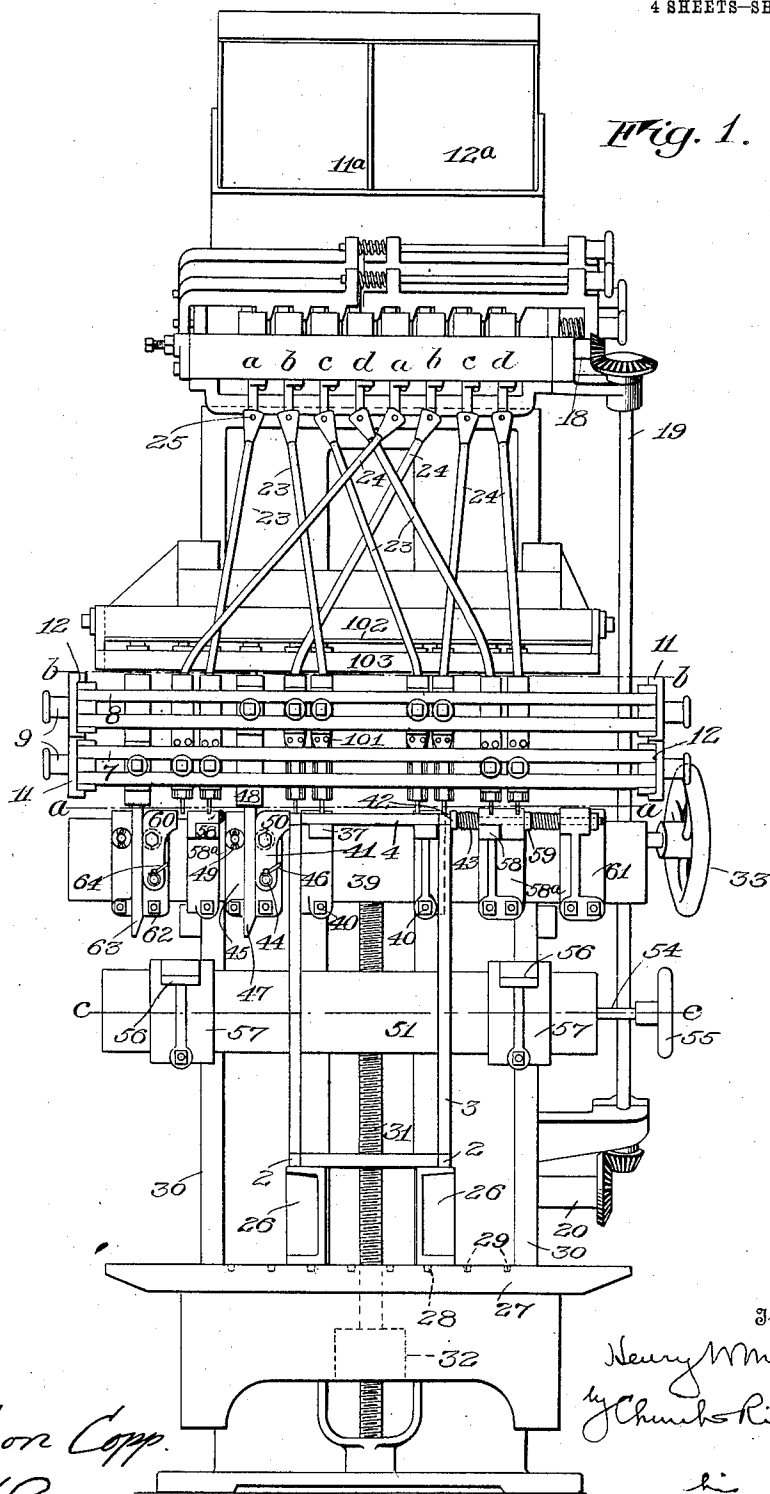


1,063,719.

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

Patented June 3, 1913.

