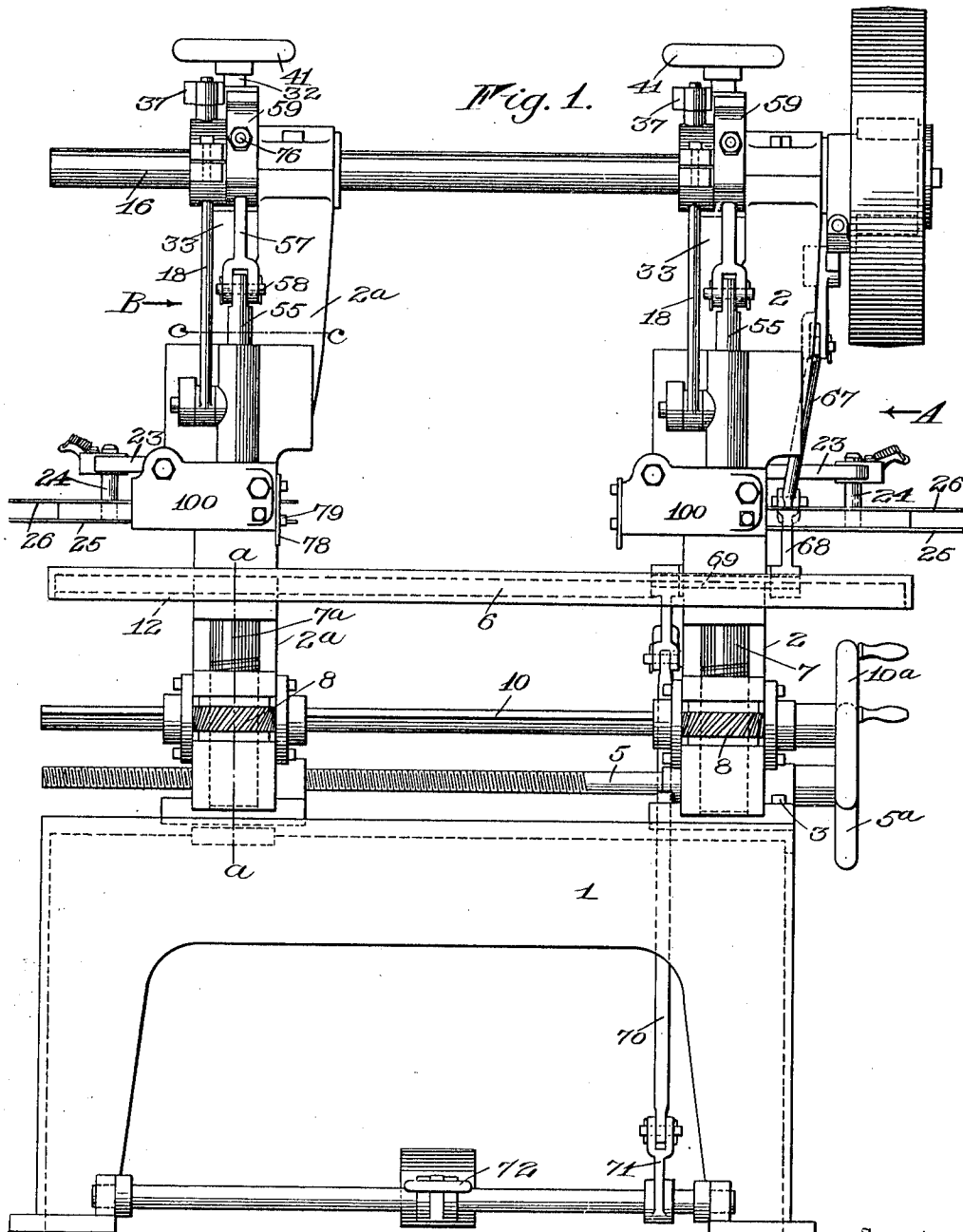


1,020,436.

H. W. MORGAN.
NAILING MACHINE.
APPLICATION FILED MAY 13, 1909.

Patented Mar. 19, 1912.

6 SHEETS—SHEET 1.



Inventor

Henry W. Morgan

Witnesses

Walter B. Payne.

