H. MESSER.

Box-Nailing Machine.

No. 217,472. Patented July 15, 1879.

Fig. 1

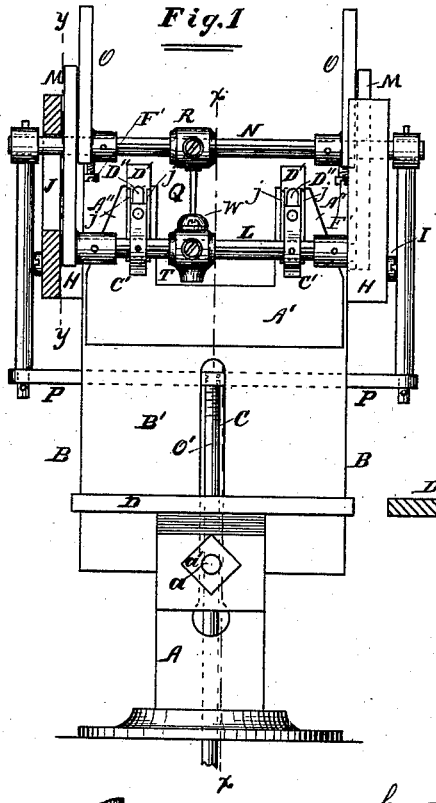


Fig. 2

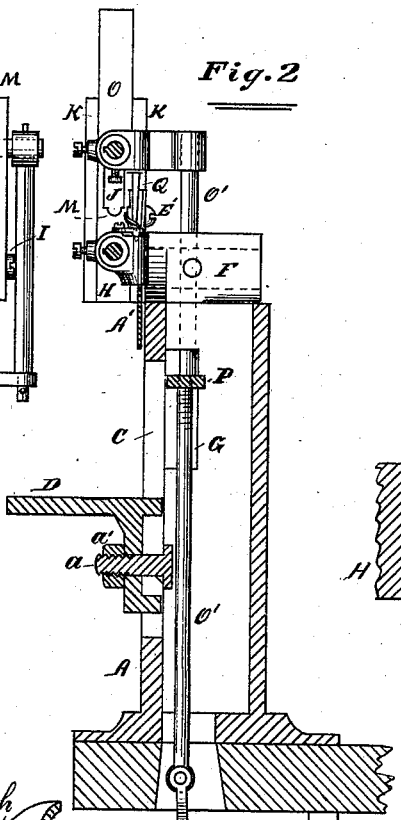


Fig. 3

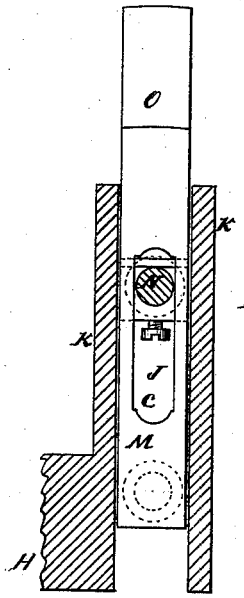


Fig. 4

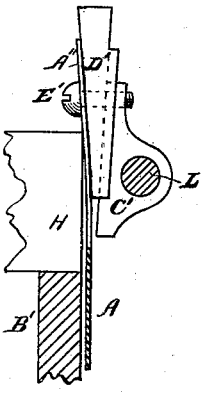


Fig. 5

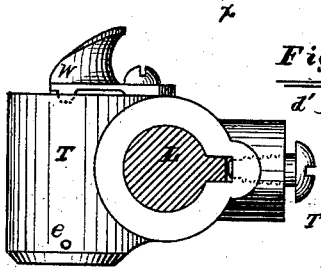


Fig. 6

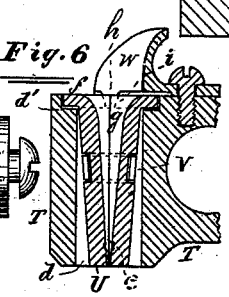


Fig. 7

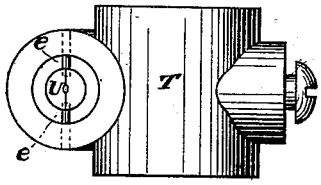