4 SHEETS-SHEET 1.



Witnesses
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H. H. Linn

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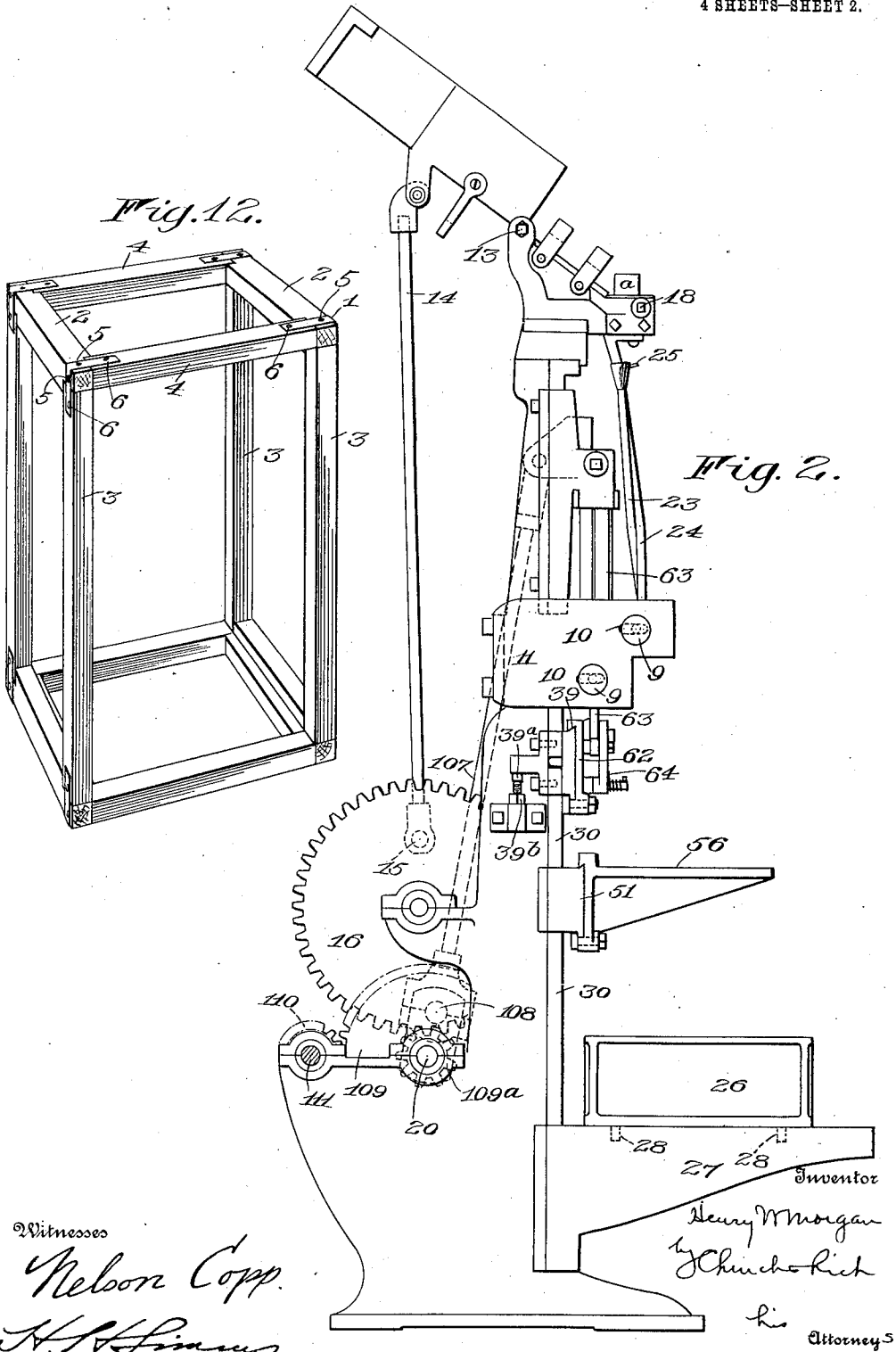
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4 SHEETS-SHEET 2.

