(No Model.) 7 Sheets—Sheet 1.

J. CASEY.

BOX NAILING MACHINE.

No. 432,477. Patented July 15, 1890.

Fig. 1

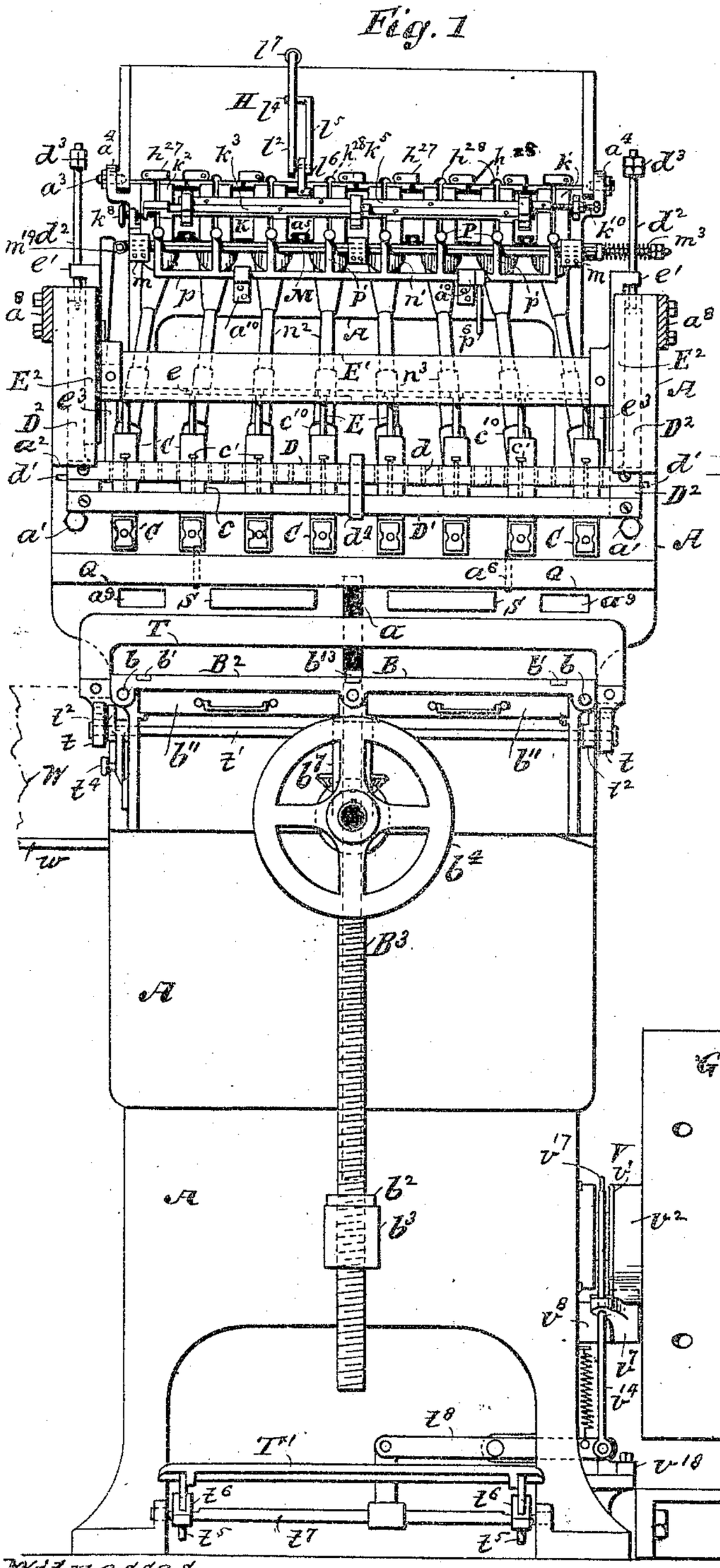


Fig. 14

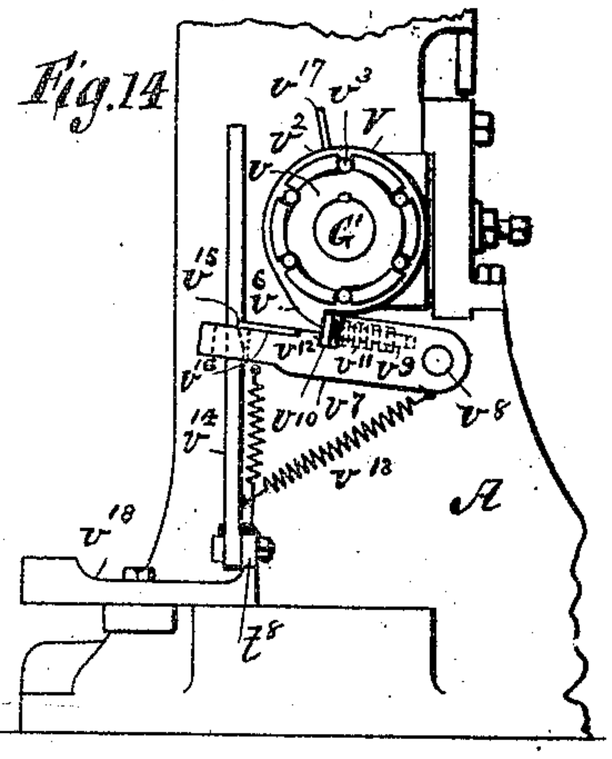