H. H. Simms

By

Church & Rich

his Attorneys

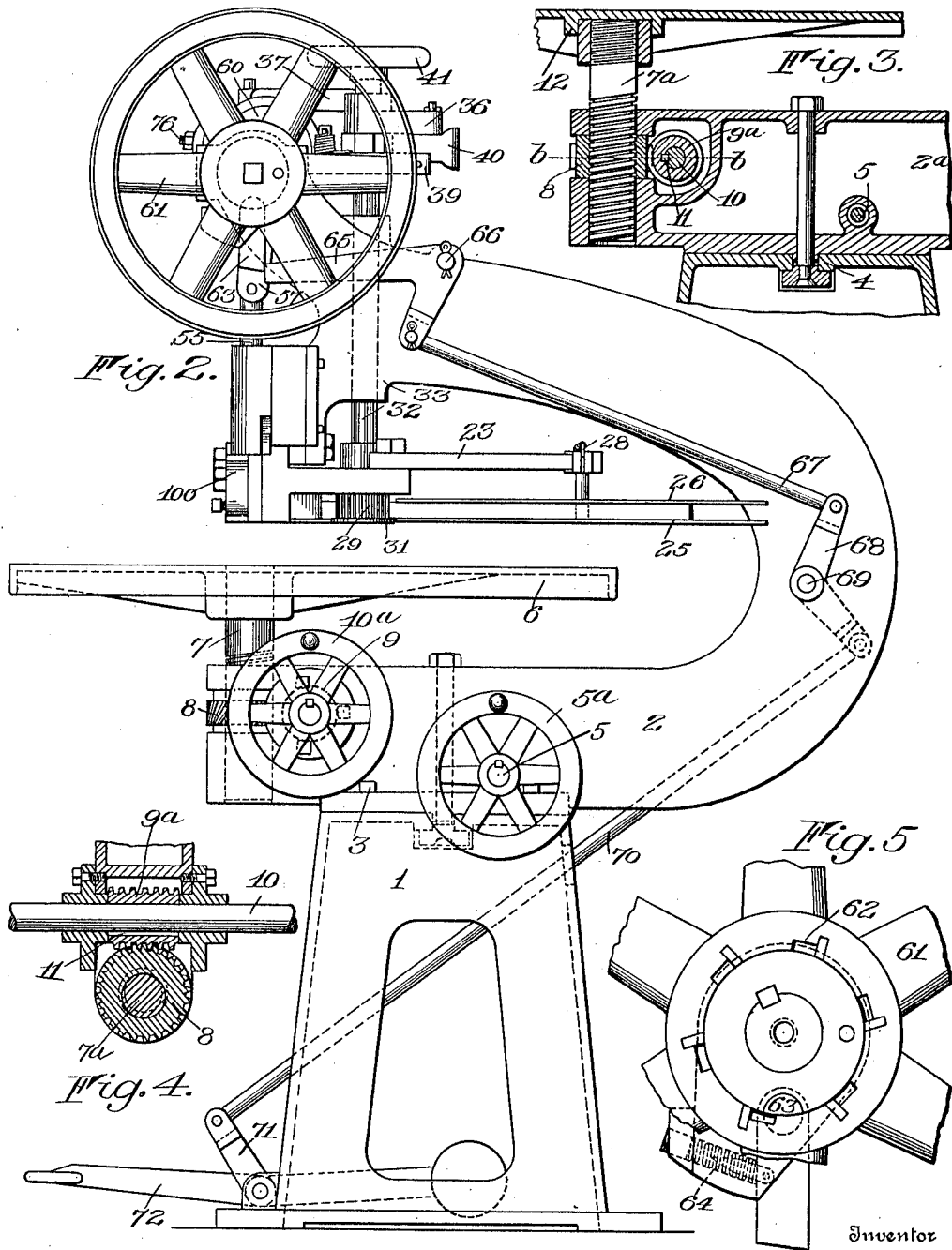
H. W. MORGAN.
NAILING MACHINE.

APPLICATION FILED MAY 13, 1909.

Patented Mar. 19, 1912.

6 SHEETS—SHEET 2.

1,020,436.



Witnesses
Walter B. Payne.
H. K. Simms

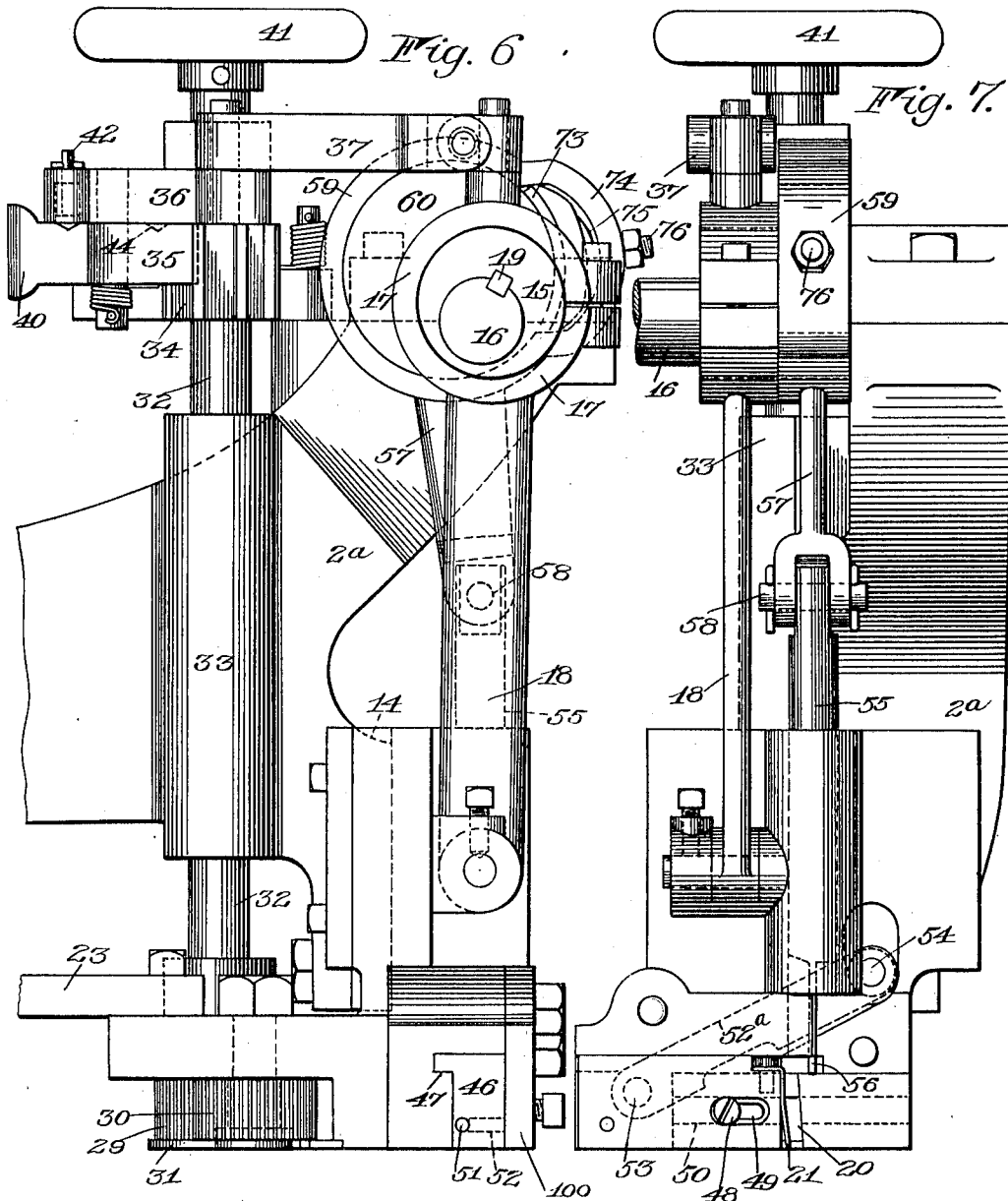
Henry W. Morgan
By Charles Rich
his Attorney

