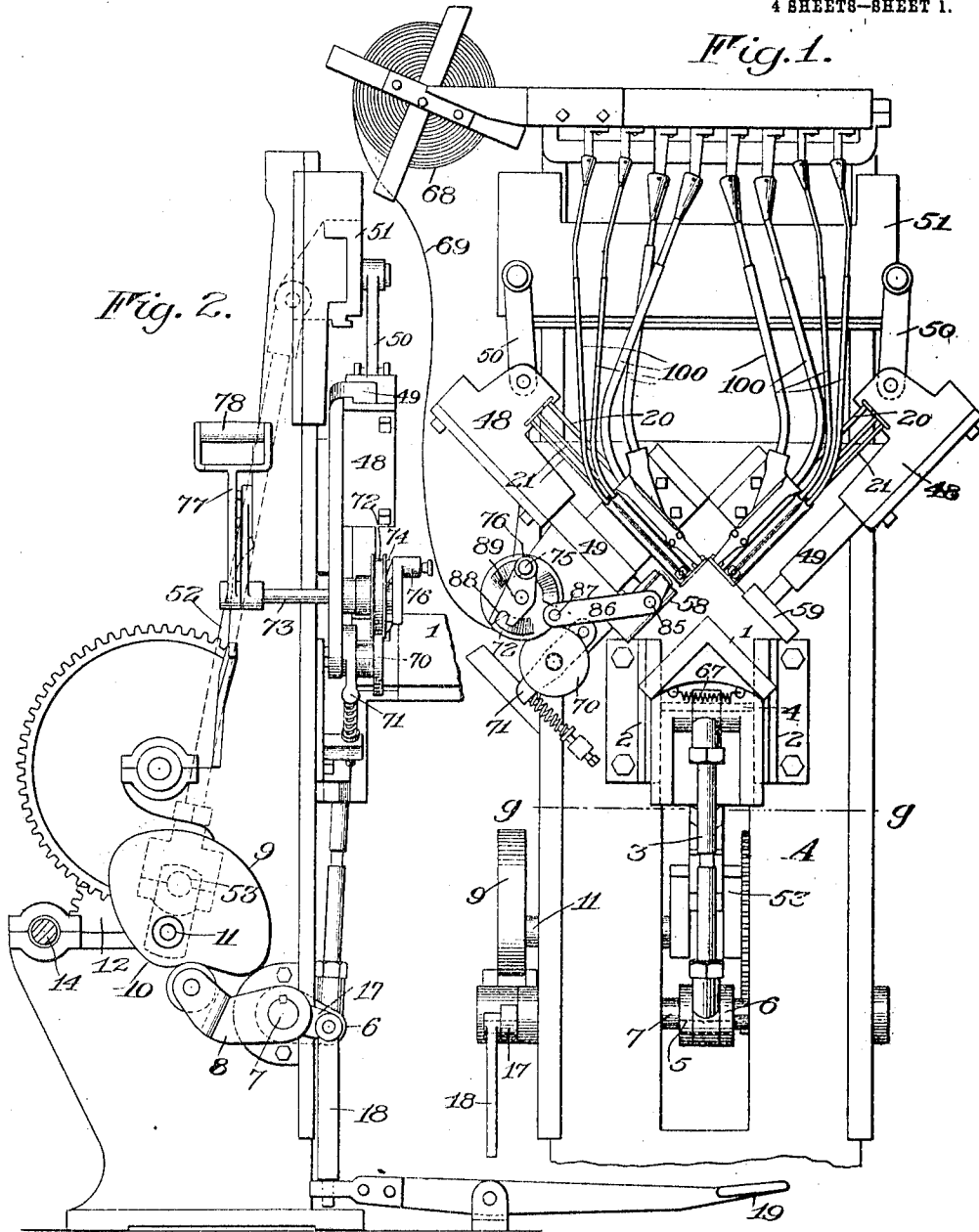


H. W. MORGAN.
NAILING MACHINE.
APPLICATION FILED MAY 13, 1909.

1,039,172.

Patented Sept. 24, 1912.

4 SHEETS—SHEET 1.



Witnesses

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4 SHEETS—SHEET 2.

Fig. 4.