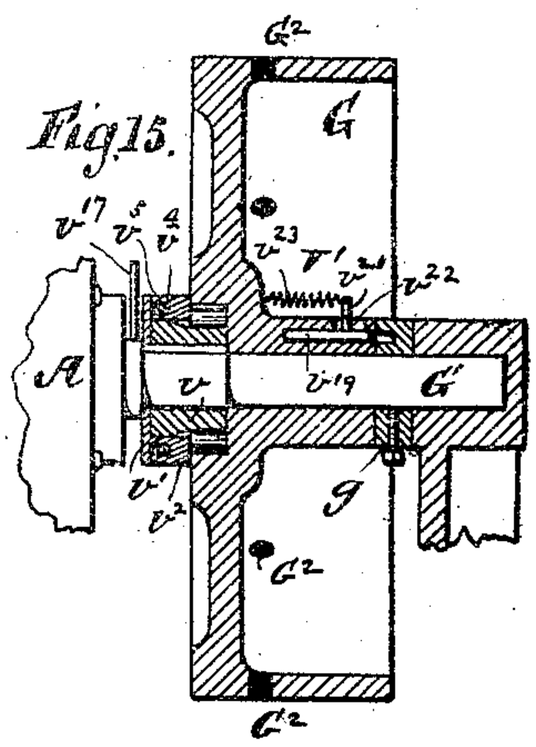


Fig. 15.



Witnesses
Philip Wasi
W. F. Huston

Inventor
J. Casey
by E. W. Robinson
his Attorney

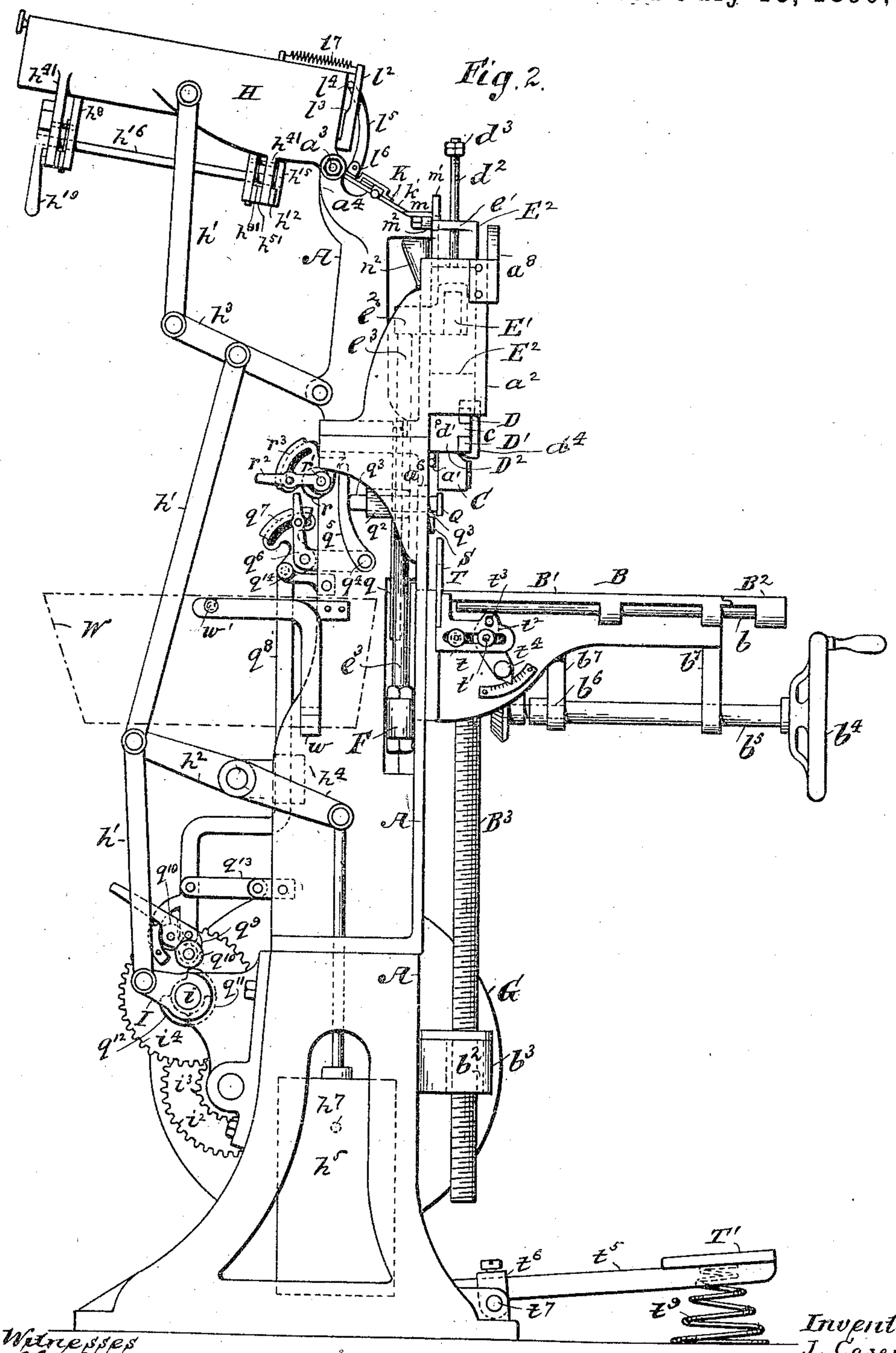
(No Model.) 7 Sheets—Sheet 2.

