F. A. BRACKETT.

NAILING MACHINE.

APPLICATION FILED AUG. 7, 1915.

1,203,554.

Patented Oct. 31, 1916.

4 SHEETS—SHEET 1.

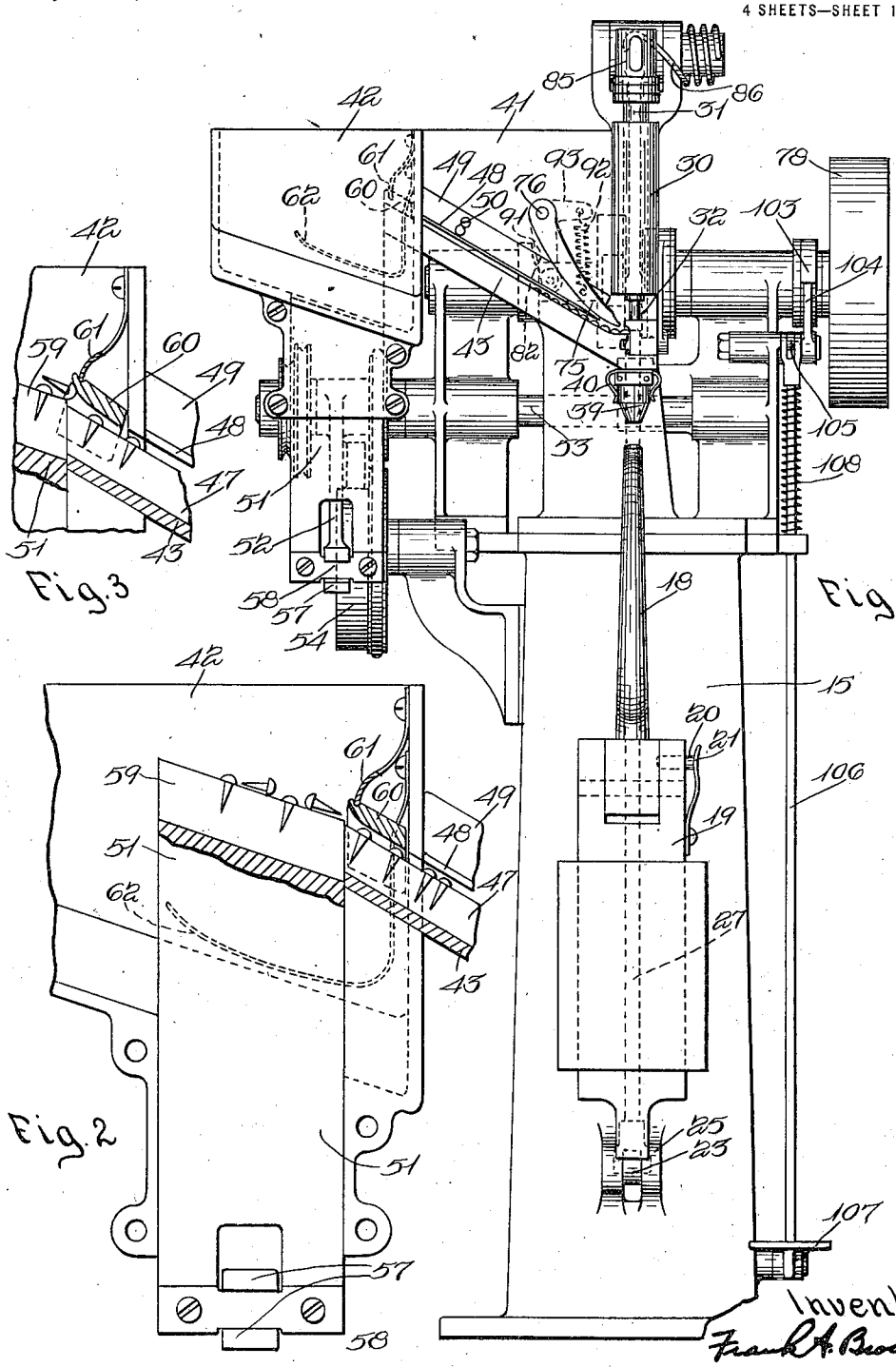


Fig. 3

Fig. 1