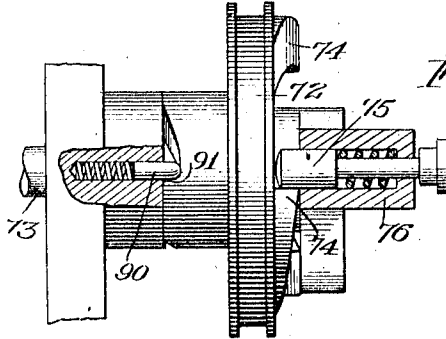
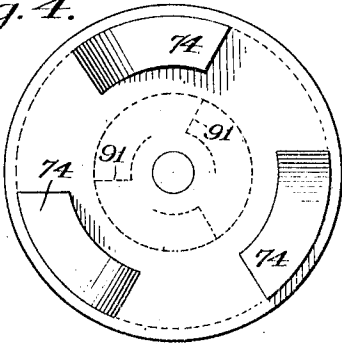


Fig. 5.

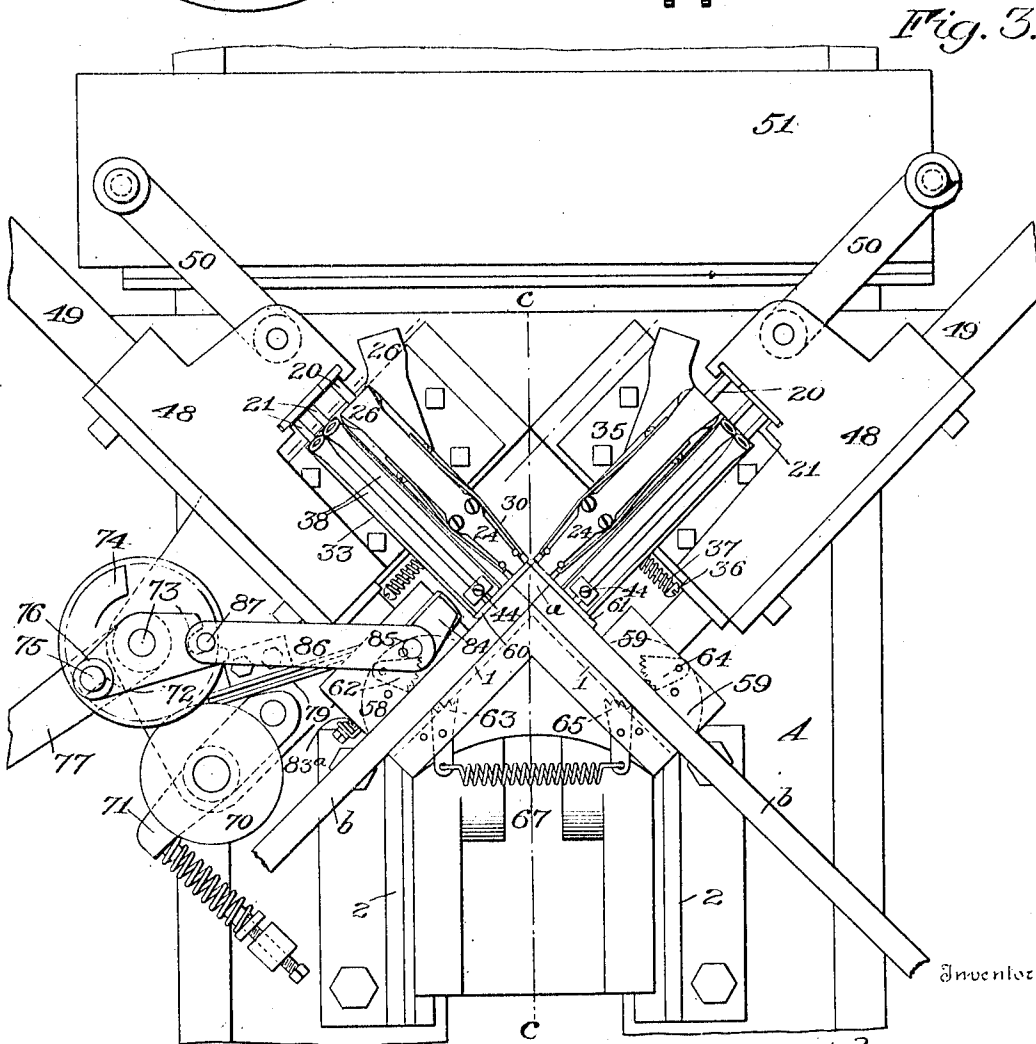


Fig. 3.