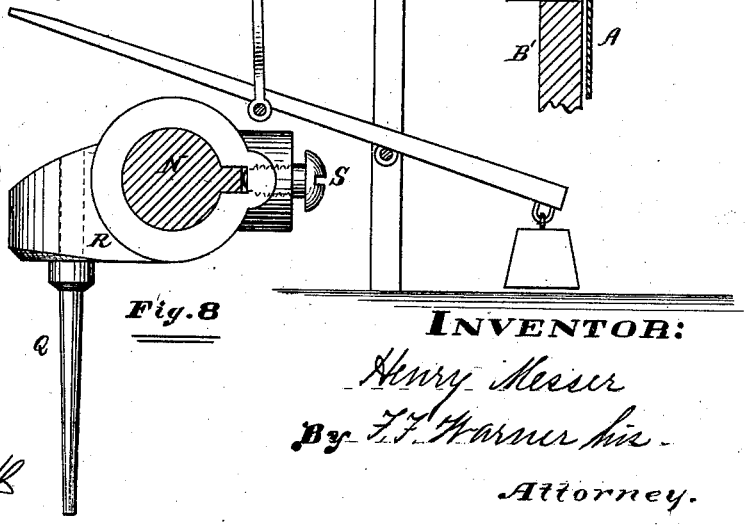


Fig. 8



Attest:

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Charles H. Schaff

INVENTOR:

Henry Messer

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Fig. 9

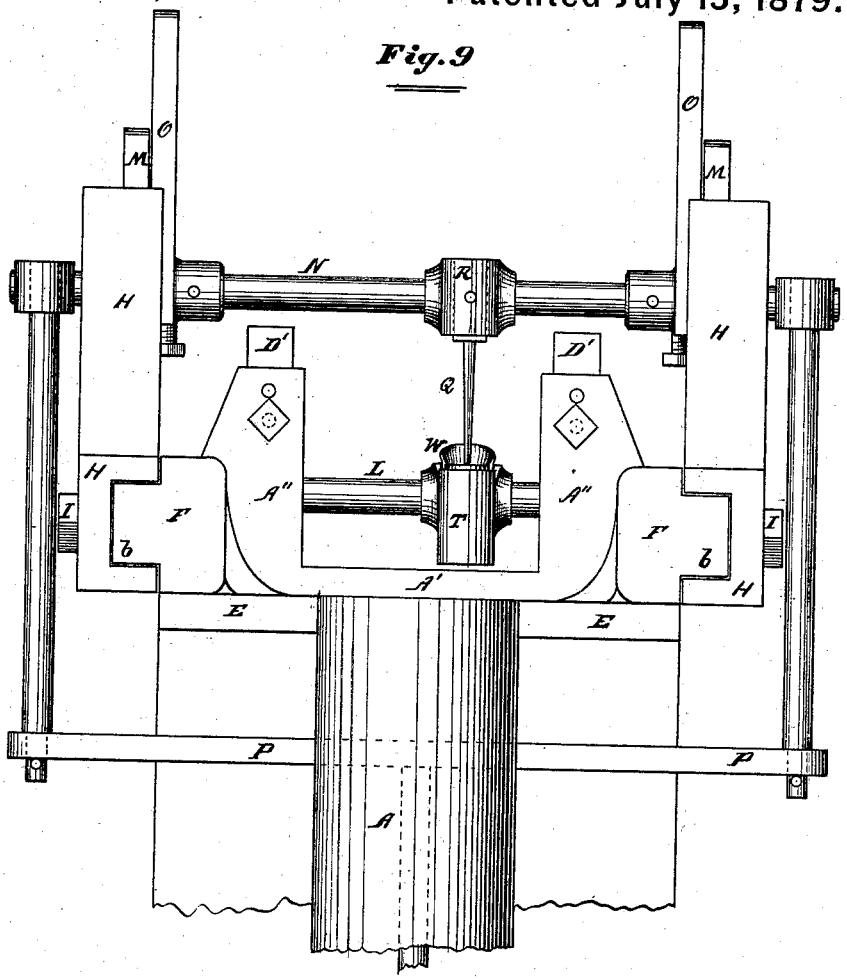
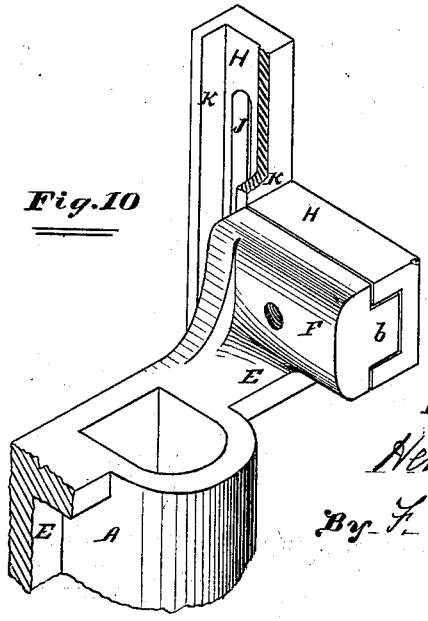


Fig. 10



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UNITED STATES PATENT OFFICE.