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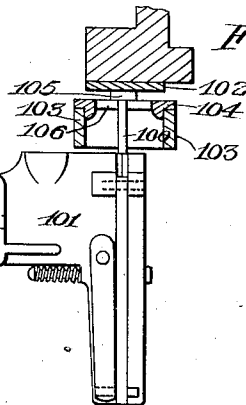
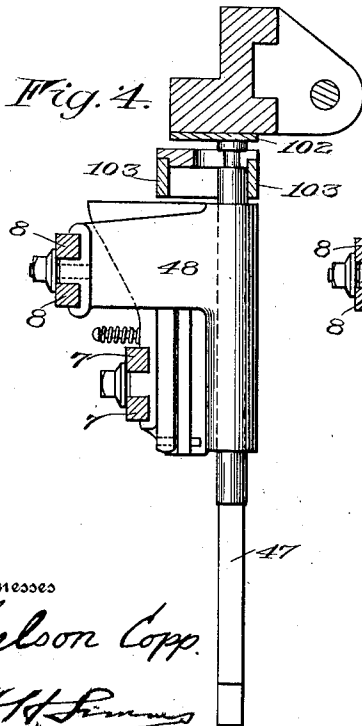
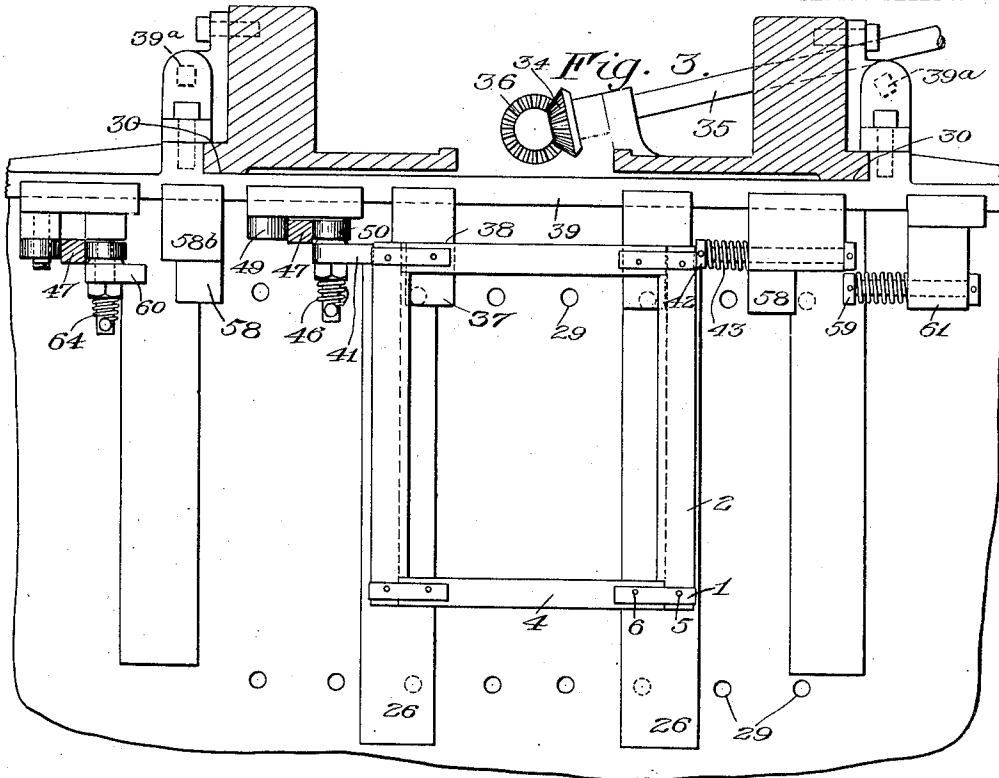
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4 SHEETS—SHEET 3.