Witnesses

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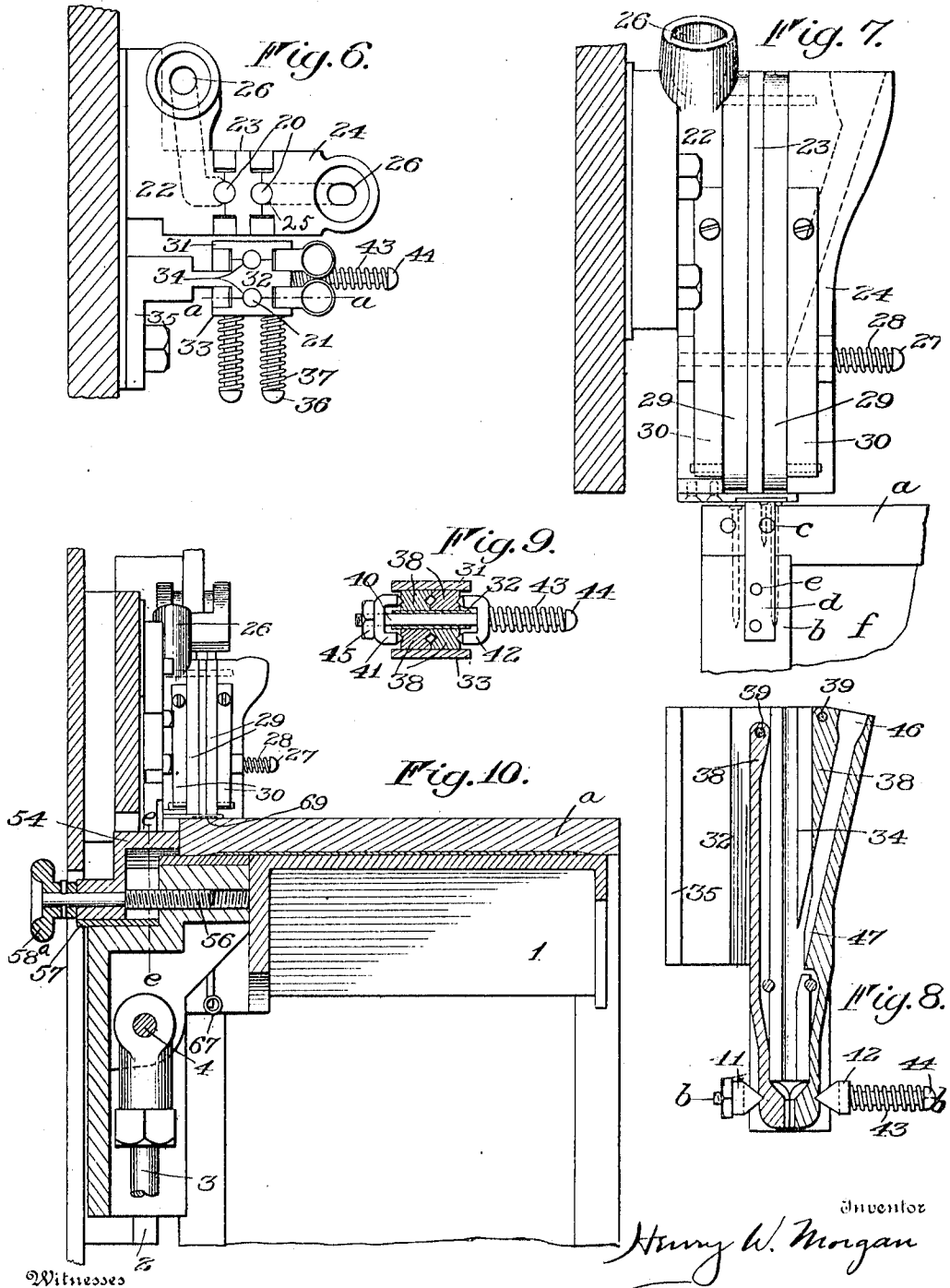
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4 SHEETS—SHEET 3.