J. CASEY.

BOX NAILING MACHINE.

No. 432,477. Patented July 15, 1890.

Fig. 2.



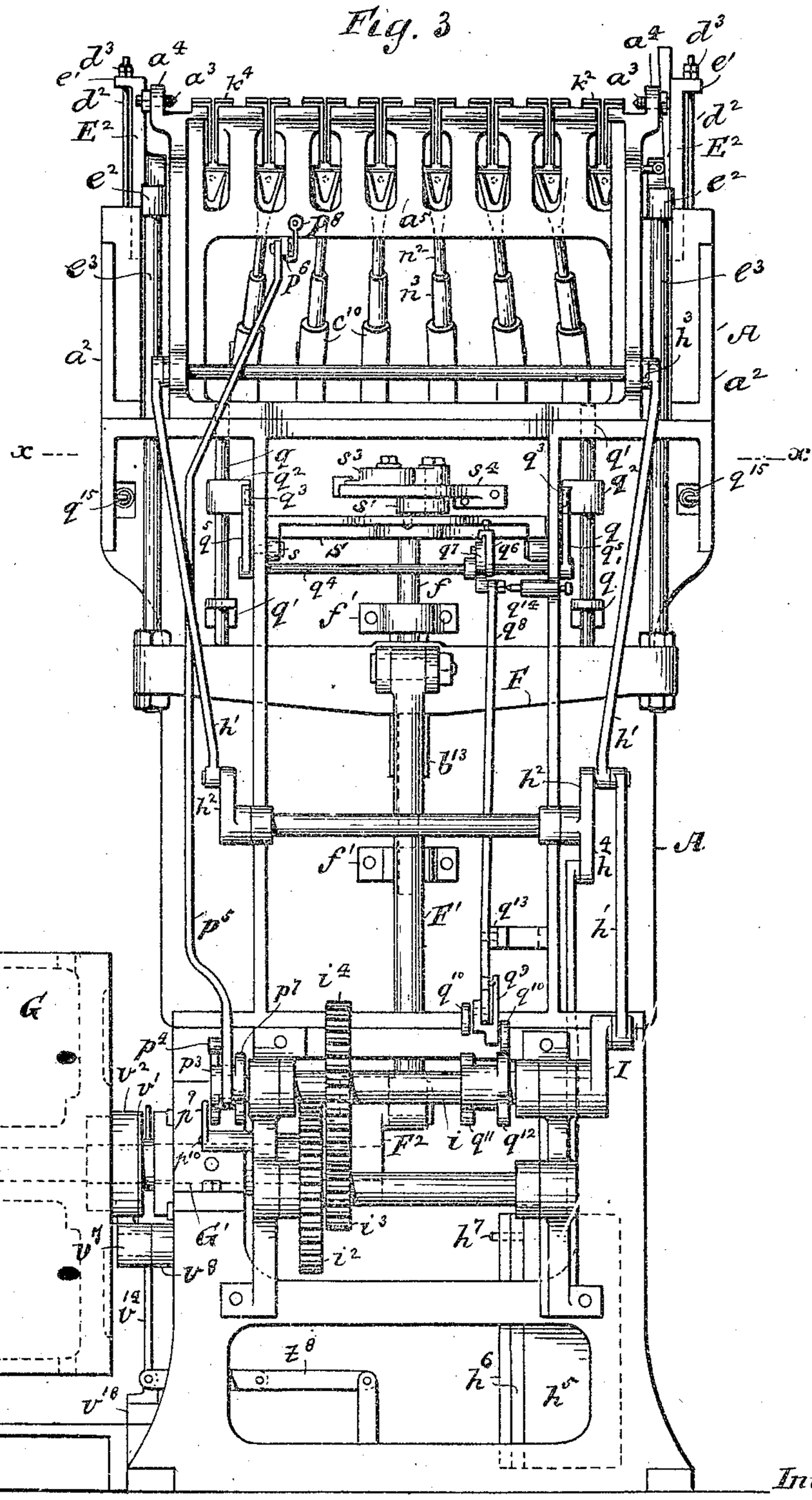
(No Model.) 7 Sheets—Sheet 3.

J. CASEY.

BOX NAILING MACHINE.

No. 432,477. Patented July 15, 1890.

Fig. 3



Witnesses
Phillemon
Villette Anderson.

Inventor
J. Casey,
by E. W. Anderson,
his Attorney.