HENRY MESSER, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN BOX-NAILING MACHINES.

Specification forming part of Letters Patent No. **217,472**, dated July 15, 1879; application filed April 15, 1879.

To all whom it may concern:

Be it known that I, HENRY MESSER, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Box-Nailing Machines, of which the following, in connection with the accompanying drawings, is a full, clear, and exact description.

Figure 1, Sheet 1, of the drawings is a front elevation of a machine embodying my invention; Fig. 2, Sheet 1, a section in the plane of the line *x x;* Fig. 3, Sheet 1, a section in the plane of the line *y y;* Fig. 4, Sheet 1, a side view of the gage-adjusting blocks; Fig. 5, Sheet 1, a like representation of the die-holder and hood; Fig. 6, Sheet 1, a vertical central section of the parts shown in Fig. 5; Fig. 7, Sheet 1, a bottom view of the same parts; Fig. 8, Sheet 1, a side view of the punch and its holder; Fig. 9, Sheet 2, a rear view of the upper part of the machine; and Fig. 10, Sheet 2, a perspective of the guide-block, showing the manner of attaching it to the frame of the machine.

Like letters of reference indicate like parts.

The object of my invention is to simplify the construction and improve the operation of machines of the class to which my invention relates in the several respects hereinafter fully set forth.

A represents a standard, having a flat or disk-shaped base, adapted to rest upon a table or work-bench. This standard, however, may form a part of a frame adapted to rest upon the floor.

The vertical part of the standard A is hollow, as represented in Figs. 2 and 10, and when the standard is applied to a table or bench the latter should have an opening therein to adapt the machine to be driven by a treadle, when a treadle is employed for that purpose, as represented in Fig. 2.

B B are wings extending laterally from the forward part of the standard A, and forming a vertical flat wall, B′, in front of the machine, as is clearly indicated in Fig. 1. C is a vertical slot in the central part of the wall B′. D is a vertically-adjustable bracket or table arranged horizontally in front of the wall B′, and connected adjustably thereto by means of a bolt, *a*, and a nut, *a′*. The table D is ribbed or extended into the slot C, so as to be retained in its horizontal position.

E E are webs or arms extending laterally from the upper end of the standard A, and rearward from the upper part of the wall B′. F F are bars or supports, arranged horizontally, and extending rearward from the upper corners of the wall B′. The standard A is also slotted, as shown at G.

All the parts now described, excepting the table D and the means employed for connecting it to the standard, may be cast in one piece.

The front face of the wall B′ and the upper face of the table D should be planed or dressed off smoothly, and the sides of the slot C should also be smooth, so that the table will move or play freely therein and be held accurately in its proper position.

It will be perceived that the standard or frame of the machine is very simple in its construction, and that it may be very easily made and adapted to the use for which it is intended.

H H are rectangular guide-plates, the horizontal arms of which are made to receive and fit upon outwardly-projecting ribs *b b* on the supports F F. It is immaterial, however, whether the ribs *b b* are upon the supports F F or upon the parts H H, or whether there be one or more ribs and corresponding grooves, the object being to match the guides H H upon the supports F F in such a manner that the vertical arms of the guides will be firmly held in an accurately-vertical position, for the purposes hereinafter referred to.

I I are screws to retain the guides H H upon the supports F F. J J are slots in the vertical arms of the guides H H, and K K are flanges extending inward from the interior faces of the said arms, thus forming a vertical guideway for controlling the movement of parts hereinafter described.

L is a cross-bar or rod, and M M are sliding blocks arranged in the guideways in the parts H H. The blocks M M are slotted vertically, as shown at *c c*, and are rigidly attached to the ends of the bar L. N is a cross-bar or rod passing freely through the slots *c c*, and O O are sliding blocks arranged in the guideways in the parts H H, the blocks M M being between the plates H H and the blocks O O, as shown, and the latter being rigidly attached to the bar N.