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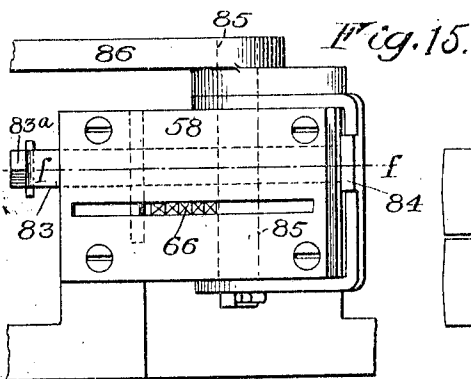
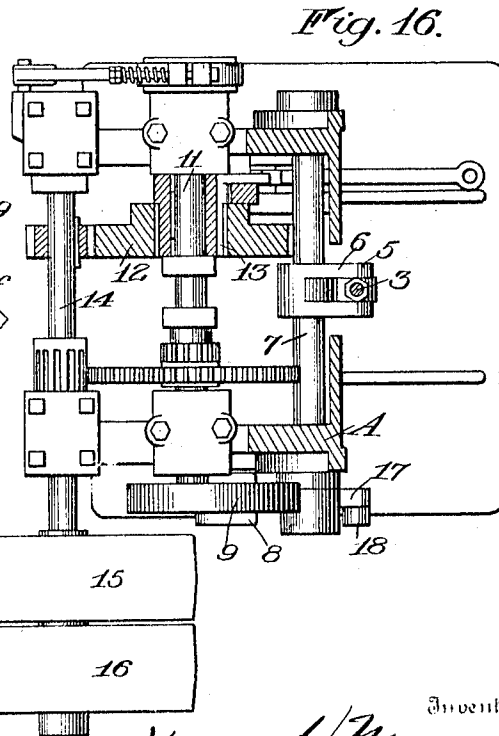
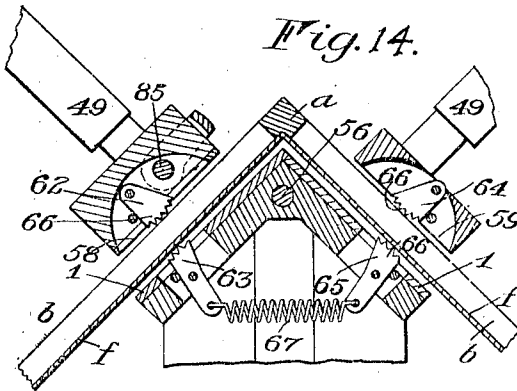
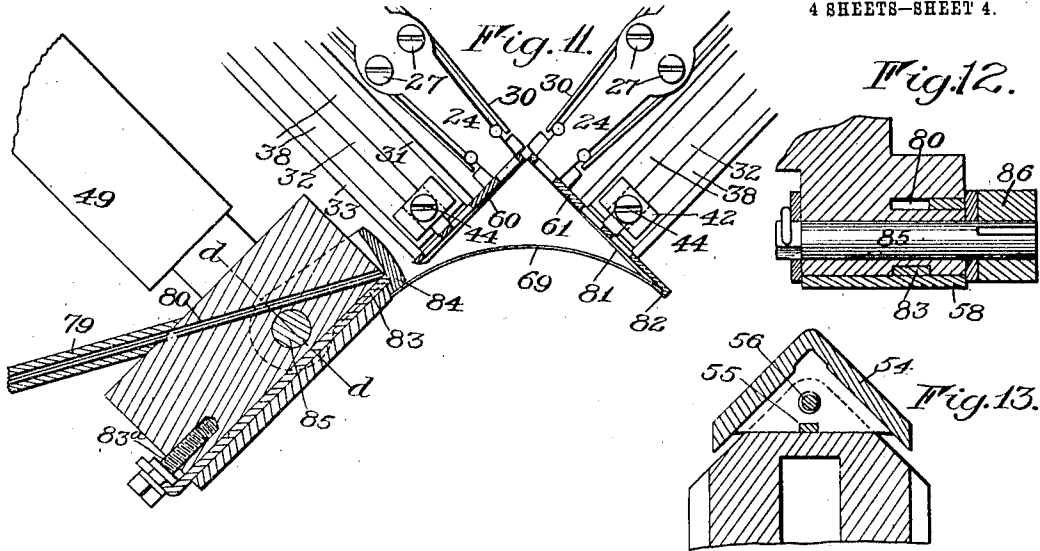
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H. W. MORGAN.
NAILING MACHINE.
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Patented Sept. 24, 1912.

4 SHEETS—SHEET 4.



Witnesses

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UNITED STATES PATENT OFFICE.

HENRY W. MORGAN, OF ROCHESTER, NEW YORK.

NAILING-MACHINE.

1,039,172.

Specification of Letters Patent.

Patented Sept. 24, 1912.

Application filed May 13, 1909. Serial No. 495,817.

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 for boxes or other articles where two work pieces, such as the sides of a box, are held in juxtaposition and preferably in angular relation while being secured together, and an object of the invention is to provide for simultaneously nailing together two proximate sides of a box or the like while at the same time applying a strap to both of said sides.

Another object of the invention is to provide a machine which while holding two work pieces in definite intersecting planes, will press or move them toward the point of intersection of their planes in order that a tight joint may be obtained between the work pieces prior to their being secured together.