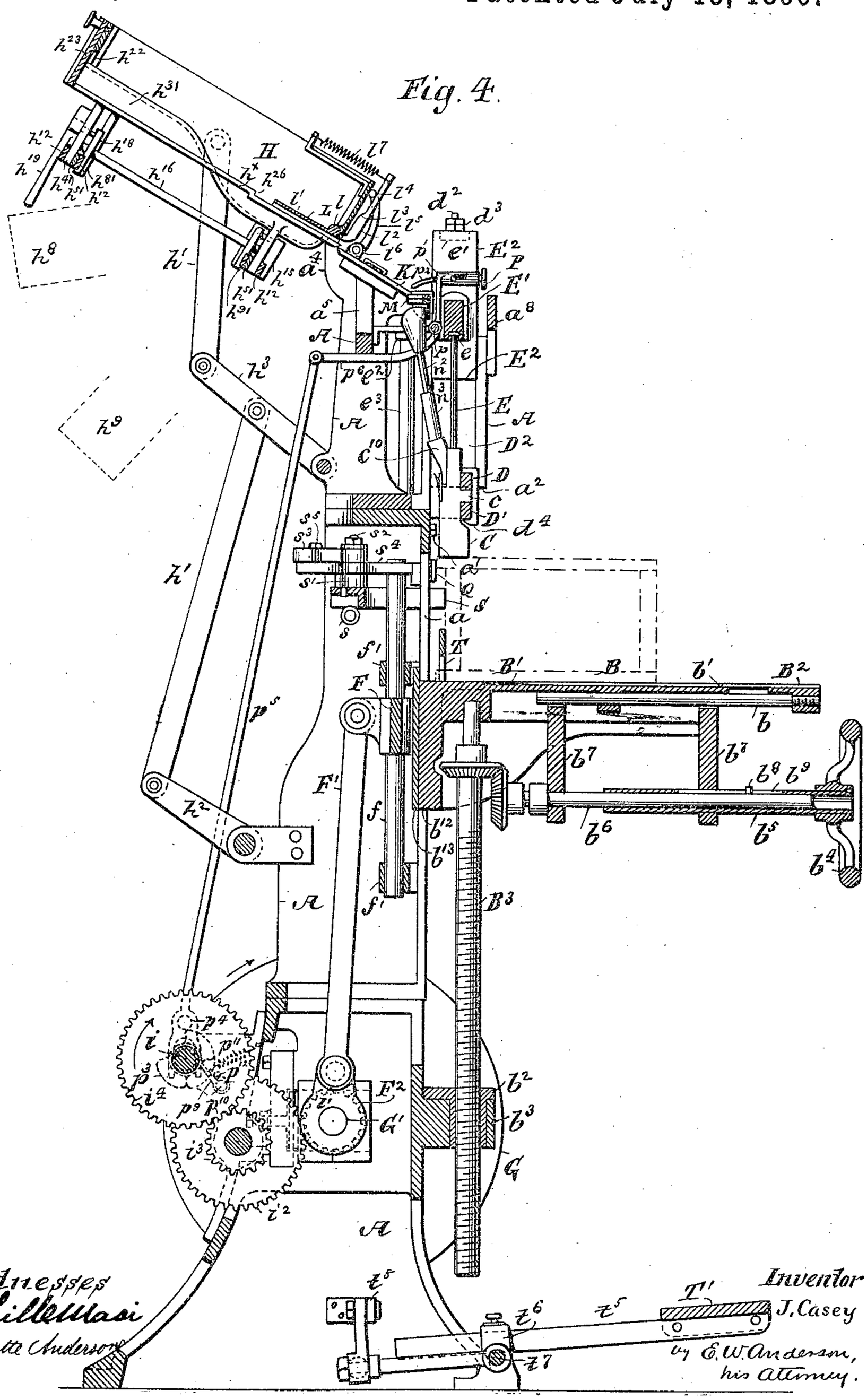
(No Model.) 7 Sheets—Sheet 4.

J. CASEY.

BOX NAILING MACHINE.

No. 432,477. Patented July 15, 1890.

Fig. 4.



(No Model.) 7 Sheets—Sheet 5.

J. CASEY.

BOX NAILING MACHINE.

No. 432,477. Patented July 15, 1890.