Witnesses

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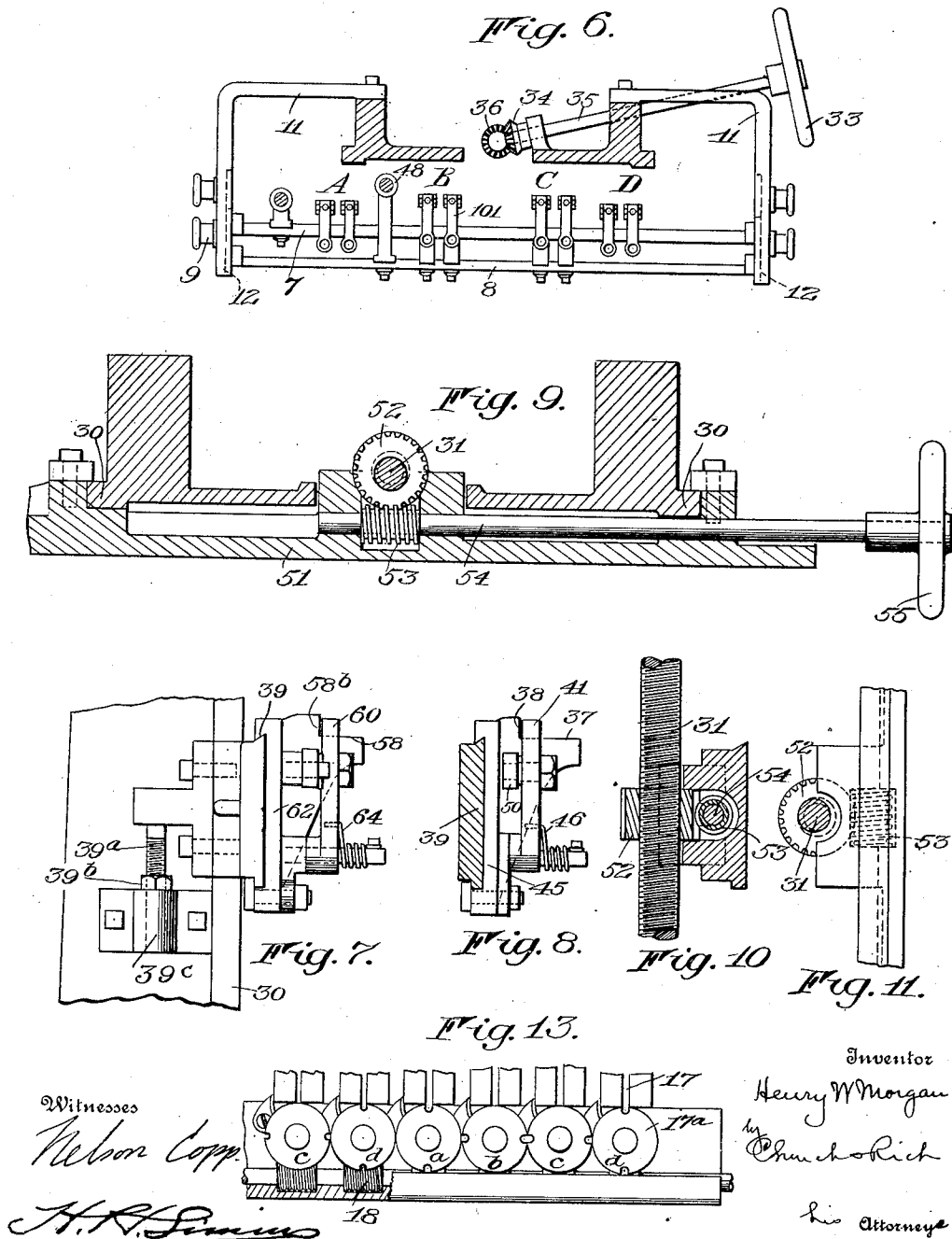
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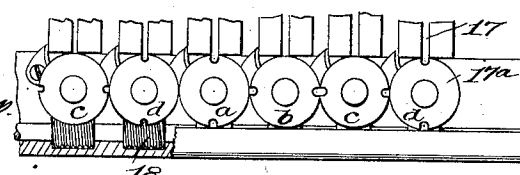


Witnesses

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Fig. 13.



