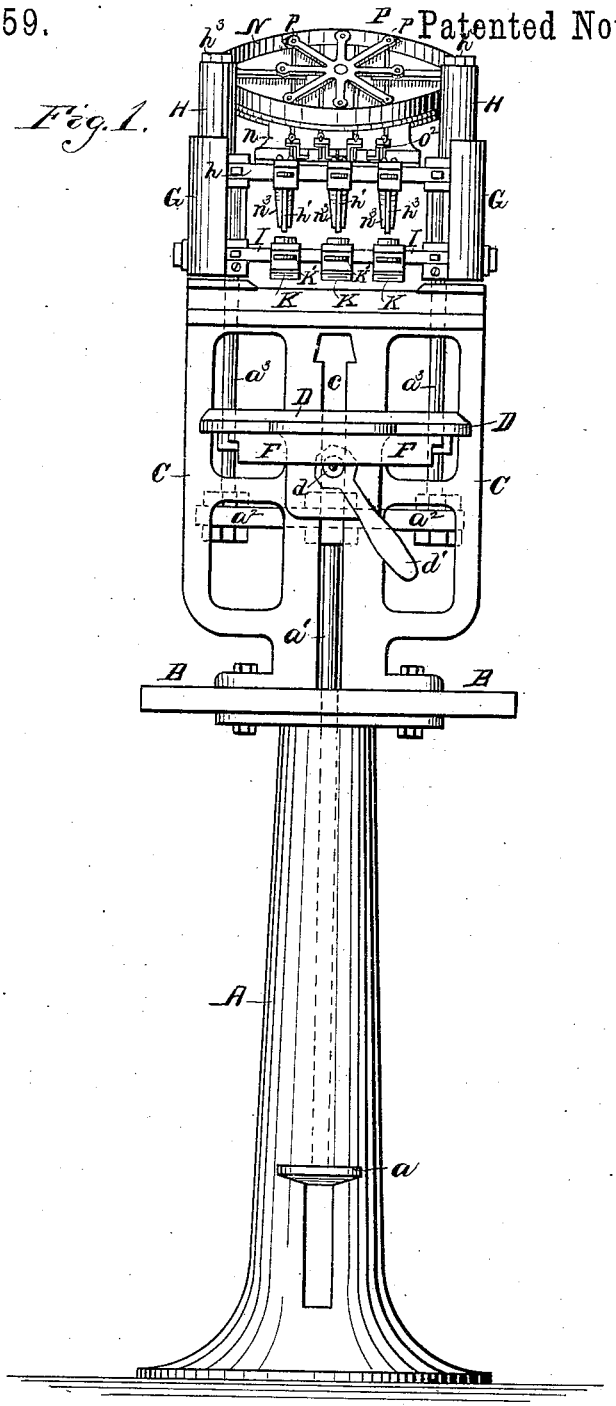
(Model.) 3 Sheets—Sheet 1.

H. MESSER.

BOX NAILING MACHINE.

No. 267,359. Patented Nov. 14, 1882.

Fig. 1.



Witnesses,
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Pliny B. Smith.

Inventor,
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per. Pliny B. Smith
Attorney.

(Model.) 3 Sheets—Sheet 2.

H. MESSER.

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Fig. 2.