1,020,436.

H. W. MORGAN.
NAILING MACHINE.
APPLICATION FILED MAY 13, 1909.

Patented Mar. 19, 1912.

6 SHEETS—SHEET 3.



Witnesses

Walter B. Payne
J. H. Simms

Inventor
Henry W. Morgan

By *Church & Rich*
his Attorneys

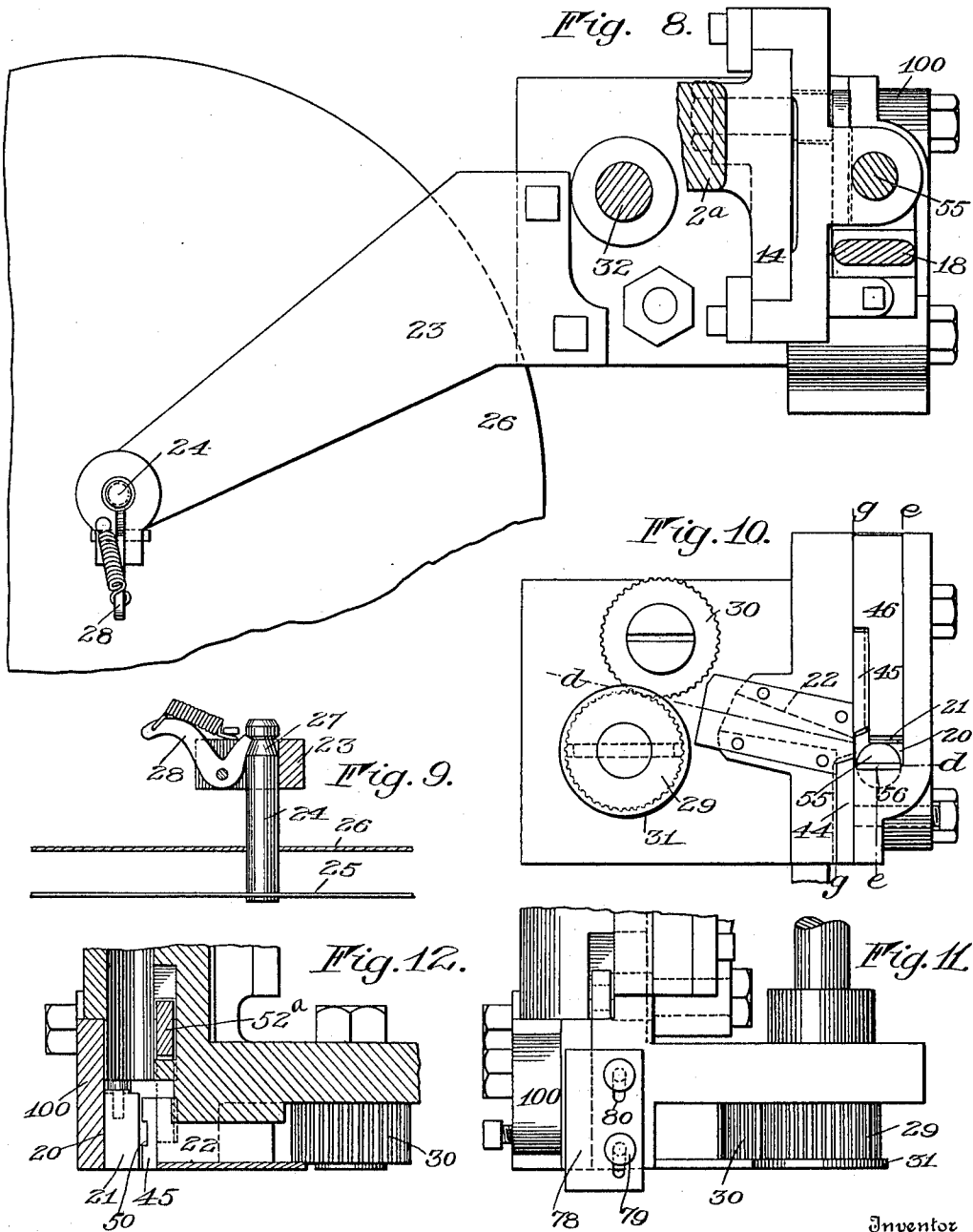
H. W. MORGAN.
NAILING MACHINE.