Fig. 2

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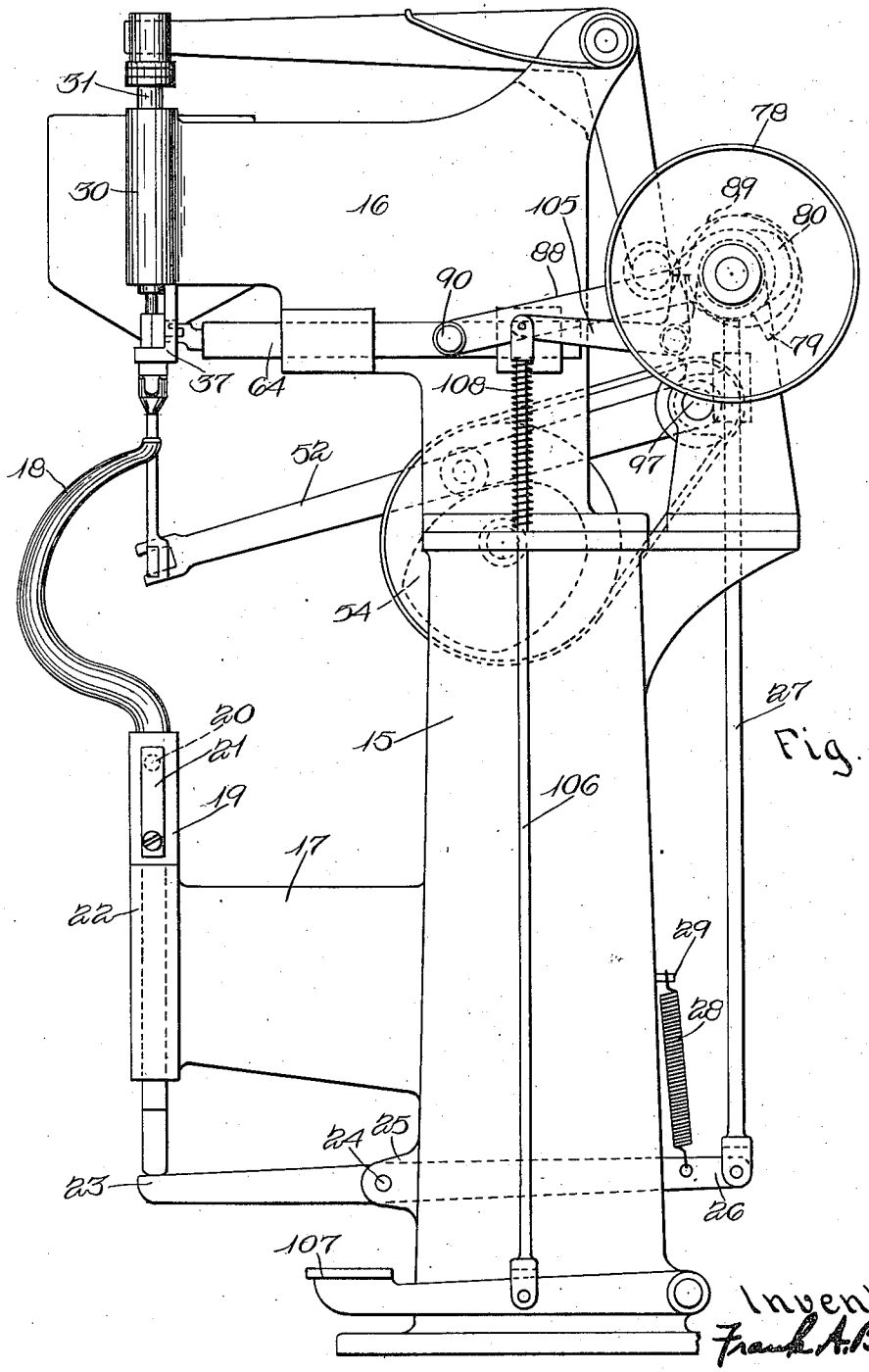


Fig. 4.

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4 SHEETS—SHEET 3.