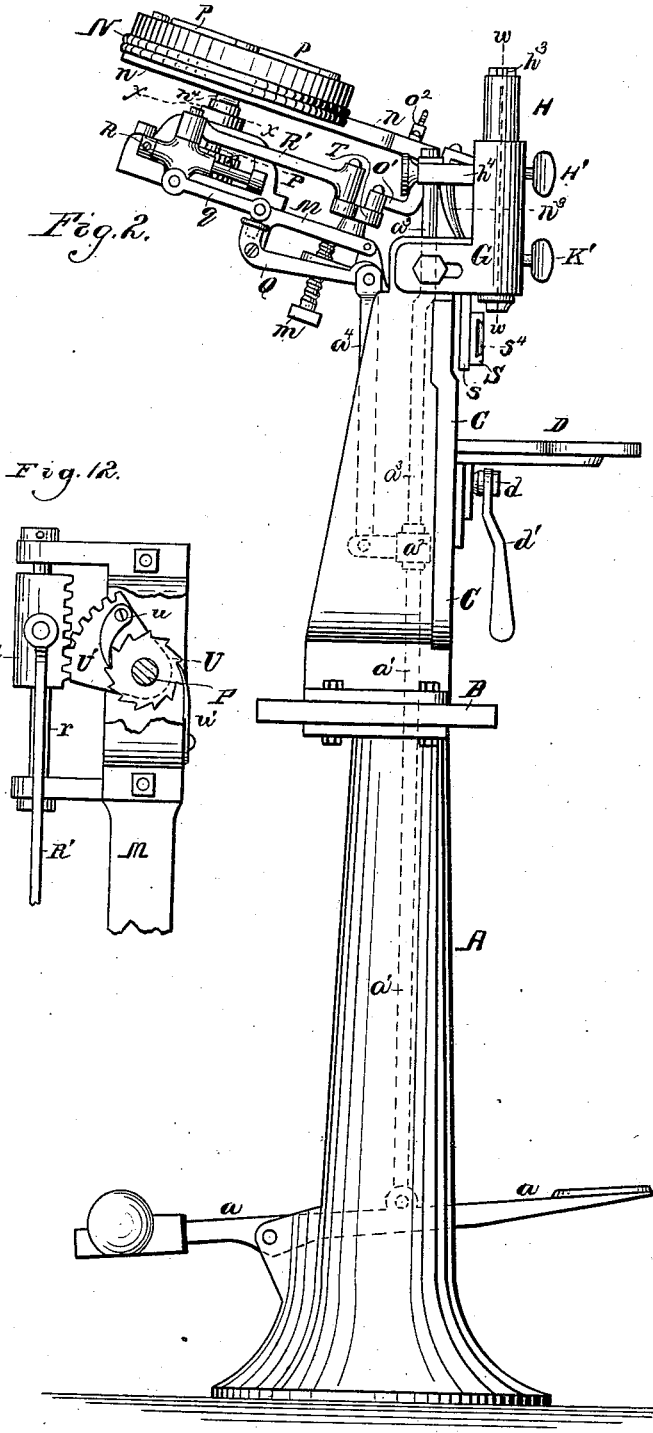

Fig. 2.

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(Model.) 3 Sheets—Sheet 3.

H. MESSER.

BOX NAILING MACHINE.

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Fig. 3

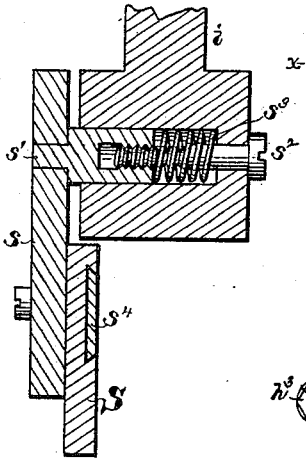


Fig. 4.

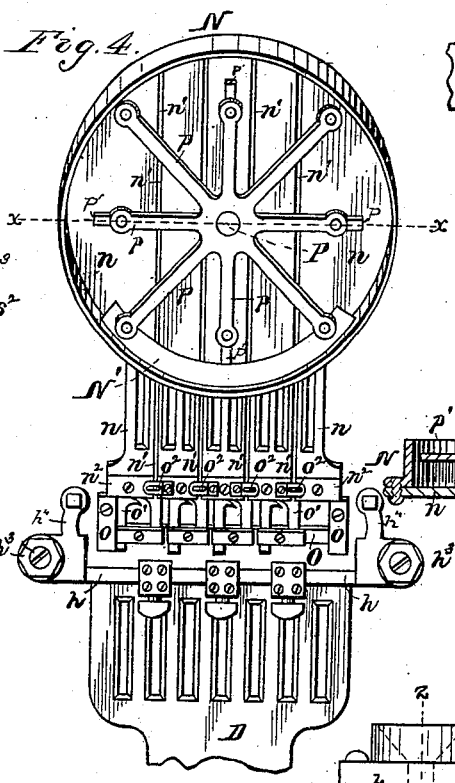


Fig. 5.

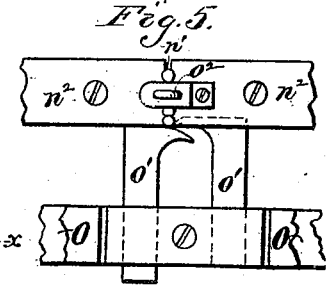


Fig. 6.

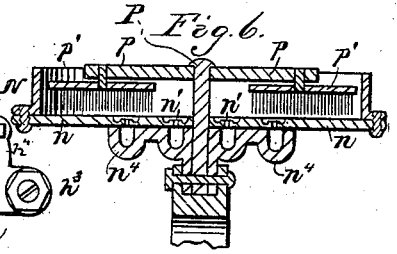


Fig. 7.