APPLICATION FILED MAY 13, 1909.

Patented Mar. 19, 1912.

6 SHEETS—SHEET 4.

1,020,436.



Witnesses

Walter B. Payne
H. H. Simms

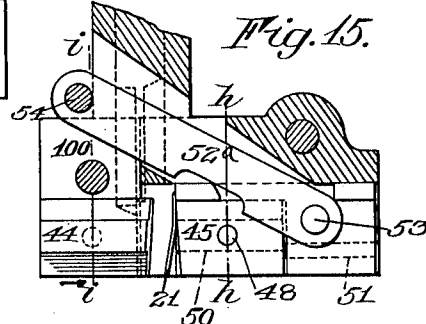
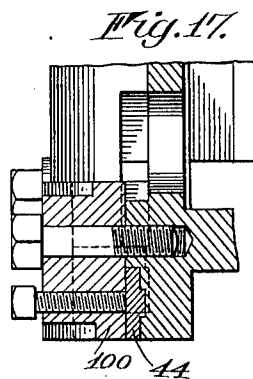
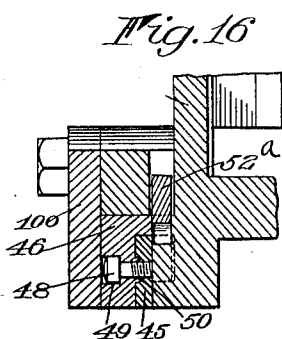
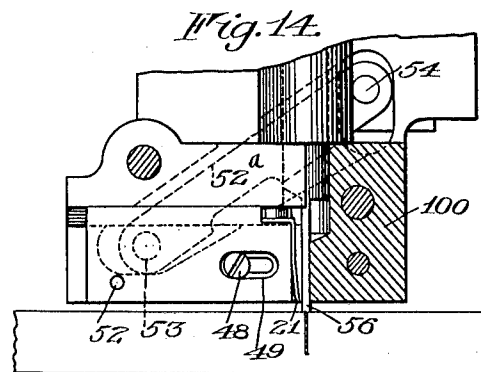
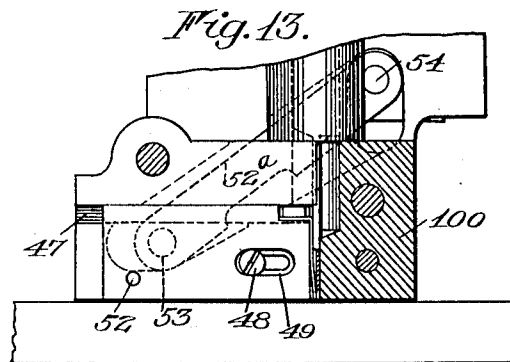
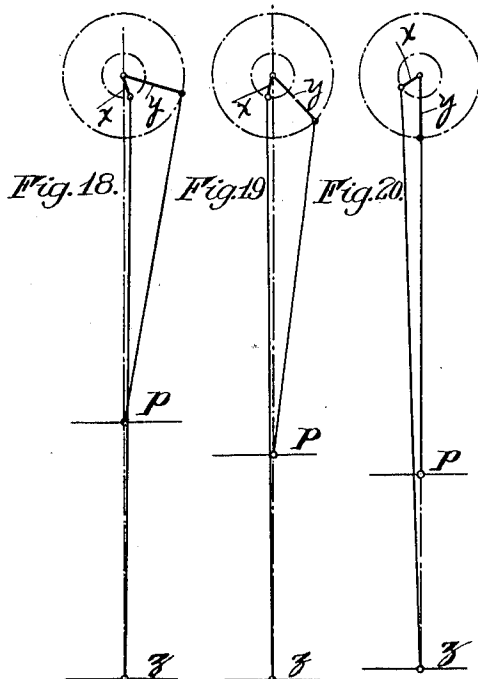
Inventor
Henry W. Morgan
By Church & Rich
His Attorneys

1,020,436.

H. W. MORGAN.
NAILING MACHINE.
APPLICATION FILED MAY 13, 1909.

Patented Mar. 19, 1912.

6 SHEETS—SHEET 5.



Witnesses

Walter B. Payne.
J. H. Linn

Inventor

Henry W. Morgan

By

Charles Rich

his Attorney

H. W. MORGAN.
NAILING MACHINE.

APPLICATION FILED MAY 13, 1909.

Patented Mar. 19, 1912.

6 SHEETS—SHEET 6.

1,020,436.