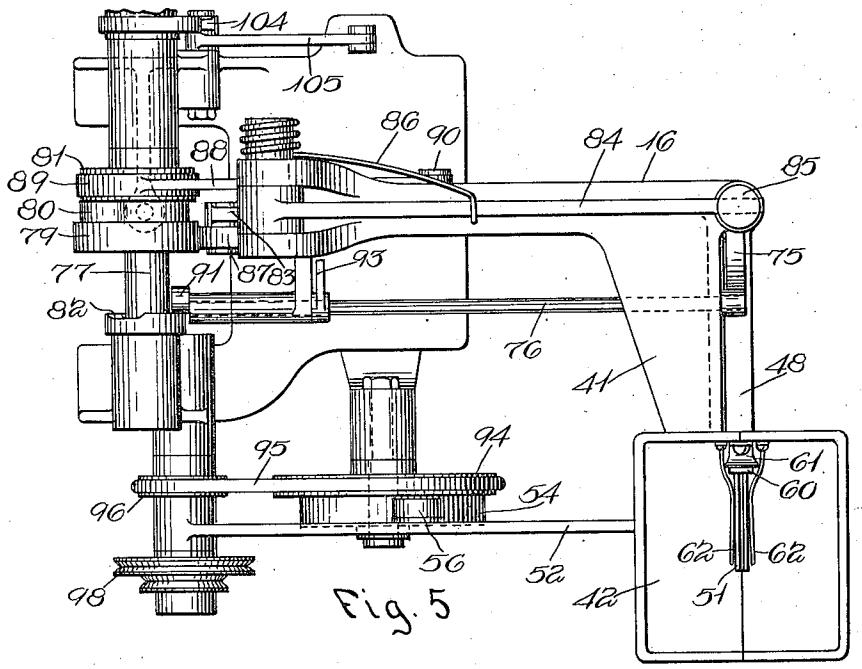


Fig. 5

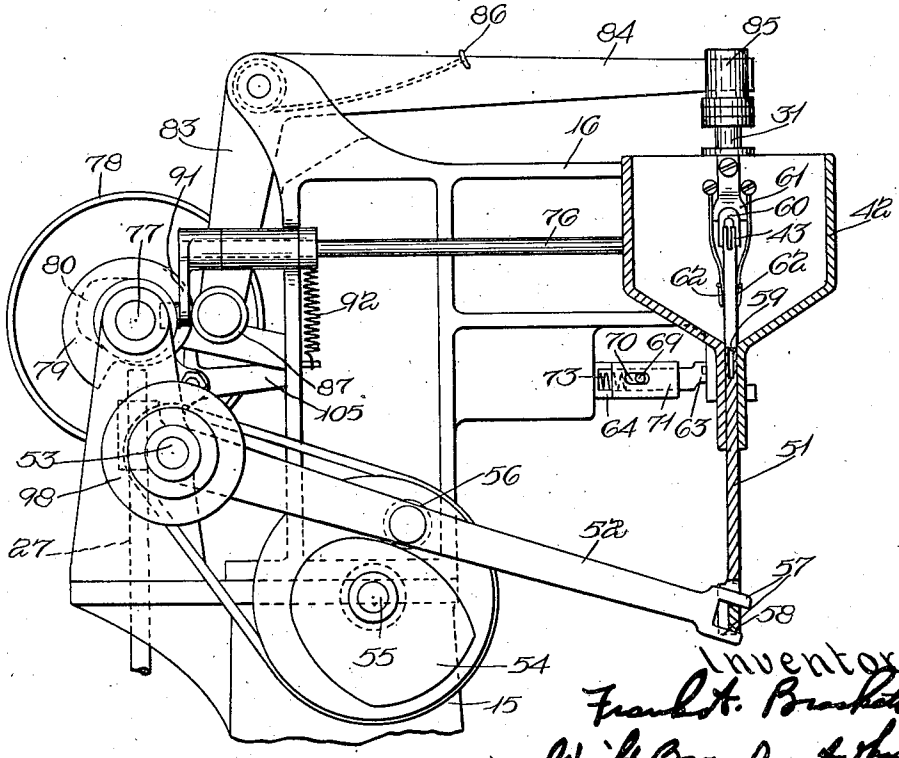


Fig. 6.

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4 SHEETS—SHEET 4.