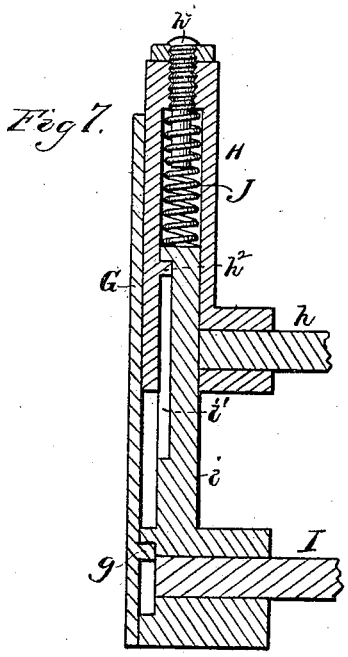


Fig. 8.

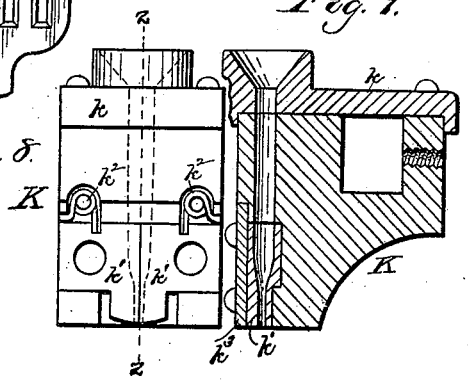


Fig. 9.

Fig. 10.

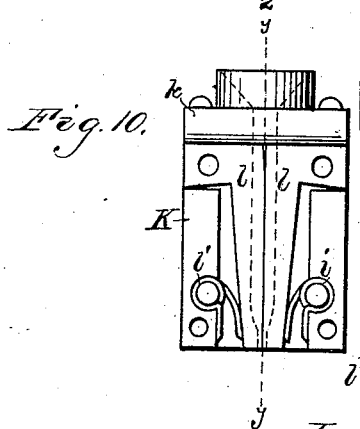
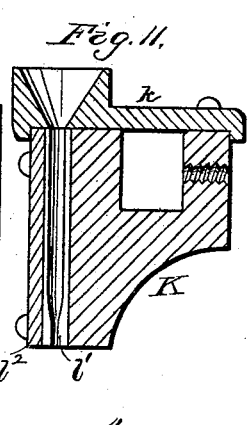


Fig. 11.



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Henry Faulkner.
Pliny B. Smith.

Inventor.
Henry Messer
per. Pliny B. Smith.
Attorneys.

UNITED STATES PATENT OFFICE.

HENRY MESSER, OF CHICAGO, ILLINOIS, ASSIGNOR TO MAGGIE E. MESSER, OF EMERSON, MANITOBA, CANADA.

BOX-NAILING MACHINE.

SPECIFICATION forming part of Letters Patent No. 267,359, dated November 14, 1882.

Application filed August 9, 1881. (Model.)

To all whom it may concern:

Be it known that I, HENRY MESSER, of the city of Chicago, Cook county, Illinois, have invented a new and useful Improvement in Box-Nailing Machines, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a front elevation of the machine. Fig. 2 is a side elevation. Fig. 3 is a transverse section of the gage and portion of the machine to which it is attached. Fig. 4 is a top view of the machine. Fig. 5 is a top view of a pair of the cut-off fingers, with a portion of the runway for the nails and the device for stopping the flow of the nails. Fig. 6 is a section of the nail-pan, taken in the plane of the line *x x* in Fig. 4. Fig. 7 is a section of one of the guide-posts and the mechanism operating therein, taken in the plane of the line *w w* in Fig. 2. Figs. 8 and 10 are two forms of die-holders and dies. Figs. 9 and 11 are sections of the same, taken in the lines *z z* and *y y*, respectively. Fig. 12 is a view showing the mechanism for rotating the arbor which carries the brushes, taken on the line *x x* of Fig. 2, with the arch over the ratchet, and in which the arbor is journaled, broken away.

Like letters indicate like parts in the different figures.

Some of the main features of my present machine are embodied in the patents issued to me July 15, 1879, and November 18, 1879, and numbered 217,472 and 221,844, respectively; but this machine combines the functions of both those described in said patents with others additional thereto.

In the drawings, A is a hollow column, upon which the operating part of the machine is supported. The column is enlarged at the base, making it sufficiently broad to afford a solid support for the machine, and tapering toward the top, which is provided with a flange. Two slots are cut in the periphery of the column upon opposite sides, to permit the insertion and operation of a treadle, which is pivoted in one of the slots, as seen in Fig. 2. A weight is secured to the treadle, adjustable to any point on the side of the pivot opposite the point of connection with the other mechanism of the machine, so that in the normal position of the machine the end of the treadle to which the actuating force is applied will be elevated and the weighted end depressed.