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UNITED STATES PATENT OFFICE.

HENRY W. MORGAN, OF ROCHESTER, NEW YORK.

NAILING-MACHINE.

1,063,719.

Specification of Letters Patent.

Patented June 3, 1913.

Application filed May 13, 1909. Serial No. 495,816.

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 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 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 to operate on the side and the end walls of an elongated rectangular article or an article having greater length than width.

Another object is to provide an improved manner of clamping an article beneath a nailing mechanism employing a series of nailing devices.

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 of the specification.

In the drawings: Figure 1 is a view showing in elevation a box-frame nailing machine constructed in accordance with this invention; Fig. 2 is a side view of the same machine; Fig. 3 is a section on line *a-a* Fig. 1; Fig. 4 is a detail view of one of the cams for operating the clamps, the parts by which the cam is carried being shown in section; Fig. 5 is a detail view of one of the nailing devices, showing parts by which it is carried in section; Fig. 6 is a section on line *b-b* Fig. 1; Fig. 7 is a side view of a guide which carries the clamps and the upper anvils, the adjusting means for the guide being also shown; Fig. 8 is a detail side view of one of the clamps for the article; Fig. 9 is a section on line *c-c*, Fig. 1 to show the adjusting means for the upper support; Figs. 10 and 11 are detail views of the said adjusting means; Fig. 12 is a perspective view of a box-frame constructed by this machine; and Fig. 13 is a detail view of the feeding devices for depositing nails in the chutes.

The present embodiment of the invention is designed for securing together members of box-frame such as shown in Fig. 12 and applying braces or straps 1 thereto, the

frame in this instance having greater length than width and consisting of corner pieces 2 mortised at their ends to receive the side and the end pieces 3 and 4 respectively. Each strap 1 passes about a corner piece and overlaps an end and a side piece, and nails 5 pass through each strap from an end and a side of the frame and connect the corner piece to an end or a side piece, while nails 6 merely pass through the strap into an end or a side piece.

To operate on a box-frame such as described I employ a nailing mechanism which will form the subject matter and be claimed in an application separate herefrom but which preferably comprises a plurality of nailing devices arranged in series each in this embodiment including a hammer 100 and a chuck 101, the hammers in this instance being in the form of plungers operating in chucks of well known formation. The nailing devices are also arranged in sets A, B, C, D, two of which, that is the end sets, at one time apply a short and long nail at each end of a side piece and another two, that is the intermediate sets, at another time apply like nails to the opposite ends of an end piece.

The members of each set of nailing devices are adjustable relatively to each other for straps of different lengths, while the sets are relatively adjustable for different sizes of boxes. For these adjustments the end sets A, D of the chucks may be mounted on one guide comprising if desirable two spaced bars 7 connected at their ends, while the intermediate sets of chucks B, C are mounted on a like guide 8. The guides 7 and 8 may be adjustable laterally to simultaneously adjust all chucks operating at one time, so that they will hold the nails nearer or farther from the edge of the box-frame, this lateral adjustment of the guides being in this instance effected by operating thumb screws 9 which are connected to the guides 7 and 8 and work in slots 10 formed in arms 11, the arms being extended from opposite sides of the main frame and having ways 12 in which the guides 7 and 8 move at their ends.

The hammers 100 which are adjusted with the chucks relatively to their driving mechanism may be slidably arranged on a cross head which may consist of an impact bar 102 engaging the upper ends of the hammers

and a pair of spaced bars 103 between which are slidably arranged blocks 104 that engage beneath heads 105 on the hammers and cause the latter to move upwardly with the cross head. The blocks 104 may be slotted at 106 in order that the hammers may shift laterally with the chucks.