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 front view of a nailing machine constructed in accordance with the present invention; Fig. 2 is a side view of the same machine; Fig. 3 is an enlarged detail view showing the anvil or work support, the nailing devices and parts in proximity thereto; Figs. 4 and 5 are detail views of the tape feeding and cutting means; Fig. 6 is a top view of the nail chucks operating on one side of a box; Fig. 7 is a side view of one of the larger double chucks; Fig. 8 is a section on line *a-a*, Fig. 6; Fig. 9 is a section on line *b-b*, Fig. 8; Fig. 10 is a section on line *c-c*, Fig. 3; Fig. 11 is a sectional view illustrating the manner in which the tape is fed and cut; Fig. 12 is a section on line *d-d*, Fig. 11; Fig. 13 is a section on line *e-e*, Fig. 10; Fig. 14 is a detail sectional view illustrating the manner in which the work pieces are pressed together; Fig. 15 is a bottom view

of one of the work clamps illustrating the cutting device for the strap, *f-f* indicating the line on which the section shown in Fig. 11 is taken; and Fig. 16 is a section on line *g-g*, Fig. 1.

Although features of this invention are applicable to nailing machines of various types and more particularly to machines which operate on any two pieces of material which are to be secured together at an angle to each other, I have in the present embodiment especially adapted it for nailing boxes or box frames which embody corner pieces *a* mortised at their ends to receive the ends of side pieces or cleats *b*, and held to the latter by nails *c* driven in the two outer faces of the corner pieces, straps *d* passing about the corner pieces and held by nails *e* driven into the side pieces *b* and also by some of the nails that hold the corner pieces and side pieces together. The upper and lower side pieces or cleats *b* may be connected by a thin web of card board or thin veneer *f* which is secured in slots in the proximate edges of side pieces. In making a box, a strip of the cardboard or veneer with wooden strips along two opposite edges to form all of the upper and lower side pieces of the box frame is provided. The wooden strips are then cut transversely where the corners are to be formed and the cardboard or veneer is bent so that a corner piece may be introduced between the cut ends of the wooden strips. In this way a box is provided having an inner wall which has a continuous surface except at the ends of the cardboard and these are located at a corner in a groove in a corner piece *a*.

To support two sides of a box such as described or for that matter any two angularly arranged work pieces while the corner or joint between them is being operated upon, there may be provided a support or anvil preferably having two faces at angles to each other so as to fit within the corner and engage the two work pieces. In this instance the support moves toward a nailing mechanism, to be hereinafter described, and to this end the frame *A* of the machine is provided on its front face with vertical guides *2* on which the support travels, the movement being effected by any suitable means. Preferably the work support is movable in timed relation to the nailing mechanism and also independently of the latter at the will of the operator. With

this end in view there may be provided a connecting rod 3 pivoted at 4 to the support and having its lower end pivoted at 5 to an arm 6 on a rock shaft 7 journaled on frame

- 5 A. Rock shaft 7 may be periodically moved by a mechanism comprising preferably, an arm 8 thereon having a roller at its outer end to cooperate with a cam having a curved portion 9 serving to hold the anvil in co-
- 10 operative relation with the nailing mechanism and a portion 10 permitting the anvil to move away from the nailing mechanism under its own weight. The cam may be arranged on a shaft 11 which carries a
- 15 loose wheel 12 adapted to be connected to the shaft by a clutch 13 of any suitable construction, under the control of an operator, and the loose wheel 12 is geared to drive shaft
- 20 14 on which are arranged fast and loose pulleys 15 and 16. To permit the movement of the work support independently of the timed driving mechanism described, the rock shaft 7 may be provided with an arm 17 to which
- 25 a push bar 18 operated by treadle 19 is connected, the cam permitting the independent movement of the rock shaft. The position of the work support may be determined by a gage 54 which preferably is guided at 55
- 30 on the rear of the work support and has an inverted V-shaped, forwardly extending portion overhanging the said support. It may be operated by a screw 56 working in the support, journaled at 57 in the gage and extending to the rear of the machine where it is
- 35 provided with a wheel 58^a by which it may be moved forwardly and rearwardly.

- The mechanism which secures the two sides of the box together in this instance embodies a nailing mechanism which may
- 40 comprise nailing devices operating at angles to each other so as to cooperate with two sides of the box or box frame supported on the work support. Preferably there is employed for each of the two sides of the box a
- 45 double or compound nailing chuck having two plungers or hammers 20 operating therein, one in rear of the other, and a smaller double chuck having its members arranged in a line parallel to the line of the members
- 50 of the larger and on the outer side of the latter and having plungers or hammers 21 operating therein; the hammers 20 driving the nails *c* and the hammers 21 driving the nails *e*. The larger double chuck is preferably
- 55 abutting one another and having their opposed faces provided with grooves 25 forming the channels in which the drivers or hammers operate, the nails being fed to the
- 60 channels by passages 26 in the two outer members 22 and 24 and rods 27 with springs 28 resiliently holding the members in co-
- 65 ing jaws 29 arranged in grooves on opposite