Between the column and that portion of the machine resting upon it is the shelf B, consisting simply of a broad board placed between the two parts and held by the bolts, which secure them together, being perforated for the passage of the rod *a*, this shelf being introduced simply as a convenience to the operator.

C C is the front elevation of the frame which supports the nailing mechanism, being a plain face or wall with rearward-extending flanges, and having therein the vertical slot *c*.

D is a vertically-adjustable table or bracket, secured to the front of the face C by means of the bolt *d* and nut *d'*, the nut being constructed, as shown, so that it may be easily turned without a wrench. The table D is made of open or grate work, and beneath it, sliding in grooves formed in flanges on its under side, is a drawer, F. Thus any nails falling upon the table D will pass through the openings into the drawer F and be preserved from loss.

G G are vertical guide-posts, the horizontal arms of which are provided with slots, through which pass bolts or set-screws, securing them to the broad flanges extending rearward from the face C. These posts are provided with grooves upon their inner faces, in which reciprocate vertically tubular sliding blocks H H. These sliding blocks are rigidly connected with each other by the cross or driver bar *h*. Upon the driver-bar are arranged the nail-drivers *h' h' h'*, which are as many in number as may be desired.

I is a cross or pocket bar, secured to the extremities of which are the vertical sliding pieces *i i*, the lower portions of which slide in grooves in the posts G, and the upper portions of which slide in the tubular sliding blocks H H, from which they are prevented from wholly withdrawing by the pins h^2, which are inserted in the blocks H H, projecting into the grooves *i'* in the sliding pieces *i* and engaging the sliding pieces at the upper ends of the grooves. The parts *i* and those mentioned in connection therewith can be seen in Fig. 7. The sliding blocks H H are not tubular throughout their entire length, the upper portion being solid except as to the openings for the insertion of the screws h^3 h^3.

Inside the sliding blocks H H, bearing against their upper portion and pressing downward upon the tops of the pieces *i i*, are the spiral springs J, which tend to force the pieces *i i* outward from the sliding blocks H H.

Extending rearward from the sliding blocks H H are two arms, h^4 h^4, Fig. 2. Attached to these arms, and extending vertically downward therefrom, are the rods a^3 a^3, which are secured in the extremities of the cross-head a^2, to the middle of which is attached the rod a', connecting with the treadle.

The operation of the parts now described is as follows: Upon depressing the treadle *a* the cross-head a^2, and with it the rods a^3 a^3, is carried downward, thus depressing the driver-bar *h*, and with it the sliding blocks H H, and as they move downward the parts *i i*, being depressed by the springs J as well as their own gravity, move with it, carrying the pocket-bar I, until the nail-pockets secured upon it rest upon the box which is being nailed, as will be hereinafter described, or the pins *g* engage the parts *i i*, as shown in Fig. 7. While the parts *i i* are thus arrested the parts H H and driver-bar *h* continue their descent until the lower ends of the screws h^3 h^3 strike against the upper ends of the parts *i i*, when the treadle is released, and by the operation of the weight upon its extremity it returns to its original position, and the parts H H, with the driver-bar *h*, are carried upward, the parts *i i* and pocket-bar I remaining stationary until the pins h^2 engage the parts *i i* at the upper portions of the grooves *i'*, when they are carried up with it until their lower portions strike the pins *g*, arresting the movement of all the parts, when the whole machine remains at rest until the movement of the treadle is repeated.

Upon the pocket-bar I are secured the die-holders K K K, corresponding in number with the nail-drivers *h'*. Two forms of the die-holders are shown, Figs. 8 and 10 being respectively a front elevation with the face-plate removed and a longitudinal vertical section of one form, and Figs. 9 and 11 being respectively the corresponding views of the other. In both is a metal block with a rectangular slot cut transversely across the block, and when the cap *k* is fastened to the block by screws, as shown, there is formed a rectangular eye, which may be slipped upon the bar I, and by means of a set-screw, K', Fig. 2, inserted, as shown in Figs. 9 and 11. The blocks may be secured firmly to the bar at any point, being laterally adjustable thereon, and prevented from turning upon it by the rectangular shape of the bar and eye. When the form of die shown in Figs. 8 and 9 is used the face of the block is furrowed, as shown in the figures.

k' k' are twin dies, the inner edges of which are grooved, so that when the dies are made to meet there will be formed a tubular orifice of the shape shown in Fig. 9, the center of which, when the dies are placed in position, will correspond to the line *z z*. The dies are placed in the block in the position shown in Fig. 8. Springs k^2 k^2 are so adjusted that they bear against the dies, their tension operating to press the dies against each other in the center of the block. The plate k^3 is then placed in position covering the dies and springs and secured to the face of the die by screws. Screws are also passed through the circular openings shown in the dies. These screws are smaller than the openings in the dies, thus permitting the dies lateral movement, but are so adjusted that the inner edge of either die cannot pass beyond the center of the block. (Represented by the line *z z*.) A hole is drilled in the top of the block on the line *z z*, so that it comes directly over the orifice formed by the grooves in the dies.