The driving of the hammers may be effected by mounting the cross head to operate on vertical guides 30 formed on the frame of the machine, its movement on the guides being effected if desired by a pitman 107 connected therewith and with a crank 108 on shaft 20. This shaft also carries a gear 109 that meshes with a pinion 110 on drive shaft 111.

The chucks are preferably fed with nails from a plurality of compartments in this instance two 11^a and 12^a both if desirable formed on a single frame which for the purpose of agitating the contents may be pivoted at 13 on the upper portion of the machine and be moved about its pivot by a connecting rod 14 that is connected to a wrist pin 15 on a gear wheel 16 which is journaled near the lower portion of the main frame and meshes with gear 109^a on crank shaft 20. The nail compartments may be formed, as in my Patent No. 556,430, granted March 17, 1896, with slots which communicate with the usual channels 17 by which the nails are conducted to rotary notched feeding devices 17^a such as shown in my Patent No. 586,711, granted July 20, 1897, the feeding devices being operated by a worm shaft 18 which is driven by shaft 19 that gears with shaft 20. The feeding devices *b, c* that charge the chucks B, C, release nails at a different time from those (*a, d*) that charge the chucks A, D, so that when the hammers operate at one time they will drive nails from chucks B, C, and when they operate the next time they will drive nails from chucks A, D. From each feeding device the nails are deposited in conductors or chutes arranged in two sets 23 and 24, the chutes being pivoted at 25 in order that they may cross so that one of each set may be directed toward one of the members of each set of nail chucks.

The two intermediate sets B, C, of nailing devices, operate as before stated on the ends of the box-frame, and the box-frame is supported, during this operation, at its lowermost end on anvils 26 which are relatively adjustable on a support 27 to accommodate boxes of different widths, the adjustment in this instance being effected by means of projections 28 on the anvils fitting in the series of openings 29 on the support. To accommodate boxes of different lengths, the support 27 is adjustable toward and from the nail chucks and for this purpose it may be mounted to move on the vertical guides 30 on the main frame, the movement

being preferably effected by a vertically arranged screw 31 which meshes with a nut 32 on the support. The screw may be rotated by a hand wheel 33 which has a bevel gear 34 on the end of its shaft 35 meshing with a bevel gear 36 on the screw.

The uppermost end of the box-frame is supported by anvils 37 having shoulders 38 which properly position the box-frame beneath the nail chutes B, C. These anvils are adjustable relatively to each other to accommodate boxes of other sizes and for this purpose may be arranged to slide on a single horizontal guide or way 39 which is carried by the main frame, being locked in adjusted positions by bolts 40 on the anvils, adapted to clamp the guide. The horizontal way 39 may be adjusted on the guides 30 of the frame toward and from the nailing mechanism in order that both anvils may be shifted to positions to correspond with the thickness of the stock of the box-frame. This adjustment in this instance is effected by screws 39^a at each end of the way, working in fixed nuts 39^c on the main frame and held in their adjusted positions by lock nuts 39^b.

The box-frame may be held in position on the anvils 26 and 37 by means of two clamps, 41 and 42, that are arranged on opposite sides of the sets B, C, one of said clamps being yieldingly supported as by a spring 43 while the other is pivoted at 44 on a slide 45 and is pressed away from the box-frame by a spring 46. The movable or pivoted clamp is preferably operated by a wedge or cam member 47 which may be slidably mounted in a slide bracket 48 that is adjustable on the guide 8 for the nail chucks, the cam being adapted to pass between a roller 49 formed on the slide 45 and a roller 50 on the clamp to move the latter into engagement with the box-frame.

To operate on the two sides of the box-frame there is provided a support 51 which in order that it may move toward and from the nailing mechanism in this instance, is arranged to travel on the guides 30 and is positioned nearer to the nailing mechanism than the support 27. The movement of the support 51 may be effected by a nut 52 which turns on the screw 31 and is preferably formed at its periphery into a worm wheel in order that it may be operated by a worm 53 that is carried by a horizontally arranged shaft 54, the shaft being operable manually by a hand wheel 55. The support 51 carries a pair of anvils 56 which may be arranged on slides 57 that are movable toward and from each other on ways formed on the support so that box frames of different lengths may be accommodated.