Fig. 5

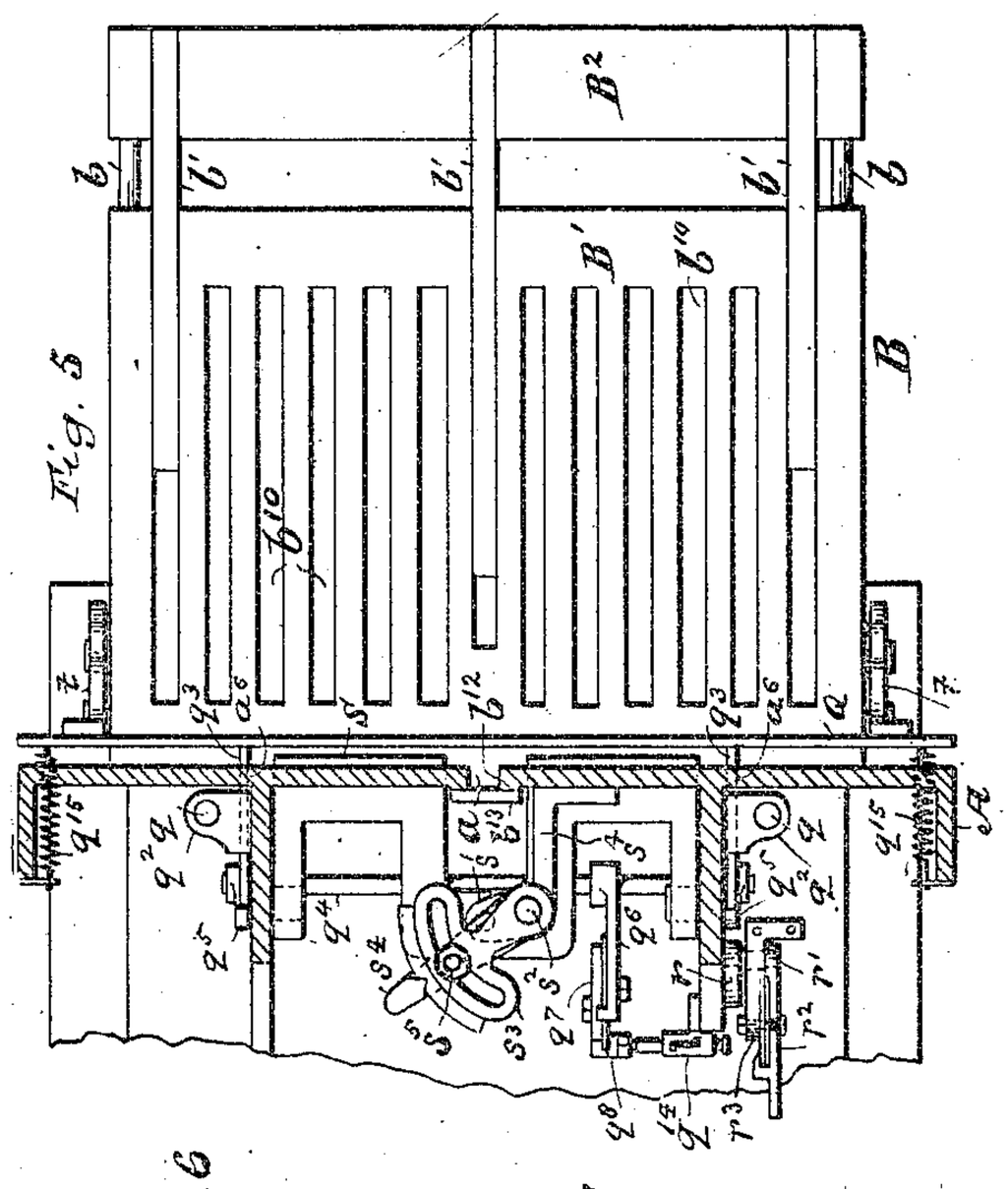


Fig. 8

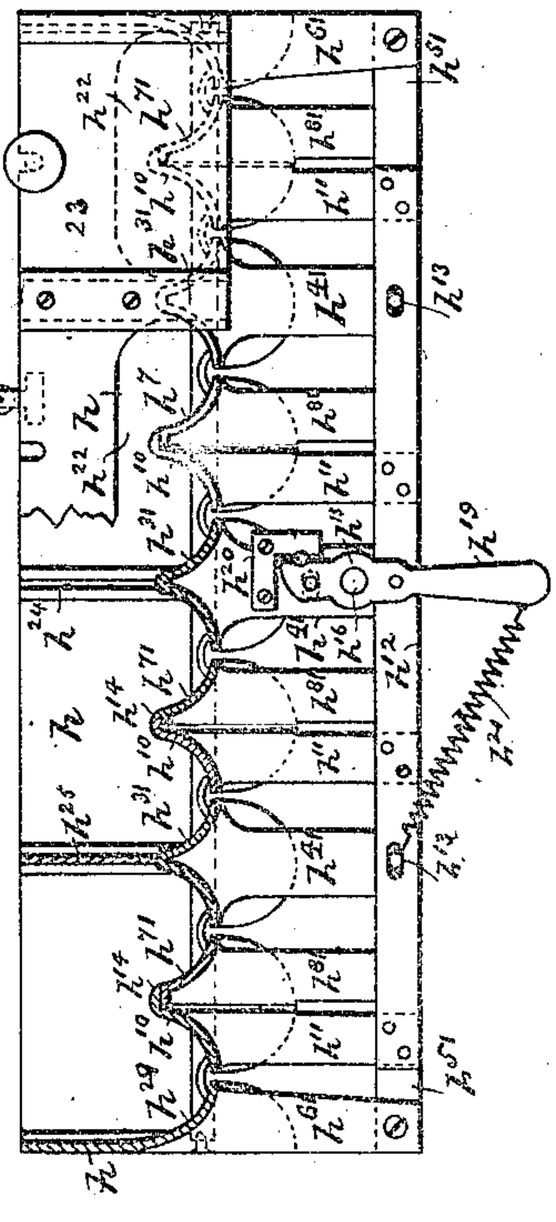


Fig. 6

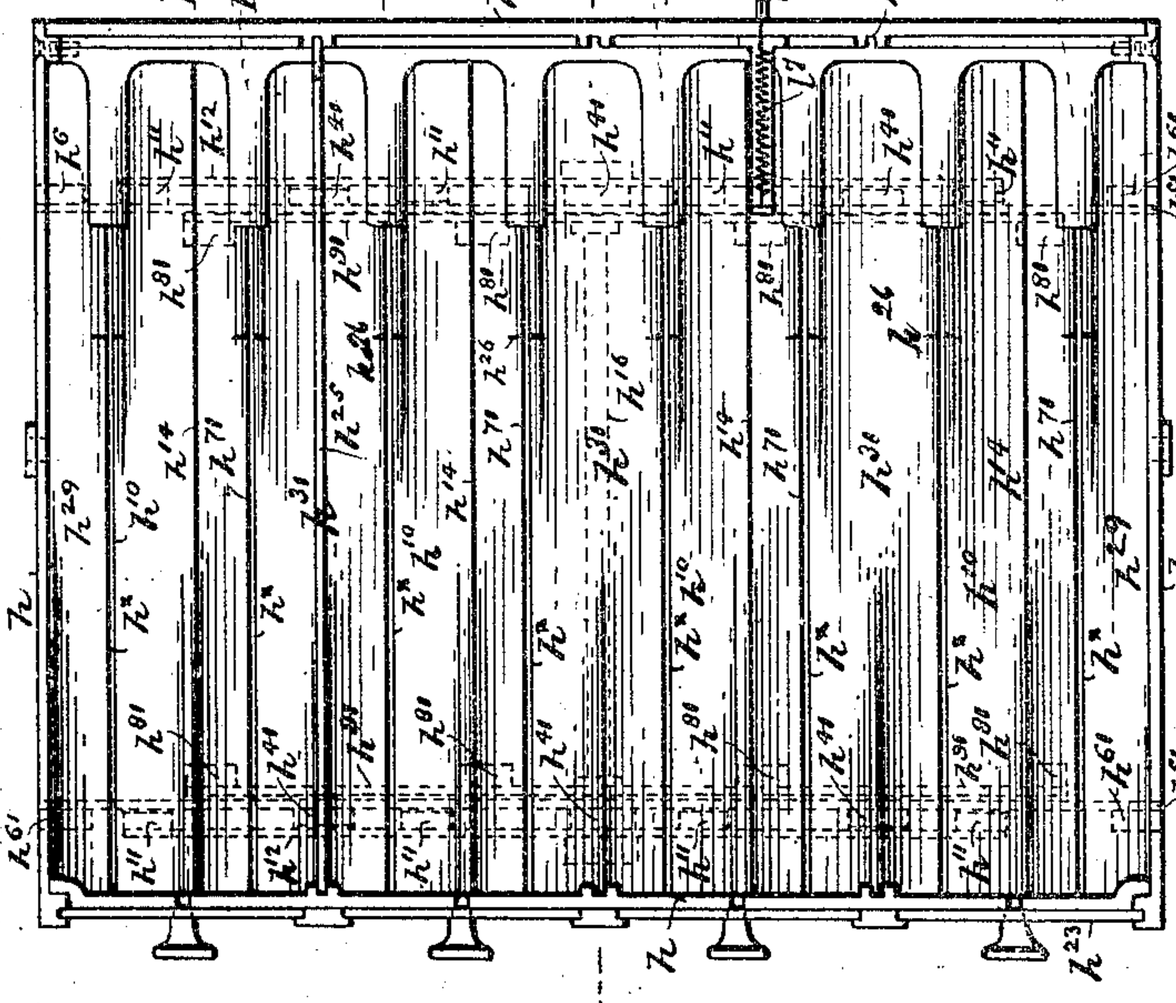