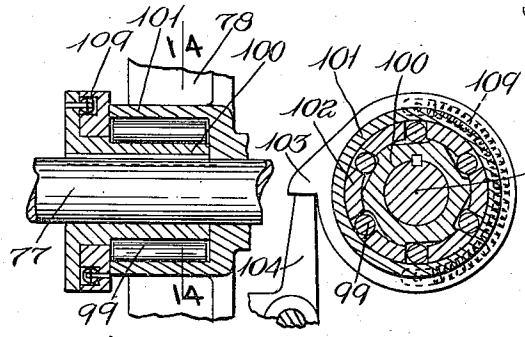


Fig. 13

Fig. 14

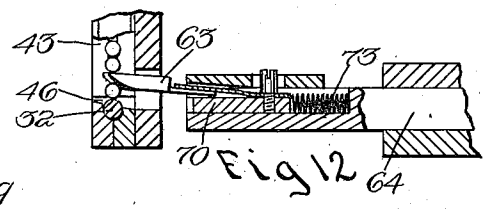


Fig. 12

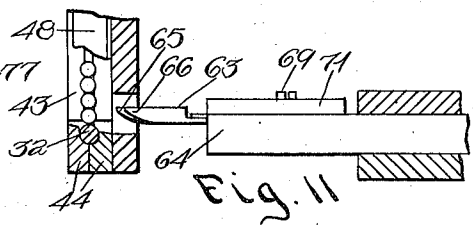


Fig. 11

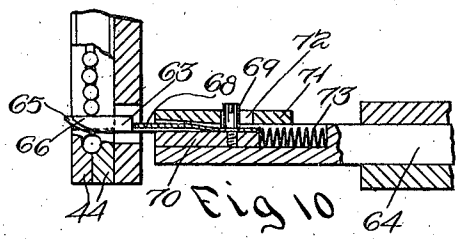


Fig. 10

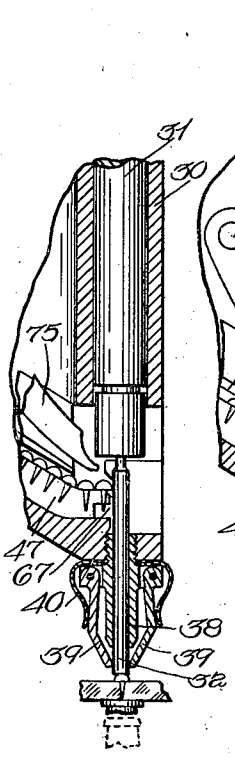


Fig. 7

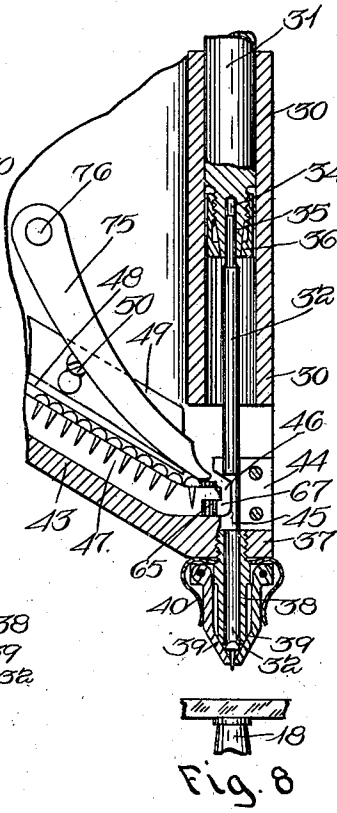


Fig. 8

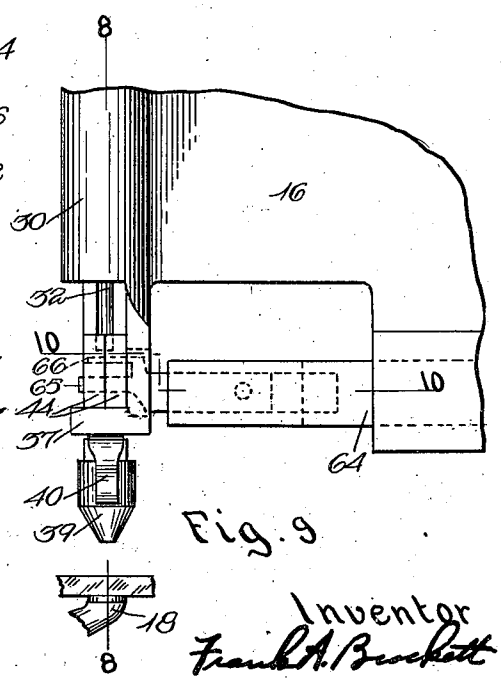


Fig. 9

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UNITED STATES PATENT OFFICE.

FRANK A. BRACKETT, OF MANCHESTER, NEW HAMPSHIRE, ASSIGNOR TO W. H. McELWAIN COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

NAILING-MACHINE.

1,203,554. Specification of Letters Patent. Patented Oct. 31, 1916.

Application filed August 7, 1915. Serial No. 44,255.