sides of the chuck and pressed together by springs 30. The smaller, double chuck may be composed also of three members 31, 32 and 33 grooved on their opposed faces at 34 to provide a channel for the hammers 70 and nails, the intermediate member being supported at 35 and the outer ones being resiliently supported thereon by rods 36 and springs 37. Clamping or supporting jaws 38 are arranged in pairs on opposite sides of 75 the chuck being pivoted at 39 and pressed together near their lower ends by a single spring for the purpose of reducing the space which the chuck will occupy. To accomplish this result a rod 40 is guided in the intermediate member and carries two relatively movable abutments 41 and 42 slidable 80 on the rod 40 and preferably of U-shape with pointed ends. Each of said abutments cooperates with a pair of jaws 38 and they are pressed together by a helical spring 43 surrounding the guide rod 40 and engaging the abutment 42 and a head 44 at one end of the rod, a head 45 on the other end of the rod 85 cooperating with abutment 41. In order to still further reduce the size of the chuck two of the pivoted jaws 38 on one side of the chuck may be provided with nail chutes 46 having passages or channels 47 communicating with the channels 34. The 95 nails may be delivered to the chucks in any suitable manner, tubes 100 in the present instance leading thereto from a nail hopper, not shown.

All of the hammers of the nailing devices 100 operating on one side of a box may be connected to one of the heads 48 that works on one of the guides 49 each perpendicular to one of the anvil or work support faces 1; and each head may be connected by a link 105 50 to a cross head or slide 51 that is guided on the frame A and operated in any suitable manner, as by a connecting rod 52 connected to a crank portion 53 on shaft 11.

In order to hold the work pieces on the support in definite intersecting planes there may be provided a pair of clamps 58 and 59 arranged at an angle to each other and each adapted to cooperate with one of the faces 115 of the work support to clamp a side of a box or work piece between them. The clamps in this instance are stationary or fixed and for this purpose are secured at the ends of the guides 49 and on opposite or the outer sides of the nailing or securing devices. 120

It is desirable to provide some means for forcing the work pieces or sides of the box toward the point of intersection of their planes and for this purpose there may be employed one or more work shifting devices which cooperate with one or both of the work pieces or box sides upon the relative movement of the work support and the clamp. In the present instance there are provided four pawls 62, 63, 64 and 65 having 130

corrugated or roughened eccentric faces 66 and arranged in pairs, the members of which cooperate with opposite faces of one of the work pieces or box sides. Preferably the
 5 pawls 62 and 63 are arranged respectively in pockets in clamp 58 and one of the faces of the work support 1, while pawls 64 and 65 are arranged respectively in pockets in clamp 59 and the other face of the support.
 10 The pawls 62 and 64, which act under the influence of gravity, engage the outer faces of the work pieces, while the inner faces of the latter are engaged by pawls 63 and 65 which are projected by a spring 67 that connects them.

A further feature of this invention is the application of straps to the work on the work support in a position to be secured by the nailing mechanism. In this embodiment, a pair of plates or members 60 and 61 are arranged in angular relation and are preferably secured to the chucks at the discharge ends thereof, the plates having provision whereby the nails or fasteners may
 20 be passed therethrough to engage the straps. These plates act to shape the straps fed thereto in any suitable manner. In this instance, a spool or reel 68 for sheet metal tape 69 is arranged on the machine and
 30 supplies the tape to a feeding mechanism comprising preferably a roller 70 arranged on a resiliently mounted support 71 and pressed toward a roller 72 that has a grooved periphery and is journaled on a shaft 73. The latter may have an intermittent driving connection with roller 72 and to this end the roller has beveled projections or teeth 74 on one face with which a pawl or spring
 35 pressed plunger 75 cooperates, the latter being carried by an arm 76 on the shaft 73 which is preferably operated manually. This may be effected by a lever 77 on the shaft 73 provided with a hand grip 78 which is grasped and turned in a direction to cause
 45 the pawl or dog to engage a tooth 74 and rotate the wheel or roller 72, thus feeding the tape 69, the return movement of the roller 72 being prevented by any suitable means, such as a spring dog 90 carried by a
 50 fixed part of the machine and engaging shoulders 91 on the roller. The tape may pass from the feeding device to a guide 79 which connects with a guide 80 formed by a bore in the clamp 58 discharging to the
 55 side of the latter in proximity to the nailing devices. After a certain amount of tape has passed from the discharge end of the bore the end of the tape cooperates with a groove 81 in plate 61 and then travels downwardly in the groove until a stop 82 is
 60 reached when a continued movement causes the tape to buckle or flex in the manner shown in Fig. 11. About this time a cutting device may be brought into operation to
 65 sever or cut a strap from the tape. The

cutting device may embody a stationary knife 83 mounted in a slot in the clamp 58 and adjustable by a screw 83^a to cause its cutting edge to project different distances from the clamp. Cooperating with the
 70 knife is a movable knife 84 which may embody a U-shaped member having its arms lying on opposite sides of the clamp and pivoted to the latter by a pin 85, the portion connecting the arms operating past the discharge end of bore 80.