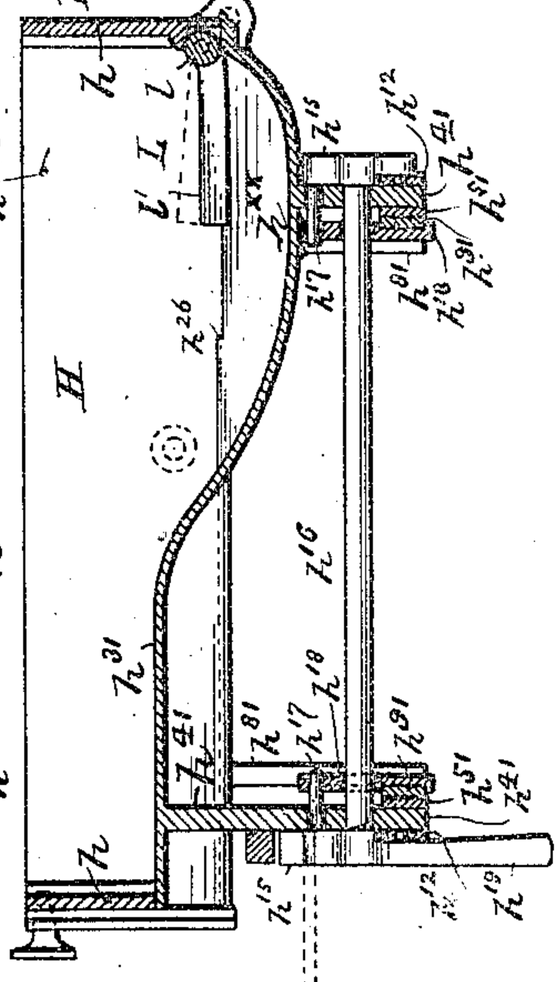


Fig. 7



Witnesses.
Phillemasi.
Villette Anderson

Inventor
J. Casey
by E. W. Anderson
his attorney

(No Model.) 7 Sheets—Sheet 6.