P is a cross-bar passing freely through the slots G G. This bar is connected by means of

rigid arms to the outer ends of the bar or rod N. O¹ is a connecting-rod, connected at its upper end to the central part of the bar P, and at its lower end to the treadle. I deem it best to make the upper part of the rod O′ screw-threaded, so that the machine may be easily adjusted to tables or benches of different heights. When a treadle is employed it should be counterweighted; but I do not here intend to restrict myself to any particular construction of treadle, nor is it even necessary that a treadle should be used, as the machine may be driven by steam-power or otherwise.

It may be here stated, before describing the construction and operation of the parts carried on the base or rods L and N, that a downward pressure on the forward end of the treadle will draw down the bar N, and consequently allow the bar L to descend, as the latter is suspended from the former by means of the slotted blocks M M. Should the descent of the bar L be stopped, however, the downward movement of the bar N may be continued, for reason that it passes freely through the slots *c c*. With the release of the treadle the bar N will move upward and carry up the bar L when the upper ends of the slots *c c* are reached. I will soon explain the purpose of this movement, and I have only referred to the matter at this time in order to call attention to the fact that the means I employ to accomplish such a movement are very simple, and that nicety of construction is avoided.

The guide-plates H H may be cast, and are applied to the supports F F by merely being arranged on the ribs *b b* and by tightening the screws I I, when they will be firmly held in the proper position, and so that the guideways will be accurately vertical, thereby causing the sliding blocks M and O to move in true vertical lines, without danger of their being twisted therefrom by reason of any torsional strain to which they may be subjected. The guideways and sliding blocks arranged therein should, of course, be sufficiently fitted and finished to move easily and truly; but even for that purpose very little work is required.

Q is a punch or nail-driver, and R is a sliding block, from which it depends vertically. The block R is mounted freely on the rod or bar N, so that it may be adjusted laterally thereon; and it is prevented from being rotated thereon, either by flattening the bar and fitting the block thereto, or by employing a feather for that purpose; and in the latter case the feather may be applied either to the bar or to the block, the other part being grooved to receive the key or feather.

S is a set-screw entering the block R, and arranged for contact with the rod or bar N. By loosening this screw the block may be adjusted laterally on the rod, and by tightening it the block will be firmly held in the position in which it is set.

T is the die-holder. The die-holder is mounted on the rod or bar L, in the same manner that the block R is applied to the rod or bar N; consequently the die-holder is laterally adjustable on its supporting rod or bar, and is prevented from being rotated thereon. In the forward part of the holder T is cylindrical opening *d*, passing vertically through the holder, as represented in Fig. 6, and the upper face of this part of the holder is countersunk about the opening *d*, as indicated at *d′*.

e e are horizontally-arranged pins extending into the opening *d*, near its lower end.

U is a die or nail-receiver. This die or receiver is tapering in form, being much smaller at the lower end than at the top. It is also flanged at the top, as shown at *f*, and this flange rests in the countersunk part of the holder T, in which the die is thus freely suspended; and the upper end of the die fills, or nearly fills, the upper end of the opening *d*, as shown, while a widening or increasing space exists about the die from its upper to its lower end, as is clearly represented in Fig. 6. The die U is also hollow or tubular, as shown at *g*, and this tubular part or chamber *g* approximates the form of the exterior face of the die, making a very small, if any, opening in the bottom of the die, and flaring or spreading from thence upward nearly to the top, where it is rounded off and becomes much broader than the remaining part, substantially as shown. I make this die in two twin parts, or as if the die, after being constructed in the manner already described, were split centrally from top to bottom, as shown at *h*.

V is a spring-clasp, surrounding the die and holding its two parts together, the said parts being cut away to receive and support the clasp, and rendering the die laterally yielding as the punch Q is pushed down through or into the contracted part of the die, it being understood that the clasp is not a continuous ring, and that its ends may be drawn or forced apart by the action of the punch in entering the die. The pins *e e* enter the die slightly between its twin parts, as indicated in Figs. 6 and 7.

W is a hood applied to the block or holder T, and extending over but not resting upon the die U. *i i* are projections on or near the forward ends or corners of the hood, and these projections extend into corresponding notches in the flange *f*, which notches are made at the meeting-line of the twin halves of the die, as represented by the broken lines in Fig. 6, the hood also extending forward of the said line. The movement of the die in expanding and contracting in the manner described is thus in no way interfered with by the hood; but the hood not only prevents the die from being drawn up from its holder, but also prevents the die from being turned therein. The pins *e e* also aid in preventing the die from being turned, and keep the lower end of the die in the center of the opening *d*; or, in other words, they keep the die properly centered

until the punch begins to drive the nail, and until the nail enters the box, as will hereinafter more fully appear.