The cutting device may be operated in any suitable manner, but preferably it is controlled by the tape feeding mechanism. With this end in view an arm 86 is secured
 80 at one end to pin 85 and at its free end carries a pin 87 which engages the walls of a notch 88 in an arm 89 on shaft 73 near the latter part of the feeding movement causing the knife 84 to cooperate with knife 83 and
 85 cut or sever the tape to form a strap which is supported by engagement with the stop 82 and end of clamp 58. After the cutting operation the knife 84 rises under the action of the lever or arm 86 which is heavier
 90 than the knife.

In using the present embodiment of the invention, two work pieces, in this instance two sides of the box or the like, are placed upon the work support while the latter is in
 95 a depressed position, and grip 78 is grasped and the lever turned in order to feed the tape 69 to the position shown in Fig. 11, the knife 84 operating immediately this position is reached. If desirable the treadle is now
 100 depressed carrying the work toward the strap which is shaped by the plates 60 and 61 and the work. If the work and the straps are positioned properly the clutch 13 is operated to start the machine, causing
 105 the work to be firmly pressed against the clamps 58 and 59. Before the clamps 58 and 59 are reached the shifting pawls or dogs 62 and 64 engage the work pieces and together with the pawls 63 and 65 press or
 110 move the work pieces toward the point of intersection of their planes and in this manner holding the parts tightly together so that they may be secured in this relation by the nailing mechanism. When the end
 115 of the upward movement of the work support is reached the nailing mechanism comes into operation and drives the nails in the two sides of the box to secure said sides together and at the same time attach the strap
 120 thereto.

A machine constructed in accordance with this invention is simple in operation and not liable to get out of order. It forces the work pieces into intimate connection prior to the
 125 nailing and the nailing devices operate in a manner to effectively secure the parts together. The straps are formed and fed in a simple and expeditious manner thus reducing the cost of manufacture of boxes and
 130

other similar articles and insuring against waste due to the improper positioning of the straps.

I claim as my invention:

5 1. In a nailing machine, a work support having two faces at an angle to each other, nailing devices operating upon work on the work support, a gage adjustable on the
10 work support and including flat faces arranged at angles to each other and adapted to overlie said faces of the work support, and means for adjusting said gage.

2. In a nailing machine, a work support having two faces at a right angle to each
15 other, a pair of clamps arranged perpendicular to the faces of the work support, nail chucks arranged between the clamps at right angles to the faces of the work support, and hammers operating in the nail
20 chucks.

3. The combination with a work support, and means for holding two work pieces in definite intersecting planes, of a device operating to press the work pieces toward the
25 point of intersection of their planes, and mechanism for securing the work pieces together.

4. The combination with a work support having two faces arranged at an angle to
30 each other, of a pair of clamp members arranged at an angle to each other, nailing devices operating between the clamp members, and work piece shifting pawls carried by the work support and the clamp mem-
35 bers and having eccentric work engaging faces.

5. In a nailing machine, the combination with a work support having a pair of faces arranged at a right angle to each other, and
40 a nailing mechanism embodying nailing devices arranged perpendicular to said faces and operating upon work on both faces of the work support, of strap-shaping means for applying a strap to the work in a position
45 tion to be secured by the nailing mechanism.

6. In a nailing machine, the combination with a work support having a pair of faces arranged at a right angle to each other, and
50 a nailing mechanism embodying nailing devices arranged perpendicular to said faces and operating upon work on both faces of the work support, of a pair of angularly arranged strap-shaping members for applying a strap to the work in a position to be
55 secured by the nailing mechanism.

7. In a nailing machine, the combination with a work support having a pair of faces arranged at a right angle to each other, and
60 a nailing mechanism embodying nailing devices arranged perpendicular to said faces and operating upon work on both faces of the work support, of means for supporting a strap between the nailing mechanism and
65 the work support so that said strap may be

secured by the nailing mechanism to the work.