The cap *k* contains an orifice which, when the cap is in position, comes directly over the orifice in the block, the upper portion of the opening being enlarged, making it funnel-shaped, as shown, thus fitting it for the easy reception of the nails. There is thus a continuous tubular opening through the cap-block and dies, the bottom of which, when the dies are pressed together, is nearly closed, thus forming a pocket. In the form of die shown in Figs. 10 and 11 the face of the block K is cut away, as shown, leaving a rib on each side of the block except for a short distance in the upper portion.

l l are twin dies, the inner edges being grooved, as in the dies *k' k'*, making, when the dies are brought together, a tubular orifice of the shape indicated in the figures. Each die is pivoted through the opening in its upper part and is susceptible of vibration upon its pivot. The springs *l' l'* are adjusted to press the dies toward the center of the block, while the bearing of the shoulders of the dies against the upper end of the ribs on the block prevents the dies from passing beyond the center of the block (represented by the line *y y*) while they are permitted to open laterally. The plate l^2 is secured by screws to the face of the die-block covering the dies and springs.

The cap *k* has a funnel-shaped opening coming directly over the tubular opening through the die, the whole thus forming a pocket, as in the other form of die.

The nail-driver consists of a punch rigidly attached to and extending downward from a block similar to block K of the die-holder, which is secured in a like manner by the set-screw H', Fig. 2, to the driver-bar *h*, being so adjusted that the punch comes directly over the pocket.

S is a gage secured to the sliding pieces *i* by the vertical arms *s*, which extend upward from the ends of the gage and are provided with the lugs *s' s'*. When a piece is designed to be nailed it is pressed against the gage S, which determines the distance from the edge of the piece at which the nails will be driven.

The gage is adjustable by means of the lugs *s'*, screws s^2, and springs s^3. (Shown in Fig. 3.) The lugs are secured firmly to the arms *s*, extending therefrom at right angles, and are

inserted in the openings in the lower part of the pieces *i*, where they are held by the screws s^2, which enter from the opposite sides of the pieces *i* and engage the lugs *s'* by means of holes therein threaded to receive and retain the screws. By turning the screws the gage is adjusted to different distances back of the nail-drivers and pockets, thus determining the position in which the nails shall be driven. The expansion force of the spring s^3 keeps the gage pressed back to the extreme limit allowed by the screws, so that by the mere turning of the screws the adjustment of the gage is regulated.

s^4 is a groove or slot cut lengthwise of the gage. It is sometimes desirable to have the edges of the bottom or side pieces of the box project slightly beyond the box. In such case the edges of the piece being nailed will project into the groove s^4, in which position it will be nailed to the box, enabling the edge to be subsequently dressed off, or otherwise, as may be desired. When it is not desired to have the edges of the box bottom or sides project from the box a metal strip accurately fitting the groove is inserted therein, and, the groove and strip being dovetailed, the strip will be securely retained, and the face of the gage thus present a plain surface.

The nail-feeding attachment is supported upon the arm M, which is pivoted upon a projecting arm or bracket attached to some solid portion of the nailing mechanism, and rests upon the end of the set-screw *m*, which is inserted in and projects through the same arm or bracket to which the arm is pivoted, so that as the screw *m* is turned the arm M is raised or depressed, and the nailways are thus easily and quickly given a greater or less degree of inclination, as may be desired, the connection of the feeding attachment with the working parts of the nailing mechanism, as hereinafter described, being such that the change of inclination thus given will not affect their operation. The nail-pan consists of the circular rim N, secured to the bottom piece, *n*.

Heretofore it has been customary to make the pan in one piece, the nailways being made in separate pieces and set into the bottom of the pan, which was grooved to receive them. This mode of constructing the pan and nailways has been found to be expensive, as the nailways have necessarily to be made from steel and the bottom dressed to receive them. In my mode of constructing these parts the nailways are constructed in the bottom of the pan, which is made of the proper shape and dimensions to extend beyond the rim N, at one side of the pan, a sufficient distance to carry the nails to the proper point, as shown in Fig. 4, thus avoiding the extra labor and expense involved in forming them of steel and in separate parts.