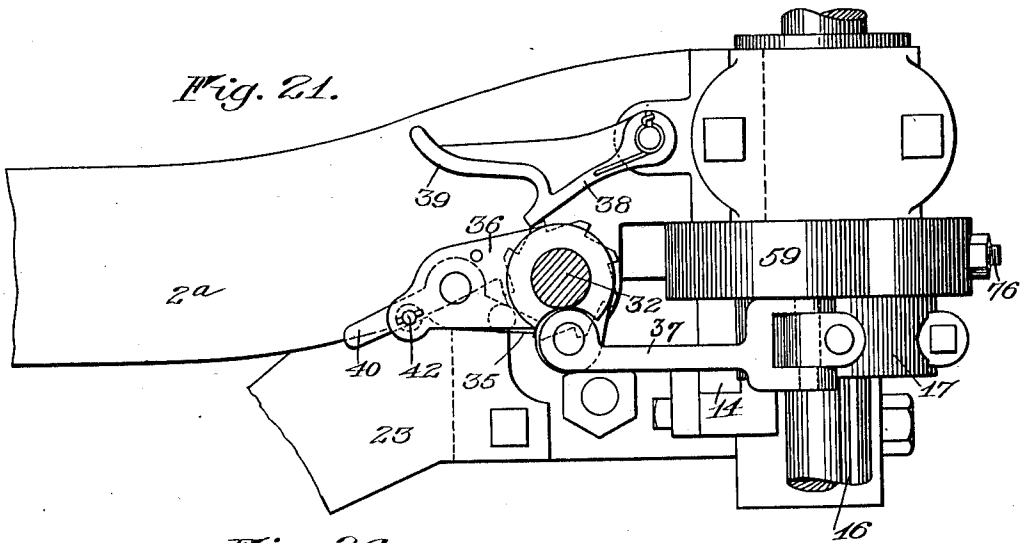


Fig. 26.

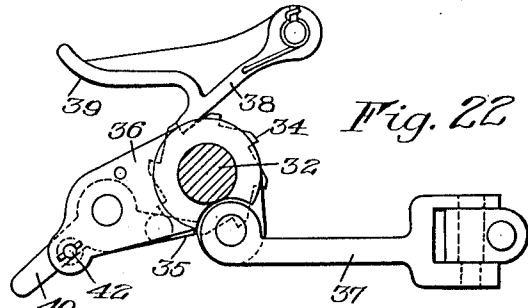
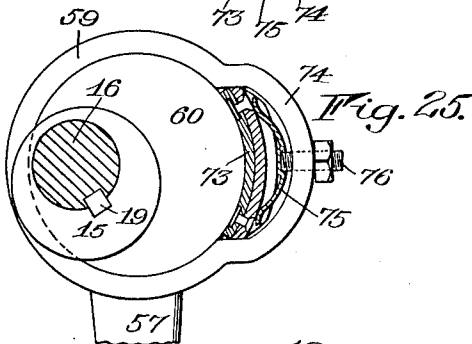
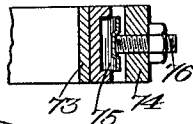


Fig. 23.

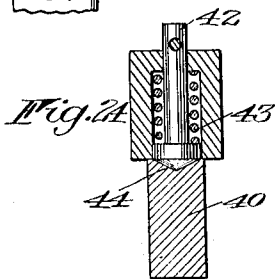
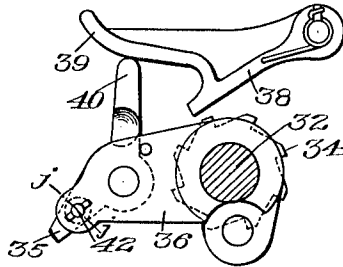


Fig. 28.

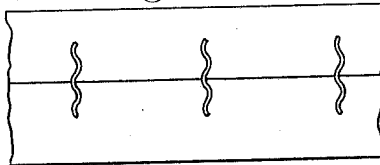


Fig. 27.



Witnesses

Halter B. Payne
J. H. Simms

Inventor

Henry W. Morgan

By

Church & Rich
Attorneys

UNITED STATES PATENT OFFICE.

HENRY W. MORGAN, OF ROCHESTER, NEW YORK.

NAILING-MACHINE.

1,020,436.

Specification of Letters Patent.

Patented Mar. 19, 1912.

Application filed May 13, 1909. Serial No. 495,818.

To all whom it may concern:

Be it known that I, HENRY W. MORGAN, of Rochester, in the county of Monroe and State of New York, have invented certain
5 new and useful Improvements in Nailing-Machines; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a
10 part of this specification, and to the reference-numerals marked thereon.

The present invention relates to nailing machines and it has for an object to provide a construction adapted for forming
15 and driving Nichol's nails, that is nails or fasteners made from sheet material.

Another object of the invention is to provide an improved means for delivering nail stock to a chuck and cutting said stock after
20 it has been fed to the path of the hammer.

Still another object is to provide simple and properly timed driving means for moving a chuck and a hammer toward the work on each nailing operation.

25 To these and other ends the invention consists in certain improvements and combinations of parts all as will be hereinafter more fully described, the novel features being pointed out in the claims at the end
30 of the specification.

In the drawings: Figure 1 is a front elevation of a machine embodying the present improvements; Fig. 2 is a side view of the machine looking in the direction of arrow
35 A, Fig. 1; Fig. 3 is a section on line *a—b*, Fig. 1; Fig. 4 is a section on line *b—b*, Fig. 3; Fig. 5 is a detail view of the clutch between the drive wheel and the operating shaft; Fig. 6 is a side view of the nailing
40 mechanism looking in the direction of the arrow *b*, Fig. 1; Fig. 7 is a detail front view of the nailing mechanism with the front plate of the chuck removed; Fig. 8 is a horizontal section of the nailing mechanism on the line *c—c*, Fig. 1; Fig. 9 is a detail
45 sectional view of the spool for supporting the stock from which the nails are made; Fig. 10 is a bottom view of the nailing mechanism; Fig. 11 is a detail view of the nailing chuck showing the side opposite to
50 that shown in Fig. 6; Fig. 12 is a section on line *d—d*, Fig. 10; Fig. 13 is a section on line *e—e*, Fig. 10 prior to the driving of the nail; Fig. 14 is a section on line *e—e*,
55 Fig. 10, immediately after the nail has been

