a point small enough to permit ready severance of a nail from the strip, and permitting the severed nail to be readily driven. The pieces *f* may be used as slugs in machines constructed for that purpose.

It will be noted that both the die and the plate 40 are removable so that these parts can be readily exchanged with a different die and plate for nails of different sizes or shapes. The cutter head 22 and the feeding head 23 can also be interchanged with cutter heads and feeder heads of different sizes and shapes. For this purpose the feeder head is keyed on the shaft and the cutter head is positioned with respect to the feeder head by pins as shown in Fig. 2. In this way the machine can be quickly adjusted for nails of different sizes.

It is obvious that various changes may be made in the details of construction within the scope of the claims without departing from this invention, and it is therefore to be understood that this invention is not to be limited to the specific construction shown and described.

Having thus described the invention what is claimed is:

1. In a string-nail making machine, the combination of a cooperating die and cutter adapted to operate on a strip to form a string of connected nails, means for clamping said strip while it is being cut, and means for feeding the strip with respect to said die and cutter and for positively hold-

ing said strip against endwise movement while it is being cut.

2. In a string-nail making machine, the combination of a cooperating die and cutter adapted to operate on a strip to form a string of connected nails, means for clamping said strip while it is being cut, and means for feeding the strip with respect to said die and cutter and for engaging the head of a cut nail to hold said strip against endwise movement while it is being cut.

3. In a string-nail making machine, the combination of a cooperating die and cutter adapted to operate on a strip to form a string of connected nails, means engaging a cut nail head adapted to feed the strip with respect to said die and cutter and adapted to hold said strip against endwise movement while it is being cut.

4. In a string-nail making machine, the combination of a cooperating die and cutter adapted to operate on a strip to form a string of connected nails, means for intermittently feeding the strip with respect to said die and cutter and for positively holding said strip against endwise movement while it is being cut.

5. In a string-nail making machine, the combination of a cooperating die and cutter adapted to operate on a strip to form a string of connected nails, means for intermittently feeding the strip with respect to said die and cutter and for engaging the head of a cut nail to hold said strip against endwise movement while it is being cut.

6. In a string-nail making machine, the combination of a cooperating die and cutter adapted to operate on a strip to form a string of connected nails, a member constructed to feed the strip with respect to said die and cutter and to positively hold said strip against endwise movement while it is being cut.

7. In a string-nail making machine, the combination of a cooperating die and cutter adapted to operate on a strip fed with respect thereto to form a string of connected nails, and a member adapted to engage the head of a cut nail and hold the strip against endwise movement while it is being cut.

8. In a string-nail making machine, the combination of a cooperating die and cutter adapted to operate on a strip fed with respect thereto to form a string of connected nails, means for clamping said strip, and means engaging and embracing the head of a cut nail for holding said strip against endwise movement while the cutter operates thereon.

9. In a string-nail making machine, the combination of a cooperating die and cutter adapted to operate on a strip fed with respect thereto to form a string of connected nails, means for clamping said strip, and a rotary member having means for feeding

said strip and for positioning the same while being cut.

10. In a string-nail making machine, the combination of a cooperating die and cutter adapted to operate on a strip fed with respect thereto to form a string of connected nails, means for clamping said strip, and a cam device constructed to feed said strip and hold the same against endwise movement while clamped.

11. In a string-nail making machine, the combination of a cooperating die and cutter adapted to operate on a strip fed with respect thereto to form a string of connected nails, and means engaging the head of a cut nail adapted to positively feed the strip with the points of the cut nails foremost.

12. In a string-nail making machine, the combination of a cooperating die and cutter adapted to operate on a strip fed with respect thereto to form a string of connected headed nails, and feeding means constructed to receive the head of a cut nail therebetween and adapted to feed the strip endwise.

13. In a string-nail making machine, the combination of a cooperating die and cutter adapted to operate on a strip fed with respect thereto to form a string of connected nails, and a clamp cooperating with said die having a removable strip engaging member thereon.

14. In a string-nail making machine, the combination of a cooperating die and cutter adapted to operate on a strip fed with respect thereto to form a string of connected nails, a clamp cooperating with said die, a removable strip engaging plate having a strip guiding groove therein, and means for locating said plate with respect to said die and cutter.

15. In a string-nail making machine, the combination of a removable die and a cooperating removable cutter adapted to operate on a strip, a removable feeding member for said strip, and a removable clamping member for said strip, said removable members being mounted to be interchangeable with other members to permit the machine to be adjusted to make nail-strings of different sizes.

16. In a string-nail making machine, the combination of a cooperating die and cutter adapted to operate on a strip fed with respect thereto to form a string of connected nails, a clamping member cooperating with said die to clamp the strip while the cutter operates thereon, means for operating said clamping member, and a spring for separating said clamping member from said die.

17. In a string-nail making machine, the combination of a cooperating die and cutter adapted to operate on a strip fed with respect thereto to form a string of connected nails, a clamping member cooperating with said die to clamp the strip while the cutter

operates thereon, means for operating said clamping member, a spring for separating said clamping member from said die, and a stop engaging said clamping member to
5 limit the separation.

18. In a string-nail making machine, the combination of a die, a rotary cutting member having a plurality of successively operating cutters adapted to operate on a strip
10 on said die to form a string of connected nails, and a plurality of successively operating rotary feeding members constructed to successively engage the heads of cut nails and feed the strip.

15 19. In a string-nail making machine, the combination of a die, a rotary cutting member having means thereon adapted to operate on a strip on said die to form a string of connected nails, and a rotary feeder head
20 having a plurality of overlapping circumferential cams thereon constructed to successively engage the heads of cut nails and feed the strip.

20. In a string-nail making machine, the combination of a cooperating die and cutter
25 adapted to operate on a strip to form a string of connected nails, and a plurality of overlapping members constructed to engage the heads of cut nails and hold the strip against endwise movement while the cutter
30 operates thereon.

21. In a string-nail making machine, the combination of a cooperating die and cutter adapted to operate on a strip to form a string of connected nails, and a member
35 having a plurality of overlapping cams thereon constructed to engage the heads of cut nails adapted to feed the strip and hold the strip against endwise movement while the cutter operates thereon.
40

In testimony whereof I affix my signature in presence of two witnesses.

STEPHEN A. DOBYNE.

Witnesses:

J. H. BRUNINGA,

E. B. DOBYNE.