The nailways *n' n' n' n'* consist of slots cut in the bottom piece, *n*, of the proper width to permit the free passage of the body of the nail, but not of the head, so that a nail may be freely suspended in the nailways by its head resting upon the edges of the slot. Across the end of the extension of the bottom piece, *n*, and on each side of the extremities of the nailways, are secured by screws narrow steel plates n^2 n^2 n^2 n^2. The piece is dressed down until a sufficient depression is formed, into which the plates are fitted so as to bring their faces on a plane with the surface of the bottom piece, *n*. Their edges are also made to correspond with the edges of the nailways, which at their extremities are thus equivalent to being cut through steel plate. As any injury to the nailways is most likely to occur at their extremities, the exposed portions are thus protected by the steel plates, which, in case injury does occur, can be easily replaced at little expense. A shallow groove is sunk on each side of and near the nailway, thus leaving slight ridges adjacent to the nailway, upon which the head of the nail rests, thus decreasing the friction and enabling them to slide freely. This formation can be readily seen in Fig. 6. N' is an apron, consisting of a metal plate secured in the bottom of the nail-pan and over the nailways, on the side of the pan toward the nailing mechanism, for the purpose of preventing the accumulation and clogging of the nails at the point where the nailways leave the pan. The plate is preferably made in the form of a segment of a broad flat ring, its outer and inner edges being concentric. On the under side of the apron are grooves, which come directly over the nailways, accommodating the heads of the nails, and thus permitting the nails to pass under the apron and out of the pan.

The arms *p*, which radiate from the arbor P, which will be hereinafter particularly described, consist of alternately long and short arms, to the extremity of which are secured brushes or equivalent devices.

The operation of the brushes and the apron is in the manner and for the purpose following: In the nail-pan constructed as described in my former patent the nails would gather in a mass at the point where the nailways leave the pan, that being, on account of the inclination of the pan, the lowest point. This accumulation, entangling the nails, greatly interferes with their exit from the pan, and sometimes entirely interrupts their flow. By the use of my device the accumulation of the nails will be upon the apron, and they will therefore be kept from contact with the nails passing out through the nailways. The brushes attached to the long arms revolve adjacently to the rim of the pan and pass over the apron, thus sweeping the nails therefrom and carrying them to the opposite and highest portion of the pan, whereas they slide down the inclined bottom of the pan, they fall into the nailways, where they are suspended by their heads, and, sliding down the ways, pass under the apron and out of the pan. The brushes upon the short arms revolve adjacently to the inner edge of the apron, and any nails which may possibly have lodged at that point are

swept away, and the flow of nails from the pan proceeds without interruption. The tendency of the nails to accumulate at this point, however, is so slight that it will be found in the practical working of the machine that a single short arm and brush will be sufficient to insure the clear operation of the nailways.

The apron may of course be made in any other form than the one described, and will serve the same purpose; but the form described is preferable, and will secure the best results.

On the lower side of the bottom piece, *n*, and beneath the center of the pan, is secured the cross-piece n^4, (shown in Fig. 6,) containing U-shaped formations, which bestride the nailways, strengthening the bottom piece and preventing any displacement of the edges of the nailways. A similar piece is placed at or near the extremities of the nailways. A small standard, o^2, rises vertically from the piece *n* at the side of each nailway, near its extremity, with a lateral arm, which extends over and across the nailway a short distance above it, in which a split pin is inserted, projecting downward, and when it is desired to stop the flow of nails from any or all of the runways the pins are projected into the nailways in front of the nails, thus interrupting their progress until withdrawn.

On the lower side of the bottom piece, *n*, and beneath the center of the pan, is secured the cross-piece n^2, (shown in Fig. 6,) containing U-shaped formations, which bestride the nailways, strengthening the bottom piece and preventing any displacement of the edges of the nailways. A similar piece is placed at or near the extremities of the nailways. Tubes n^3 are secured to a transverse bar, so that their upper ends are directly beneath the ends of the nailways, while their opposite ends are over the funnel-shaped openings of the nail-pockets. These tubes are secured by pivotal connections, so that they may be swung to and secured in any desired position, so as to conduct the nails to the pockets wherever they may be adjusted on the bar.