Arranged nearer to the nailing mechanism in line with the anvils 37 and on opposite sides of the latter is a pair of anvils

58, which are carried by slides 58^a that are movable on guide or way 39. Each anvil 58 is provided with a shoulder 58^b to position the box-frame and these shoulders are arranged in a vertical plane different from that of the shoulders 38 of the anvils 37 so that the clamps 41 and 42 will be cleared and will not interfere with the positioning of the box-frame during the nailing of the sides. Of course to cooperate with the anvils 58 the nail chucks A, D must be arranged in the same plane therewith and for this purpose said chucks are arranged farther outwardly than the chucks B, C. The clamping means for the box-frame while the sides are being nailed is also arranged forward of the clamping means that is effective when the ends are being nailed. Otherwise the two means are practically the same, the present means embodying two clamps 59 and 60. The clamp 59 is yieldingly supported on a slide 61 which is adjustable on way 39 while the clamp 60 is mounted on the slide 62 movable on the way. Further a cam or wedge 63 movable on a slide that is adjustable on the guide 7 cooperates with the clamp 60 to move it toward the box against the action of spring 64.

The operation of the several parts has been hereinbefore set forth and therefore it will be necessary only to give a general statement at this point. The anvils 37, the clamps 41 and 42, the support 51 and the nailing devices B, C, are adjusted to correspond with the width of the box-frame, while the anvils 56 and 58, clamps 59 and 60, support 27 and nailing devices A, D are adjusted to correspond to the length. The box-frame is then fitted in machine on anvils to correspond to its position, and the machine is started. The clamps grip the box-frame and then the two sets of nailing devices operate at opposite corners, securing the frame together and at the same time nailing the corner strips. Assuming that an end is first operated on, then the box is turned 90 degrees and the sides are positioned so that they will be operated on. As all of the nailing devices operate on every down stroke of the cross head the feeding devices supply nails only alternately to the end and the intermediate sets of nailing devices to prevent nails being driven when not desirable.

A machine constructed in accordance with this invention permits a box-frame to be rigidly held while being nailed. Further, one machine may be employed for nailing the ends and the sides without one operation interfering with the other.

I claim as my invention:

1. The combination with a nail driving mechanism, of a pair of work supports adapted to be used alternately without changing their position, one of said work

supports being in a plane above the other work support when they are in operative position and embodying a pair of anvils spaced apart in order that the work may engage the other support.

2. The combination with a nail driving mechanism, of a pair of work supports adapted to be used alternately without changing their position, one of said work supports being in a plane above the other work support when they are in operative position and embodying a pair of anvils spaced apart and adjustable toward and from each other.

3. The combination with a nail driving mechanism, of a pair of work supports, a rotary screw for operating one of said supports, a nut carried by the other support and cooperating with the screw, and mechanism for rotating the nut.

4. The combination with a frame having a guide thereon, and a nailing mechanism on the frame, of a pair of work supports movable on the guide toward and from the nailing mechanism, a screw connected to one of the supports, mechanism for rotating the screw to move said support, a nut carried by the other support and working on the screw, and mechanism for rotating the nut.

5. The combination with a frame having a vertically disposed guide thereon, and a nailing mechanism on the frame, of a pair of work supports independently movable on the guide toward and from the nailing mechanism and each comprising a pair of anvils, and mechanisms for moving the supports.

6. The combination with a nailing mechanism, of a guide arranged in proximity to the nailing mechanism, a series of slides movable on the guide, anvils carried by some of said slides, and clamps carried by the remaining slides, the latter being adjustable toward and from the slides which carry the anvils.