8. In a nailing machine, the combination with a work support having a pair of faces arranged at a right angle to each other, and
70 a nailing mechanism embodying nailing devices arranged perpendicular to said faces and operating upon work on both faces of the work support, of means for supporting a strap between the nailing mechanism and
75 the work support in a position to be secured by the nailing mechanism to the work, means for guiding a tape to the supporting means, and a cutting device operating to cut the tape to form the straps. 80

9. In a nailing machine, the combination with a work support having a pair of faces arranged at a right angle to each other, and a nailing mechanism embodying
85 nailing devices arranged perpendicular to said faces and operating upon work on both faces of the work support, of a pair of angularly arranged members for applying a strap to work on the support in a position
90 to be secured by the nailing mechanism, means for guiding a tape to said members, and a cutting device operable to sever the tape to form straps.

10. In a nailing machine, the combination with a work support having a pair
95 of faces arranged at a right angle to each other, and a nailing mechanism embodying nailing devices arranged perpendicular to said faces and operating upon work on both faces of the work support, of a pair
100 of angularly arranged members for applying a strap to work on the work support in a position to be secured by the nailing mechanism, one of said members being provided with a stop, means for guiding a tape
105 to engage said stop, and a cutting device operable to cut the tape to form straps.

11. In a nailing machine, the combination with a work support having a pair of faces arranged at a right angle to each
110 other, and a nailing mechanism embodying nailing devices arranged perpendicular to said faces and operating upon work on both faces of the support, of a pair of angularly arranged strap-shaping members cooperating with the work on said faces of the support, the nailing mechanism operating to
115 secure the strap to the work.

12. In a nailing machine, the combination with a work support having a pair of faces
120 arranged at a right angle to each other, and a nailing mechanism embodying nailing devices arranged perpendicular to said faces and operating upon work on both faces of the support, of mechanism for feeding a
125 tape to a position to be secured by the nailing mechanism to work on the work support, and a cutting device arranged to cut the tape thus fed.

13. In a nailing machine, the combination 130

with a work support having a pair of faces arranged at a right angle to each other, and a nailing mechanism embodying nailing devices arranged perpendicular to said faces and operating upon the work on both faces of the work support, of a guide arranged to direct a tape to a position to be secured by the nailing mechanism to the work, a manually operable feeding mechanism for moving the tape on the guide, and a cutting device operating to cut the tape to provide straps.

14. In a nailing machine, the combination with a work support having a pair of faces arranged at a right angle to each other, and a nailing mechanism embodying nailing devices arranged perpendicular to said faces and operating upon the work on both faces of the work support, of a guide arranged to direct a tape to a position to be secured by the nailing mechanism to the work, a feed roller for moving the tape on the guide, an operating lever, and an intermittent grip device interposed between the lever and the roller.

15. In a nailing machine, the combination with a work support having a pair of faces arranged at a right angle to each other, and a nailing mechanism embodying nailing devices arranged perpendicular to said faces and operating upon the work on both faces of the work support, of a guide arranged to direct a tape to a position to be secured by the nailing mechanism to the work, a feed roller for moving a tape on the guide having teeth thereon, a rock shaft on which the roller turns, an arm on the shaft, and a dog carried by the arm to engage the teeth on the roller.

16. In a nailing machine, the combination with a work support and a nailing mechanism, of a clamp cooperating with the support and having a guide therethrough for directing tape to a position to be secured by the nailing mechanism to work on the work support, and a U-shaped cutter having its arms pivoted to the clamp and operating to cut a tape fed through the guide.

17. In a nailing machine, the combination with a work support and a nailing mechanism, of mechanism for feeding a tape in a position to be secured by the nailing mechanism to work on the work support, and a cutting device operated by the feeding mechanism to cut a strap when the proper position of the latter is reached.

18. In a nailing machine, the combination with a work support and a nailing mechanism for driving nails in work on the support, of a guide for feeding tape in to a position to be secured by the nailing mechanism to work on the work support, a pivoted cutter operating to cut the fed tape into straps, an arm on the pivoted cutter, a rock shaft having an arm thereon cooperating with the arm of the cutter in certain positions of the rock shaft, and a feeding mechanism for the tape operated from said shaft prior to the cooperation of the arms.

19. In a nailing machine, the combination with a work support having a pair of angularly arranged faces, of a pair of angularly arranged strap shaping members cooperating with the pair of angularly arranged faces of the work support, one of said members having a stop thereon, a nailing mechanism operating to secure a shaped strap to work on the work support, a guide directing a tape so that one end of said tape engages the stop, a pivoted cutter operating to sever the tape to form straps and having an arm thereon, a rock shaft, a manually operated lever connected to the latter, a feed roller turning on the rock shaft and provided with teeth, a dog carried by the rock shaft to engage the teeth in order to effect the rotation of the roller, and an arm on the rock shaft cooperating with the arm of the cutter to effect the movement of the latter after the operation of the feed roller.

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Witnesses:

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