In feeding nails to the dies, which is usually done from the rear of machines of this class, the nails are apt to fall forward far enough to prevent them from properly entering the dies. The hood W, by extending up from the front part of the die, as shown, prevents this tendency, and serves as a shield or guide to direct or aid in directing the nails into the dies. The center of the punches is directly over the centers of the dies, and this central line passes a little way in front of the wall B′, and rearward of the bars which carry the punches and die-holders, this rearward arrangement admitting of the nails being fed by hand with facility and without danger, there being no necessity of extending the hand between the moving parts for that purpose. A′ is a gage, arranged in front of the wall B′ and extending below the dies. C′ C′ are blocks rigidly attached to the rod or bar L, and arranged near the ends thereof. D′ D′ are wedge-shaped or tapering blocks, having therein the vertical slots D″ D″. Vertical arms A″ A″ extend upward from the lower part of the gage A′, and are clamped to the faces of the blocks D′ D′ by means of screws or clamps E′ E′, which pass freely through the slots D″ D″ and enter the blocks C′ C′, thus clamping the blocks D′ D′ between the blocks C′ C′ and the arms A″ A″ of the gage A′. The blocks D′ D′ may therefore be moved up and down by loosening the screws E′ E′, and when adjusted as may be desired they may be fastened or held in place securely by tightening the screws E′ E′. To prevent the blocks D′ D′ from being tilted laterally, small ribs or lips *j j* may be made thereon and arranged to lap the sides of the blocks C′ C′.

It will be perceived that as the rear faces of the blocks D′ D′ incline forward, or are farther forward at the bottom than at the top, the gage A′ will be set more or less forward or away from the front face of the wall B′ by adjusting the blocks D′ D′ vertically in the manner described, it being understood that the gage A′ is thus connected to and moves vertically with the rod L, and that the gage is adjusted back and forth with relation to the wall B′ by being raised and lowered with relation to the said rod. A supplemental gage may also be applied to the gage A′, or otherwise employed, to determine the lateral position of the parts to be nailed.

In order to use the machine now described, I arrange upon the bar L a number of die-holders provided with hoods and containing dies or nail-receivers, the number being equal to the number of nails to be driven at the same time; and upon the bar N, I arrange a like number of punches or drivers. The distance between the dies should, of course, correspond to the distance between the nails when driven.

In nailing together the parts of boxes, the first step, usually, is to nail the sides to the ends, the parts being first made of the proper dimensions. In other words, the frame of the box is first nailed. I therefore adjust the table D such a distance below the dies, when they are near the lowest point of their descent when the treadle is depressed, that they will then rest upon the side piece arranged upon the end piece of the frame or box when these parts are arranged against the wall B′ in position for being nailed together, it being understood that for that purpose the end piece is to be arranged vertically on one end on the table, and with one face against the wall, and that one end of the side piece is to be supported on the upper end of the end piece, and also to be in contact with the wall, the side piece standing out horizontally therefrom.

If the distance between the upper end of the end piece and the lower ends of the dies is a little greater than the thickness of one of the side pieces, supposing the side pieces to be of equal, or nearly equal, thickness, the adjustment will be proper for beginning work.

After the end piece is arranged in the manner described there will be ample room between it and the dies to allow the other side piece to be arranged on the other end of the end piece. If the treadle be now released the punches or drivers and the dies or nail-holders will move upward, the drivers starting first, and continuing until they are drawn out from the nail-holders, and until the latter are drawn up to their highest point of suspension, and until the dies and their holders, the lower ends of which are flush, or nearly flush, with each other, are in a position sufficiently above the parts to be nailed to allow the said parts to be arranged in position for further work.

When the nails are fully driven the resistance offered in the attempt to drive them farther will be sufficiently increased to be perceptible to the operator, and the treadle should then be released.

When it is desirable that the downward movement of the treadle should cease with certainty at a given point, and that this result should be accomplished automatically, I set two screws, F′ F′, into the lower ends of the slides O O, or into other parts carried by the rod or bar N, or into the rod itself, arranging the screws so that they will either strike parts carried by the rod L or the rod L itself. The minor distance between the rods L and N may thus be regulated by turning the screws F′ F′, and the downward movement of the punches correspondingly regulated.