7. The combination with a nailing mechanism, of a guide arranged in proximity to the nailing mechanism, and a series of slides arranged on the guide and carrying inner and outer pairs of anvils, respectively, free spaces being afforded between the inner and outer pairs of anvils whereby a box frame may be supported by either pair without changing their position.

8. The combination with a nailing mechanism embodying a series of nailing devices, of a pair of anvils for supporting the work, a clamp arranged at each end of said series of nailing devices, said clamps being on opposite sides of and without the pair of anvils, one of said clamps being yieldable and the other of said clamps being movable to engage the work.

9. The combination with a nailing mechanism embodying a series of nailing devices,

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of a pair of anvils for supporting the work, a clamp arranged at each end of the series of nailing devices, said clamps being on opposite sides of and without the pair of anvils, one of said clamps being yieldable and the other of said clamps being operable by the nailing mechanism to engage the work.

10. The combination with a nailing mechanism embodying a series of nailing devices, of a pair of anvils for supporting the work, a clamp arranged at each end of the series of nailing devices, said clamps being on opposite sides of and without the pair of anvils, one of said clamps being yieldable, and a cam operated by the nailing mechanism for moving the other of said clamps into engagement with the work.

11. The combination with a nailing mechanism embodying a series of nail chucks and a cross head carrying a plurality of hammers coöperating with the chucks, of a pair of anvils for supporting the work, a clamp arranged at each end of the series of chucks, said clamps being on opposite sides of and without the pair of anvils, one of said clamps being yieldable, and a movable cam coöperating with the other of said clamps to cause it to engage the work.

12. The combination with a nailing mechanism, of a guide arranged in proximity to the nailing mechanism, a pair of anvils adjustable relatively to each other on the guide, and a pair of clamps adjustable on said guide and located without and on opposite sides of the anvils.

13. The combination with a nailing mechanism embodying a cross head carrying a plurality of hammers, of a guide arranged in proximity to the nailing mechanism, a pair of anvils adjustable toward and from each other on the guide, a pair of slides arranged to move on the guide on opposite sides of the anvils, a yielding clamp carried by one of the slides, a movable clamp carried by the other slide, and a cam carried by the cross head and adapted to coöperate with the movable clamp.

14. The combination with a nailing mechanism, of a pair of anvils to engage an article operated upon by the nailing mechanism and a second pair of anvils arranged on opposite sides of the first mentioned pair, free spaces being afforded between the respective anvils whereby a box frame may be

supported upon the inner or outer pair of anvils without changing their position.

15. The combination with a nailing mechanism, of a pair of anvils to engage an article operated upon by the nailing mechanism, a pair of clamps arranged on opposite sides of the pair of anvils, and a second pair of anvils beyond the clamps and having shoulders arranged to cause an article supported thereon to clear the clamps for an article on the first named anvils.

16. The combination with a nailing mechanism, of a pair of clamps arranged in proximity to the nailing mechanism, and a second pair of clamps arranged on opposite sides of the first named clamps and offset relatively to the latter a distance sufficient to permit an article clamped thereby to clear the first named clamps.

17. The combination with a nailing mechanism, of a guide arranged in proximity to the nailing mechanism, slides carrying anvils adjustable on the guide relatively to each other, free spaces being afforded between the anvils whereby a box frame may be supported alternately on different pairs of anvils without changing their position, and means for adjusting the guide toward and from the nailing mechanism.

18. The combination with a nailing mechanism, of a pair of supports, one arranged nearer the nailing mechanism than the other and embodying a pair of spaced anvils, another pair of anvils arranged nearer the nailing mechanism, and still another pair of anvils having its members arranged on opposite sides of the second named pair of anvils.

19. The combination with a frame carrying guides and a nailing mechanism, of a guide adjustable on the first named guides, slides movable on the last named guide and carrying two pairs of anvils, one pair having its members arranged on opposite sides of the first named pair, and a pair of supports adjustable on the first named guides, one of said supports being nearer the nailing mechanism than the other and embodying a pair of spaced anvils.

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Witnesses:

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