driven; Fig. 15 is a section on line *g—g*, Fig. 10; Fig. 16 is a section on line *h—h*, Fig. 15; Fig. 17 is a section on line *i—i*, Fig. 15, looking in the direction of the arrow; Figs. 18, 19 and 20 are diagrams
60 illustrating the timing of the driving means for the chuck and the hammer; Figs. 21 and 22 are detail views illustrating the feeding mechanism for the nail ribbon or stock; Fig. 23 is a detail view showing the feeding
65 and retaining dogs for the nail ribbon; Fig. 24, is a section on line *j—j*, Fig. 23; Figs. 25 and 26 are detail views of the brake; Fig. 27 is a detail view of one of the nails; and Fig. 28 is a detail view showing the
70 use of the nails.

The present embodiment of the invention is constructed to feed and drive what are termed Nichol's nails, thus permitting these fasteners to be employed for tying together
75 strips to form shooks for boxes. In this instance there is provided a main frame 1 having auxiliary frames 2 and 2^a thereon preferably of U-shape form opening forwardly and being relatively adjustable horizontally toward and from each other. One
80 of these auxiliary frames may be rigidly secured to the main frame 1 by bolts 3 while the other (2^a) may be guided in ways 4 on the top of said frame 1; the relative adjust-
85 ment being effected by any suitable means such for instance as a horizontally arranged screw 5 operated by hand wheel 5^a, journaled to turn in the stationary frame 2 and having engagement with threads on the
90 movable frame 2^a.

The work support may be in the form of a vertically adjustable table 6 lying between the arms of the auxiliary frames and carried by uprights 7 and 7^a which work in
95 openings in the lower arms of said auxiliary frames 2. These uprights may be exteriorly threaded and engaged by nuts 8 which have their peripheries formed with worm teeth to be engaged by worms 9 and 9^a on a shaft
100 10 operated by hand wheel 10^a, the worm 9^a being adapted to move longitudinally of the shaft with its auxiliary frame but being caused to turn with the shaft by a key 11 or
105 other suitable means, this being necessary because of the relative movement between the auxiliary frames 2 and 2^a. It is apparent that when the shaft 10 is turned the worm wheels or nuts 8 will be rotated and
110 the table or work support 6 raised or low-

ered. The upright 7 is rigidly secured to the table 6 but upright 7^a has its upper end movable on a guide 12 formed on the under surface of said table so that it can be moved
5 with the guide 2^a.

The nailing mechanism embodies as many nailing devices as there are auxiliary frames 2, 2^a and each nailing device may comprise a chuck which preferably moves on a vertical guide 14 formed on the upper arm of each auxiliary frame so that the chuck can move toward and from the work on each nailing operation. The movement of each chuck is preferably effected by an eccentric
15 15 which is secured to a shaft 16 and turns in a strap 17 rigidly secured to one end of a pitman 18 whose other end is pivotally connected to the chuck 13, the shaft 16 being journaled in the arms and provided with a longitudinal groove in which moves a key
20 19 on the eccentric 15 that operates the chuck on the auxiliary support 2^a. A chamber 20 in the chuck may be provided with a yielding wall 21 which supports the nails against discharge, the nails being fed into the chamber through a lateral throat or opening 22.

As Nichol's nails and other small nails or staples are inconvenient to handle in bulk it is desirable to provide a strip, or ribbon of stock from which nails are formed. For this purpose there may be employed for each nailing device a spool which turns about a vertical axis in a bearing in bracket
30 23 that is extended rearwardly from each chuck. The spool preferably embodies a vertically arranged spindle 24 carrying a flange or disk 25 and a flange or disk 26, the flange 25 being rigidly secured to the spindle 24 and the flange or disk 26 being
40 freely slidable on said spindle so that the distance between the flanges will correspond to the width of the stock strip or ribbon. To permit the spool to be removed for a new supply the spindle is provided with an annular groove 27 in which a spring pressed latch 28 operates, a movement of the latter against the action of its spring releasing the spool from its bearing in the bracket 23.
50 From each spool the ribbon is carried to a feeding mechanism which in this instance embodies a pair of corrugated rollers 29 and 30 turning about vertical axes on the bottom of the chuck, the roller 29 being provided with a peripheral flange 31 at its lower end overlapping the roller 30 to support the ribbon between the rollers. The roller 29 also has a drive shaft 32 connected thereto, this shaft being extended upwardly
60 from the chuck and turning in a bearing 33 in the proximate auxiliary support. Above the bearing 33, the shaft carries a ratchet wheel 34 which is engaged by an operating pawl 35 carried by a swinging member 36 on the shaft 32. The latter is connected by

a link 37 to the upper portion of strap 17 which slightly pulls on the link to swing member 36 when the eccentric 15 is rotated. A retaining pawl 38 pivoted to the auxiliary support is arranged to cooperate with the wheel 34 and it is provided with a cam portion 39 adapted to be engaged by a portion 40 on the pawl 35 when the latter is moved out of engagement with wheel 34, thus freeing the shaft 32 to permit the latter to be rotated by hand by means of hand wheel 41. The pawl 35 may be held out of engagement with the wheel 34 by a latch 42 which is slidably arranged on the pawl swinging member 36 and is pressed toward the pawl by a spring 43, an end of this latch entering a notch 44 in the pawl after the wheel 34 is freed.