J. CASEY.

BOX NAILING MACHINE.

No. 432,477. Patented July 15, 1890.

Fig. 11

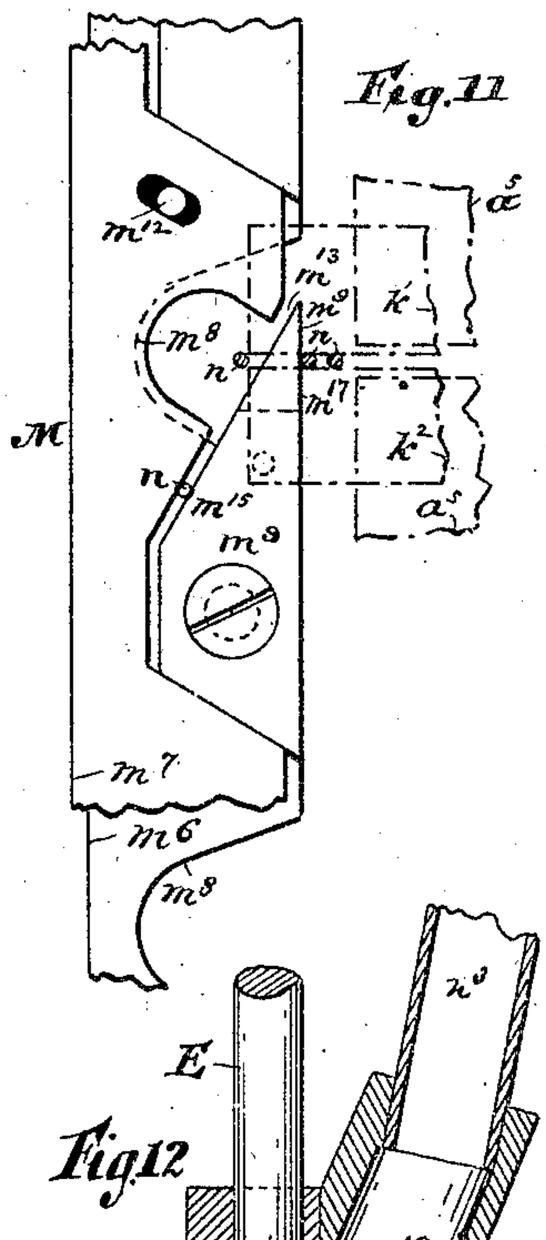


Fig. 10

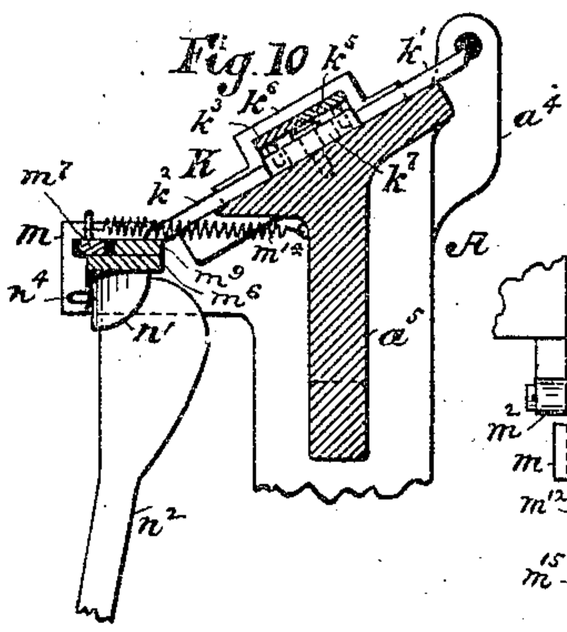


Fig. 9

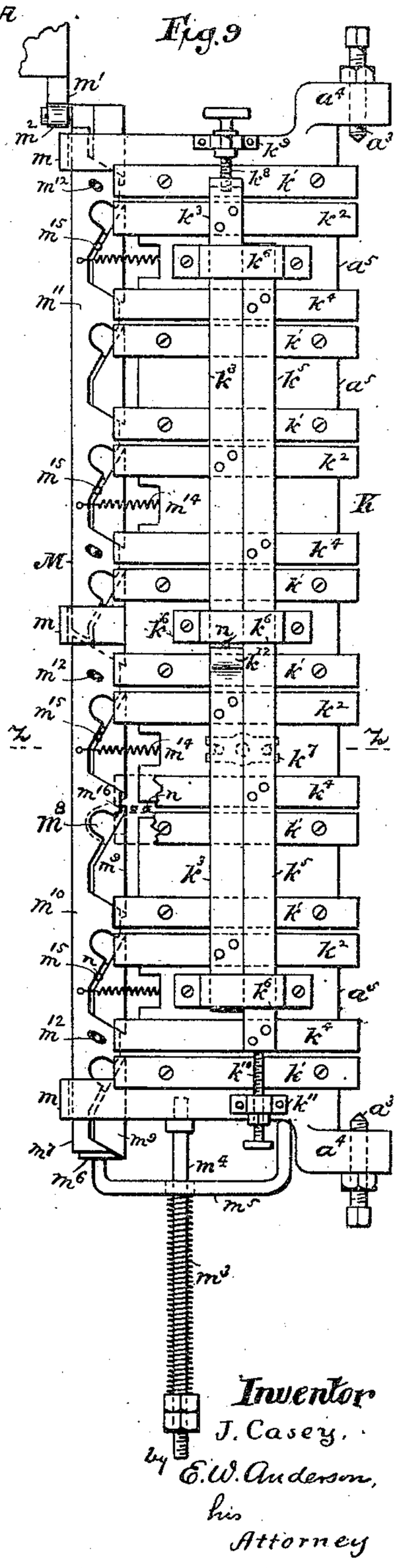


Fig. 12

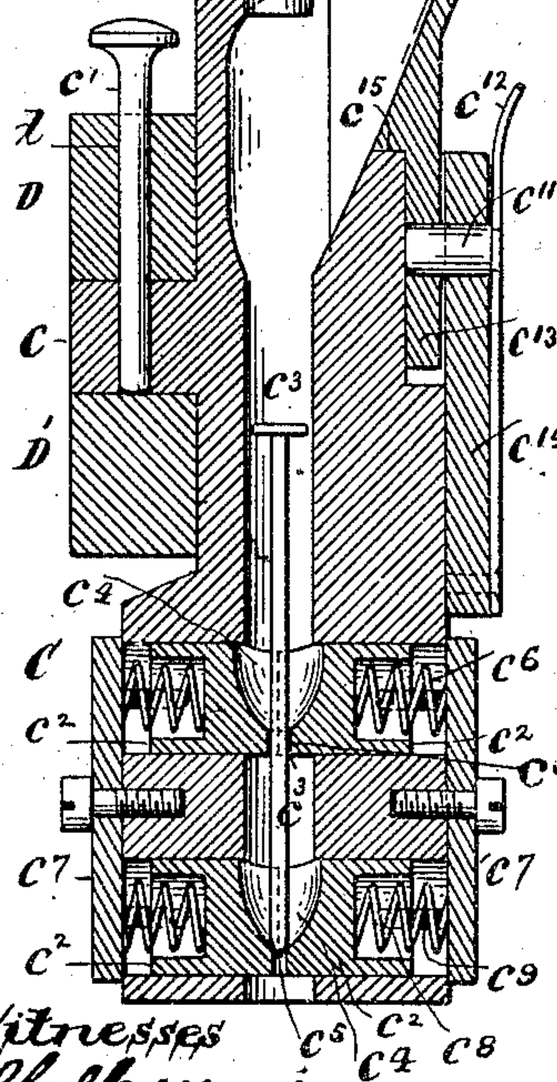