To all whom it may concern:

Be it known that I, FRANK A. BRACKETT, a citizen of the United States, and resident of Manchester, in the county of Hillsborough and State of New Hampshire, have invented certain new and useful Improvements in Nailing-Machines, of which the following is a specification.

The present invention relates to machines for driving nails or tacks, the work for which the particular machine here shown is designed being that of driving hobnails in the soles of shoes, but of course the principle of the invention is not restricted to the driving of any particular sort of nails in any particular location or work.

The invention principally concerns improvements in the construction and mode of operation of a machine of this character by which to guard against improperly placing the nails in the raceway which feeds them to the driving location, in an improved means for transferring the nails one by one from the raceway into the path of the nail driver, and in other features hereinafter described and claimed.

In the drawings, Figure 1 is a front elevation of a nailing machine embodying my invention. Fig. 2 is a detail view showing a part of the nail hopper and the nail lifter which operates therein. Fig. 3 is a view of the same parts, somewhat broken away, illustrating the action of one of the improvements with which my invention is concerned. Fig. 4 is a side elevation of the entire machine as seen from the right hand side of Fig. 1. Fig. 5 is a plan view of the machine. Fig. 6 is an elevation as seen from the left of Fig. 1 showing the nail hopper and nail lifter in section. Figs. 7, 8, and 9 are detail views illustrating in elevation and in section the operation of the nail feeder and nail driver. Figs. 10, 11, and 12 are horizontal sectional plan views illustrating the construction and mode of operation of the nail feeder. Figs. 13 and 14 are, respectively, an axial section and a cross section of the clutch used for intermittently applying power to drive the machine.

Referring to the drawings, 15 represents a column or pedestal on the top of which is secured a head 16 and from the lower part of which projects a bracket 17 beneath the head. The bracket 17 supports a horn 18 which forms the work support when the machine is designed to drive nails in shoes, although of course other forms of work supports may be used for other characters of work. The shank of the horn is set into a block 19 and secured by a pin 20 which is pressed upon by a spring 21. The block slides in a bearing or guideway 22 on the bracket and rests upon the arm 23 of a lever which is pivoted at 24 to lugs 25 on the column, and which has a second arm 26 connected to a link 27 rising at the rear of the column and to which is also connected a spring 28 so arranged and anchored to the column, as by means of a pin 29, that it tends to raise the arm 26 and rod 27, thereby lowering the arm 23 and permitting the horn to assume a lowered position.

The head 16 has a bearing or guideway 30 directly over the work supporting end of the horn in which there is mounted movably a driver bar 31 carrying a driver 32, the latter being shown in detail in Fig. 8 and having a shank which is inserted into a socket 34 in the lower end of the bar 31 between jaws 35, which are clamped upon it by a nut 36 screwed on the bar and pressing upon the tapered outer surfaces of the jaws. A bracket 37 depends from the head 16 and holds a tube 38, which has a guiding channel to receive the driver and upon which are externally pivoted jaws 39 which are actuated by springs 40 so as to come together below the outlet of the tube 38, their function being, as usual in machines of this class, to hold the nail or tack in position for driving and to give way under the pressure of the driver.

At one side of the head 16 there is a laterally projecting arm 41 which supports the nail hopper 42. From the hopper an inclined raceway 43 extends toward the location of the driver and terminates in the open space between the lower end of the bearing 30 and the upper end of the guide tube 38. It should be noted that the bracket 37 supports two blocks 44 which are riveted or screwed together and are recessed to form a vertical passage 45 for the driver and a lateral recess 46 opposite to the end of the raceway and opening into such passage to admit nails.

The raceway may be of any usual or other construction and is here shown as a narrow

trough having a shallow groove 47 adapted to receive the shanks of nails, of which the heads rest on the edges of the groove. A plate 48 overlies the raceway and is provided with a web 49 which lies against the arm 41 and is hung upon studs 50 projecting from such arm.

A nail lifter 51 reciprocates vertically through an opening in the bottom of the nail hopper, and projects below the latter, being connected to a lever 52 which is pivoted on a shaft 53 and is actuated by a cam 54 on a shaft 55, said lever having a roll 56 resting on the cam. The connection between the lever and lifter is made by jaws 57 on the lever embracing a bar 58 on the lifter. The lifter is formed with a groove 59 in its upper edge adapted to receive the shanks, and being too narrow to admit the heads, of the nails. It is located in line with the raceway and substantially in contact with the inner end of the latter, when raised, and passes through the lowest point of the hopper bottom, as shown in Fig. 6, being alternately lowered in its operation below such lowest point and raised to the level of the raceway, thereby being caused to pick up nails and deliver them to the raceway in a well known manner.