The feeding rollers 29 and 30 carry the nail stock into the passage or throat 22, and at the end of the throat is located the cutting device comprising preferably a fixed knife 44 arranged upright at a slight inclination to the vertical or in other words at a slight angle to the line of operation of the nailing device. In addition to the fixed knife the cutting device embodies a movable cutter 45 operating in a line transverse to the path of movement of the hammer to be described and arranged preferably on a slide 46 guided on the chuck as by guide faces 47. The cutter 45 is preferably adjustable longitudinally of the slide and to this end the slide has a guideway 50 on which the cutter is movable by a screw 51 journaled in the cutter and operating in the slide. A set screw 52 serves to hold screw 51 against accidental movement, while a bolt 48, secured to the cutter and working in a slot 49 in the slide, holds the cutter against lateral movement with respect to the slide. The slide 46 also carries the yielding clamping wall 21 of the chuck chamber so that the chuck chamber 20 is enlarged during the introduction of the nail stock and the yielding element is moved toward and engages the cut nail during and after the cutting device has operated. The movement of the cutter 45 may be effected in any suitable manner but it is preferred to effect the cutting during the movement of the chuck toward the work by employing a link 52^a pivoted at 53 to the cutter slide 46 and at 54 to the auxiliary support 2 or 2^a so that it lies at an angle to the line of movement of the chuck. From this it will be seen that when the chuck is reciprocated the knife will be reciprocated on the chuck, for the link has one end connected to a part of the machine that does not move with the chuck and the other end connected to the knife which moves on the chuck. The front plate 100 of each chuck is removable in order that the cutters and other movable parts may be released for adjustment and repair.

In addition to the chuck, each nailing device comprises a hammer 55 operating vertically through and guided by the chuck and having one end 56 reduced and operating through chuck chamber 20 to discharge and drive the nail. The mechanism for operating the hammer preferably embodies a link 57 pivoted to the hammer at 58 and having a strap 59 which surrounds an eccentric 60 on the shaft 16, the rotation of the latter effecting the reciprocation of the hammer.

It will be noted by reference to Figs. 18, 19 and 20 that the throw of the two eccentrics 15 and 60 are different, the one effecting the movement of the hammer being greater than that effecting the movement of the chuck thus permitting the hammer to be moved relatively to the chuck in order that nails may be fed to the latter. It will be further noted that the greatest radii x and y of the two eccentrics are arranged at slight angles to each other, the greatest radius x of the smaller or chuck operating eccentric 15 being slightly in advance of the greatest radius y of the eccentric 60, thus causing the chuck to advance toward the work slightly in advance of the hammer and to recede from the work after the hammer has engaged and partially driven the nail. This relation permits either long or short nails to be driven, as will be seen by reference to Figs. 18 and 19. In Fig. 18 the point z indicates the position of the lower edge of the chuck while the point p indicates the upper end of the hammer when a long nail is first engaged. The position of these parts when a short nail is first engaged is shown in Fig. 19 while the position at the end of the driving operation for each nail is shown in Fig. 20. It will be noted that the point z has a very slight movement during the driving operation so that the nail is supported properly until it is driven without regard to its length.

The shaft 16 may be driven in any suitable manner but it is preferred to employ a drive wheel 61 mounted to turn on shaft 16 and having a plurality of recessed portions 62 in its bearing, the walls of which form shoulders adapted to be engaged by a clutch member 63 turning in the shaft 16 and of substantially semicircular cross section. This clutch member has a normal tendency to move to clutching position under the action of a spring 64 acting between said member and an arm on the shaft 16. When the machine is not in motion a stop 65 pivoted at 66 lies in the path of the clutch member 63 to maintain the spring 64 compressed and the member out of engagement with the shoulder 62. The stop 65 may be controlled by a rod 67 connected to an arm 68 on a rock shaft 69 which by a rod 70 is connected to an arm 71 on a treadle 72, the

latter being retained by the weight in such a position that the stop 65 lies in the path of the clutch member.

In order to prevent the spring 64 acting to turn the shaft 16 when the stop 65 engages clutch member 63, there is provided a brake comprising preferably a shoe 73 arranged in a pocket 74 in the strap 59 and pressed toward the eccentric 60 by a spring 75 which is acted on by an adjusting screw 76.

To the end that the work may be positioned properly relatively to the nailing devices, there may be employed on each chuck a gage preferably in the form of a slide 78 guided vertically by means of headed pins 79 on the chuck working in slots 80 in the slide. This gage normally depends below the chuck but moves freely thereon, so that when the chuck moves toward the work the latter is first engaged by the gage which then stops and the chuck moves to the work. It is desirable to locate the gages on opposed sides of the two chucks so that the relation of both to a piece of work on the work support may be ascertained with little trouble.

In operation, the two nailing devices are adjusted relatively to each other by means of hand wheel 5^a on screw 5 so as to obtain the proper distance between them, the relative adjustment between the uprights 7 and 7^a taking place at the same time. The work support is then adjusted vertically to the proper position by means of hand wheel 10^a and the work piece such as two strips are placed upon the work support so that the front edges of the gages 78 coincide with the joint between the two strips. Upon the depression of the treadle 72 the clutch member 63 is released and connects drive wheel 61 to the shaft 16 which moves the chuck toward the work, thus effecting the feeding of the stock, the cutting of the nail by the cutting device, the clamping of the cut nail by the clamp 21. During the movement of the chuck toward the work the hammer 55 moves downwardly causing a driving of the cut nail into the work piece. Of course after each depression of the treadle the latter is released thus permitting the stop 65 to move into the path of clutch member 63 and stop the machine after each nailing operation.