The finger-bar O is secured in bearings *o o* on the extremity of the bottom piece, *n*, in which it can be reciprocated. To this bar are secured the cut-off fingers *o' o'*. These fingers consist of oblong plates, with a point projecting from one side at the extremity of the plate. They are arranged in pairs, as shown in Fig. 5, the points extending toward and overlapping each other, one point being sufficiently in advance of the other to permit a nail in a vertical position to readily pass between them. The fingers are so placed that one of each pair is beneath and adjacent to the bottom piece, *n*, and the other is on a plane with its upper surface, each pair reciprocating across the line of the nailway.

An arm, O', Fig. 2, is attached to and extends downward from the finger-bar, and is engaged by mechanism which will be described, and by which the finger-bar is reciprocated. An arbor, P, extends through a suitable bearing in the center of the nail-pan. To the upper extremity of this are secured the radial arms *p*, already referred to, to the extremities of which are secured the brushes *p'*. The arbor projects below the bottom of the nail-pan, and to its lower extremity is secured the ratchet-wheel U, Fig. 12. A rocker-cam, U', is journaled on the arbor above and adjacent to the ratchet-wheel. The outer edge of the cam forms an arc, and is provided with cogs, which are engaged by cogs upon the side of the sliding block R, which, as it reciprocates upon the rod *r*, as hereinafter described, imparts a rocking motion to the cam. The cam is provided with the spring-pawl *u*, which presses against and engages the ratchet-wheel, and as the cam rocks upon the arbor the pawl thus gives an intermittent rotary motion to the ratchet-wheel, a retrograde movement in which is prevented by the click *u'*, and the brushes P' are thus rotated, as already mentioned.

a^4 is a rod, pivoted at one end to a rigid arm projecting rearwardly from the cross-head a^2, as shown by the dotted lines in Fig. 2, the other end being pivoted to one arm of the crank-lever Q, the other arm of the lever Q being pivoted to one end of the connecting-rod *q*, the other end of which is pivoted to the sliding block R, which reciprocates upon the fixed guide-rod *r*. The opposite side of the sliding block, by means of mechanism not shown, operates a push-pawl, which engages the ratchet-wheel on the lower end of the arbor P.

Pivoted to the sliding block Q is the connecting rod Q', which is pivoted to one arm of the crank-lever T, the other arm of which engages the arm O' of the finger-bar O.

The operation of the entire machine is as follows, commencing with the feeding attachment: The feeding attachment is adjusted at such an angle that the nails will slide readily down the nailways, and a suitable quantity of nails is placed in the pan. Upon depressing the treadle *a* the rod a^4 is carried down, vibrating the crank-lever Q upon its pivot. This causes the block R to slide upon the guide-rod and operates the pawl above described, which, engaging the ratchet-wheel on the lower end of the arbor P, causes a partial revolution of the arbor, and with it the arms *p* and brushes *p'*. The nails are thus swept across the bottom of the pan, and, falling into the nailways, are suspended by their heads and slide down the nailways until they reach the extremities of the same, when they come in contact with one of the fingers *o*, and their progress is interrupted, as shown in Fig. 5. The downward motion of the treadle has brought in front of the nailways the fingers, which are on a plane with the upper surface of the piece *n*. When the treadle is released the weight upon its extremity brings it back to its normal position, giving the crank-levers and connecting-rods of the feeding attachment a motion opposite to the one which has just taken place, and the lever T, engaging the arm O', causes it to reciprocate the bar O, and the fingers in front of

the nailways are withdrawn, and the ones beneath the bottom piece, *n*, are moved across the line of the nailways, and are so adjusted that each finger passes between the nail at the extremity of the nailway and those behind it. The progress of the latter is thus prevented, while the former drops from the nailway into the tube n^3, by which it is conducted to and falls into the nail-pocket. In nail-feeding attachments of this character which have heretofore been made the finger nearest the front of the machine has been adjusted beneath the nailway, and would thus bear against the nail in advance below the point of suspension, and the nail being crowded forward by those following pressing against its head, its body would be caused to project obliquely backward, and thus when the finger-bar would be reciprocated the other finger would fail to engage it. By placing the finger directly in front of the nailway, as in my present machine, and on a plane with the piece *n*, the finger being beveled toward its lower side, its edge bears against the nail opposite the point of suspension and pressure, and the nail is thus permitted to retain a perpendicular position, and the finger will not fail to engage it.