One of the improvements to which my invention relates is a device for preventing clogging of the raceway by nails which might be improperly placed upon the lifter while being raised thereby. This device is a U shaped member or saddle 60 which embraces the end of the raceway adjacent to the lifter and has shoulders resting on the top of the raceway as shown in Fig. 6. The channel in this piece is wide and deep enough to allow the head of a properly placed nail to pass without touching it, but not enough to admit the head when the nail happens to be carried by the lifter in a reclining position as shown in Fig. 3. The saddle is held in the normal position by a resilient brace 61 fixed to the front wall of the hopper and engaging the saddle in the manner best shown in Figs. 2 and 3. It sometimes happens that a nail becomes lodged on the lifter in a reclining position with its shank resting on the head of the next nail and its head bearing against the end of the raceway. A nail so placed is prevented by the saddle from entering the raceway, and if it should become jammed between the saddle and lifter, as indicated in Fig. 3, the spring brace allows the saddle to give way and avoid crushing the nail or doing other damage.

I provide strippers 62 for removing nails which might lodge crosswise of the lifter. Such strippers are conveniently wire secured to the wall of the hopper and bent so as to extend along the sides of the lifter substantially parallel to the upper edge thereof, at a height above the lowermost position of such upper edge, and substantially in contact with the side faces of the lifter. If a nail happens to lodge crosswise on the lifter either its point or its head will project from one of the faces thereof where it will strike one of the strippers as the lifter rises, being thereby knocked off. The strippers and the saddle together prevent any nails entering the raceway except such as are properly placed in the lifter with their shanks contained in the groove thereof and their heads resting on the edges of such groove.

The nails at the lower end of the raceway are picked off one by one and advanced into the path of the driver by a feeder 63, which is carried by a horizontally reciprocating slide 64 in a path transverse to the raceway and adjacent to the path of the driver. This feeder has two wedge like tongues 65 and 66 arranged with a space between them, and the lower part of the raceway at its extreme end is notched at 67 to admit the lower tongue 65. Said lower tongue engages the shank of the nail while the upper tongue 66 engages the head, and its cam or wedge surface extends beyond that of the upper tongue, whereby the two tongues may act simultaneously on the nail and properly place it while maintaining it in a vertical position, that is parallel to the line of drive. As soon as the nail leaves the raceway it enters the passage 45 and falls through the same and through the tube 38 until it is arrested by the jaws 39 in driving position, as shown in Fig. 8. The herein described construction and arrangement of the feeder jaws insures that the nail will fall through this passage, point first, without jamming.

The feeder operating mechanism is timed to advance the feeder when the driver is raised. In order that the nail should not be crushed or the feeder jammed in case the driver should not happen to be raised far enough, when the feeder is thus advanced, to allow the nail to pass under it, the feeder is mounted to yield both lengthwise and laterally of its movement. It is connected by means of a stiff spring 68 and a screw 69 with a block 70 which slides in a recess in the bar 64. A plate 71 overlies such recess and the block 70 and has a slot 72 through which the screw 69 is passed. A spring 73 is confined in the recess and tends to project the slide 70. Enough space is left within the cover plate 71 to allow movement sidewise of the spring 68. The normal mode of operation of the feeder is shown in Fig. 10, the feeder advancing then in a straight line without deflection and propelling the nail into the driving channel. Fig. 12 shows the operation when the nail is prevented by the driver from advancing. The feeder then gives way by the yielding of the spring 68,

and may stop completely while the slide 64 continues its movement, compressing the spring 73.

A hold-back 75 is provided to hold back the nails in the period following withdrawal of the feeder and preceding advance of the driver. It is an arm secured to a rock shaft 76 and extending over the raceway to a point near the driver. Its end is adapted to bear on the endmost nail next to the feeder. It is raised when the driver is down, as shown in Fig. 7, to permit advance of the whole line of nails in the raceway and of the foremost nail into the position for feeding.

The devices and mechanisms hereinbefore described comprise the entire invention which I wish to protect herein.

I will now briefly describe the operating means for the various mechanisms described, in order to make my description complete.