A machine constructed in accordance with this invention makes it possible to drive Nichol's nails by machinery. The mechanisms employed are simple in operation and involve but a few parts which may be quickly and easily repaired.

I claim as my invention:

1. The combination with a work support, of a chuck movable toward and from the same, a hammer operating to remove a nail therefrom, a cutter carried by the chuck and

movable relatively thereto, and means for effecting the cutting movement of the cutter by the movement of the chuck toward the work.

5 2. The combination with a work support, of a chuck movable toward and from the same, a hammer operating to remove a nail therefrom, a cutter movable transversely of the line of movement of the hammer, and
10 means for effecting the cutting movement of the cutter by the movement of the chuck toward the work.

3. The combination with a work support, of a chuck movable toward and from the
15 same, a hammer operating to remove a nail therefrom, a cutter movable on the chuck, and a link connected to the cutter and to a part of the machine to which the chuck moves relatively.

20 4. The combination with a support and a chuck movable thereon, of a hammer operating to remove a nail therefrom, a member movable on the chuck in a line transverse to the line of movement of the hammer, a
25 cutter on the member, and a link secured to the support and to said member.

5. The combination with a support and a chuck movable thereon, of a hammer operating to remove a nail therefrom, a slide
30 movable on the chuck in a line transverse to the line of movement of the hammer, a cutter, a yielding clamp carried by the slide to hold a nail in the chuck, and a link connected to the support and to the slide.

35 6. The combination with a support and a chuck movable thereon, of a hammer operating to remove a nail therefrom, a clamp movable transversely to the line of operation of the hammer to hold a nail in the
40 chuck, and a link connected at one end to the support and at its other end to the clamp.

7. The combination with a support, a
45 chuck movable vertically thereon, and a hammer operating to remove a nail therefrom, of a vertically arranged feed roller carried by the chuck and directing nail stock thereto, a shaft extending from the roller and guided in the support, and means
50 for periodically rotating the shaft.

8. The combination with a chuck and a hammer operating to remove a nail therefrom, of a feed device for carrying nail stock to the chuck, a ratchet wheel connected with the feed device, a swinging
55 member, means for operating said swinging member, an operating pawl carried by the swinging member and cooperating with the ratchet wheel, and a retaining pawl cooperating with said ratchet wheel, one of
60 said pawls having a portion to cooperate with the other pawl when moved out of engagement with the ratchet wheel in order to throw the other pawl out of engagement
25 with the ratchet wheel.

9. The combination with a support, of a chuck movable on the support, a suitably driven eccentric, a strap surrounding the eccentric and connected to the chuck for moving the latter, a hammer operating to
70 remove nails from the chuck, a feed device directing nail stock to said chuck, a shaft connected to said feed device, a swinging member turning on the shaft, a pawl carried
75 by said swinging member to operate the shaft, and a link connected to the swinging member and to the strap that surrounds the eccentric.

10. The combination with a support, of a chuck guided vertically thereon, a suitably
80 driven eccentric, a strap surrounding the eccentric and connected to the chuck, a hammer operating to remove nails from the chuck, a feed wheel for directing nail stock to the chuck, a shaft carried by the chuck
85 and having the feed wheel mounted thereon, said shaft also being guided in the support, a ratchet wheel carried by the shaft, a swinging member turning on the shaft, a pawl carried by the swinging member and
90 cooperating with the ratchet wheel, and a link connecting the swinging member and the strap.

11. The combination with a main frame, of a pair of auxiliary frames thereon, one of
95 which is rigid with the main frame, and the other of which is adjustable on said main frame, nailing devices carried by the auxiliary frames, a work support common to the nailing devices of both auxiliary frames,
100 and supporting uprights for the work support carried by the auxiliary frames, one of said uprights being rigidly secured to the work support and the other being guided thereon.
105

12. The combination with a main frame, of a plurality of substantially U-shaped auxiliary frames adjustably supported on the main frame and opening forwardly, nailing
110 devices carried by the forward ends of the upper arms of the U-shaped frames, and a single work support carried by the lower arms of both U-shaped frames.

13. The combination with a main frame, of a plurality of substantially U-shaped auxiliary frames supported on the main frame and opening forwardly, nailing devices carried by the forward ends of the upper arms
115 of the U-shaped frames, uprights having external threads and working in the lower arms of the U-shaped frames, a work support carried by the uprights, nuts turning on the threads of the uprights and provided with worm teeth on their peripheries
120 and a worm shaft cooperating with the worm teeth of the nuts.
125

14. The combination with a main frame, of a plurality of U-shaped frames opening forwardly and adjustable horizontally relatively to each other, nailing devices carried
130

by the upper, forward ends of the U-shaped frames, and a work support arranged between the arms of the U-shaped frames and common to both of said frames.

5 15. The combination with a main frame, of a pair of auxiliary frames supported thereon, one of which is rigidly secured to the main frame and the other of which is guided on the main frame, an upright car-

ried by each auxiliary frame, a work sup- 10
port rigidly secured to one of said uprights and guided on the other, and means for effecting the adjustment of the movable auxiliary frame on the main frame.

HENRY W. MORGAN.

Witnesses:

HAROLD H. SIMMS,

RUSSELL B. GRIFFITH.

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