Ordinarily the punches should pass to the lower ends of the dies, in order to drive the nails flush with the wood and to free them from the dies. They may, however, pass below the dies, in order to set the nails deeper into the wood.

After the side piece is nailed to the end piece in the manner described, it may be nailed to the other end piece in like manner. The unnailed ends of the end pieces are then turned

up to receive the other side piece, which is nailed to them as the first was, when the frame of the box is completed.

It will be observed that the surface entered first by the nails when the second side piece is nailed is much nearer to the dies than was the upper face of side piece first nailed, the distance being diminished by the thickness of the second side piece. The dies, however, stand sufficiently above the second side piece to allow it to be placed in position with facility, and when the treadle is again depressed the dies will descend until they rest upon the side piece, the punches will continue to descend, and the operation will be the same as when the first side piece was nailed.

It will also be perceived that this work is accomplished without a further or special adjustment of the table D, owing to the independent movement of the punch-carrying bar and the die-carrying bar. In other words, after the table D is once adjusted all the parts constituting the frame of the box may be nailed together without again adjusting any part of the machine.

Provision may also be made, in first adjusting the table, to allow the bottom to be nailed to the frame without further special adjustment for that purpose, especially if the end pieces are square, or nearly so; and even boxes varying from each other in size within a certain range may be likewise nailed, the frequency of adjustment depending upon the correspondence between the independent movement of the punches and dies, the range within which the table is adjustable, and the swing of the treadle.

It is desirable that the nails should be driven in, or nearly in, the center of the edges of the end pieces, especially when those pieces are quite thin. Consequently when this thickness varies materially in different boxes provision should be made for bringing the centers of the edges directly below the centers of the dies. This I accomplish by means of the gage A′, which may be adjusted for that purpose in the manner already described, it being understood that the parts to be nailed together are to be placed against the gage instead of against the wall, when such a gage is employed.

It is obvious that many of the details of construction herein described are not absolutely essential, and that some parts of the machine are only auxiliary to, but not absolutely dependent upon, other parts, though I deem it preferable to employ those parts which are merely auxiliary, for the reasons already given.

I do not, therefore, here intend to restrict myself to mere details and auxiliaries, except as hereinafter specifically set forth; but,

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A box-nailing machine wherein is a vertically-reciprocating punch or driver and a vertically-reciprocating nail-receiver or die, and in which the nail-receiver is movable vertically with relation to the driver, for the purposes set forth.

2. A box-nailing machine wherein the nail-carrier is suspended on a vertically-reciprocating driver-carrier by means of open links, substantially as and for the purposes specified.

3. The combination, in a box-nailing machine, of the vertically-movable punch bar or carrier N, the slotted blocks or links M M, the die bar or carrier L, and the vertically-slotted guide-plates, substantially as and for the purposes specified.

4. The combination, in a box-nailing machine, of the horizontal supports F F, forming a part of the frame, and the rectangular slotted and flanged guide-plates H H, matched to the said supports by means of ribs and grooves, substantially as and for the purposes specified.

5. The combination of the fixed vertical wall B′, the vertically-adjustable table D, the vertically-reciprocating nail-receivers U U, having their centers arranged in front of the wall B′ and rearward of the bar carrying the said receivers, and the independently vertically-reciprocating punches, in a box-nailing machine, substantially as and for the purposes specified.

6. The combination of the die-holders T T, having therein the pins *e e*, the dies U U, entered by the pins *e e*, and the spring-clasp V, all constructed and arranged with relation to each other substantially as and for the purposes specified.

7. The combination of the flanged, tapering, and laterally-yielding receivers U U, consisting of twin parts, the holders T T, and the hook W, applied to the said holders, and having thereon the projections *i i*, extending into the upper or flanged end of the said receivers at points between the twin parts thereof, substantially as and for the purposes specified.

8. The combination of the hood W, having thereon the projections *i i*, the dies U U, entered by the parts *i i*, and the die-holders T T, substantially as and for the purposes specified.

9. The combination of the adjustable gage A′ with the wall B′ and the dies, substantially as and for the purposes specified.

10. The combination of the gage A′, the wall B′, the dies, the tapering and slotted blocks D′ D′, the blocks C′ C′, and the clamps E′ E′, substantially as and for the purposes specified.

HENRY MESSER.

Witnesses:
F. F. WARNER,
H. C. BALLARD.