A main shaft 77 is mounted in bearings secured to the pedestal back of the head 16. This shaft is driven by a belt pulley 78 through the clutch shown in Figs. 13 and 14. On the shaft 77 are a cam 79, cam 80, eccentric 81 and cam 82. The cam 79 acts through a bell crank lever 83 to lift the driver, the arm 84 of said bell crank being engaged with a head 85 on the driver bar. A spring 86 wrapped about the pivot stud of the bell crank and bearing on arm 84 propels the driver whenever the high point of the cam 79 passes the roll 87 on arm 83. Cam 80 lifts the horn 18 or other work support to meet the blow of the driver, acting through the rod 27, on which its periphery directly bears and through the lever 23, 26, as already described. The eccentric 81 actuates the slide bar 64 through eccentric rod 88 connected with an eccentric strap 89 and pivoted to the slide bar 64 by a pin 90. The cam 82 actuates the hold-back 75 by acting upon an arm 91 secured to the rock shaft 76. A spring 92 (see Fig. 1) pulls on an arm 93 also fixed on the rock shaft and holds the arm 91 against the cam, also tending to press the hold-back down toward the nails. The cam 54 which actuates the lifter is driven by a pulley 94, belt 95, and pulley 96 on the counter-shaft 53, which latter is equipped with pulleys 98 for a belt adapted to transmit power from any source. The lifter is thus operated independently of the main shaft in order that it may work continuously to maintain the raceway full of nails. The clutch for connecting loose pulley 78 to shaft 77 consists of a number of rolls 99 confined between a sleeve 100 on the shaft and a drum 101 on the pulley. The sleeve has eccentric depressions in which the rolls lie. A sleeve having segments 102 lying between the rolls and also between the sleeve 100 and drum 101 is equipped with an external shoulder 103 arranged to coact with a stop arm 104, to which latter is connected a second arm 105, further connected through a link 106 with a controlling treadle 107. A spring 108 presses the arm 105 up. A spring 109 is connected at one end to the sleeve 100 and at the other end to the collar by which the segments 102 are carried, as shown in Fig. 13, being arranged to turn the collar whenever released by displacement of the stop 104, in the direction which crowds the clutch rolls against the eccentric surfaces of the sleeve 100.

What I claim and desire to secure by Letters Patent is:

1. In a nailing machine, a nail hopper, a raceway projecting into said hopper, a nail lifter arranged to rise and descend adjacent to the end of said raceway, a saddle overlying the said end of the raceway to prevent entrance into the latter of improperly placed nails, and a yielding brace pressing said saddle toward the raceway.

2. In a nailing machine, a hopper, a raceway having an end projecting into the hopper, a lifter arranged to rise and descend adjacent to the end of the raceway for supplying nails thereto, and a member overlying said raceway end and having a channel adapted to admit the heads of properly placed nails and to reject those of improperly placed nails.

3. The combination of a nail hopper, a raceway having a groove in its upper side adapted to receive the shanks of nails, a lifter having a groove in its upper end similar to the raceway groove arranged to travel from the lower part of the hopper to a position in which its groove registers with that of the raceway, and return, and a guard overlying the raceway end adjacent to said lifter and having a channel communicating with the raceway groove, the width and depth of said channel being respectively greater and less than the mean diameter of the nail heads.

4. In a nailing machine, a nail hopper, a raceway passing through a wall of said hopper having a groove in its upper side to receive the shanks of nails, such groove being of less width than the heads of such nails, a saddle embracing and resting upon the raceway within the hopper and having a channel open to the raceway groove similar in transverse form to the profile of the nail heads and of greater area than the same, but of such shape and size as to exclude the heads of nails passing endwise of such channel, a nail lifter arranged to reciprocate up and down past the end of said raceway, and a resilient brace bearing on said saddle adapted to permit yielding of the saddle when the head of a nail becomes jammed between the lifter and the saddle.

5. In a nail driving machine, the combination with a driver guided to travel in a definite path, of a raceway extending to-

ward and terminating beside said path, a finger arranged and operated to displace nails successively from the raceway into the driver's path, a hold-back arranged and operated to bear on the endmost nail in the raceway, and mechanism for actuating said feeder and hold-back constructed and arranged to make the hold-back inoperative when the driver is lowered and to operate the finger for feeding when the driver is raised.

In testimony whereof I have affixed my signature.

FRANK A. BRACKETT.

Witnesses:
ELLIOT BARTA,
HAROLD R. PERRY.