The operation of the nailing mechanism is as follows: The table B is adjusted at the proper position to allow the pieces intended to be nailed together to be readily adjusted beneath the die-holders. While the machine is in its normal position a piece to which another is to be nailed is placed vertically upon the table and pressed back against the gage S, which is so adjusted as to bring the transverse center of the piece directly under the central point in the pockets. The piece to be nailed is then placed in position on the first mentioned and also pressed against the gage. A nail having been deposited in each pocket, as described, the treadle is depressed, causing the driver-bar to descend, as has been described, carrying with it also the pocket-bar I, which descends until the die-holders rest upon the box, when its further descent is arrested. The driver-bar continues to descend and the punches or drivers enter the pockets, spreading them to allow the exit of the nails, which are then forced or driven by the punches into the box, the grooves in the dies giving them the proper direction. The treadle is then released and the bars *h* and I are raised, and the machine resumes its original position, and another piece is placed in position for nailing.

The springs J perform an important function. In machines of this description heretofore constructed there has been no actuating force to depress the pocket-bar except its own gravity and that of its attachments. As the gage S depends from the pieces *i i*, where a box is placed in the machine to be nailed and pressed against the gage, the weight of the pocket-bar and attachments is frequently insufficient to overcome the resistance caused by this pressure, and the bar thus fails to descend, and the nails will not be properly driven into the wood; but by the introduction of the spring the certain depression of the pocket-bar and contact of the pockets with the box are insured. These springs could be inserted between the bars at any point and in different modes, which would suggest themselves to the mind of a practical mechanic; but the mode described is the one much preferable.

A peculiar and important advantage is obtained by the construction of the die-blocks and dies, which permit the dies to spread laterally—that is, in the manner described. Heretofore dies have been made for this purpose which spread longitudinally—that is, on a line running from the front to the rear of the machine—the result being that when the dies did not open accurately, either from the inequality of the springs pressing them together or their not being adjusted in exact correspondence with the drivers, the nail, losing its direction, would be driven to one side of the proper line, and thus fail to engage the lower of the two pieces being nailed. In this form of die, in case of any accidental failure of the dies to operate accurately, the only effect upon the nail is to displace it to a different point upon the line in which the nails are to be driven and cause it to be driven through the upper and into the lower piece obliquely, which only binds them the more securely.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a box-nailing machine, a vertically-reciprocating cross-bar provided with nail-drivers, and a vertically-reciprocating cross-bar provided with nail buckets or guides, and movable vertically in relation to the driver-bar, in combination with a spring compressed between the bars or their attachments and constantly tending to force them apart, substantially as described.

2. In a box-nailing machine, the cross-bar *h*, secured to the sliding blocks H, and the cross-bar I, secured to the sliding pieces *i*, in combination with the spring J, all constructed and arranged substantially as and for the purposes described.

3. In a box-nailing-machine, the gage S, provided with a groove into which the edge of the piece to be nailed may project, and said groove adapted to be closed by a detachable strip, substantially as described.

4. In a box-nailing machine, the gage S, provided with a groove into which the edge of the piece to be nailed may project, in combination with a detachable strip, which may be secured in the groove so as to give the gage a plain surface, substantially as described.

5. In a box-nailing machine, the open or grate work table D, in combination with the drawer F, arranged beneath the same, substantially as described.

6. The sliding piece *i*, in combination with the sliding box H H, provided with the screws h^3, to regulate the depression of the driver-bar, substantially as described.

7. In a box-nailing machine, a nail-feeding

attachment adjustably pivoted thereto, and provided with the actuating-lever Q, in combination with the connecting-rod a^4, pivoted to the lever K and to the cross-head of the actuating-rod a' of the nailing-machine, all arranged substantially as and for the purposes described.

8. In a box-nailing machine, the arm M, supporting the nail-feeding attachment, and adjustably pivoted to the nailing mechanism, in combination with a set-screw to adjust and rigidly support the arm, substantially as described.

9. In a box-nailing machine, the bottom piece, n, with the ways n' cut in the same, and provided with the plates n^2, in combination with the rim N all arranged substantially as and for the purposes described.

10. In a box-nailing machine, the gage S, having the arms s, provided with the lugs s', in combination with the screws s^2, the whole constructed and arranged, substantially as and for the purpose described.

11. The nail-pan N n, provided with the nailways n', in combination with the segmental apron N$'$ and revolving brushes sweeping the bottom of the pan, substantially as described.

12. In a box-nailing machine, the combination, with the nailways, of the cut-off fingers o' o', constructed as described, arranged in pairs and in different planes, and the finger-bar, to which said fingers are rigidly attached and by which they are simultaneously reciprocated across the line of the nailways, substantially as described.

13. In a box-nailing machine, the nailways n', in combination with the standard o^2 and the pin fitting therein, substantially as described.

HENRY MESSER.

Witnesses:
PLINY B. SMITH,
M. L. BEERS.