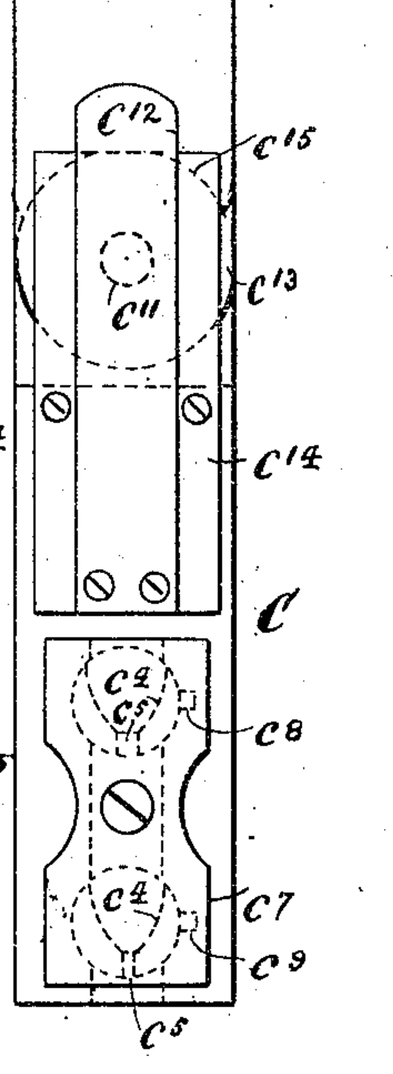


Fig. 13



Witnesses
Phillemasi.
Villette Anderson.

Inventor
J. Casey.
by E. W. Anderson,
his
Attorney

(No Model.) 7 Sheets—Sheet 7.

J. CASEY.

BOX NAILING MACHINE.

No. 432,477. Patented July 15, 1890.

Fig. 16

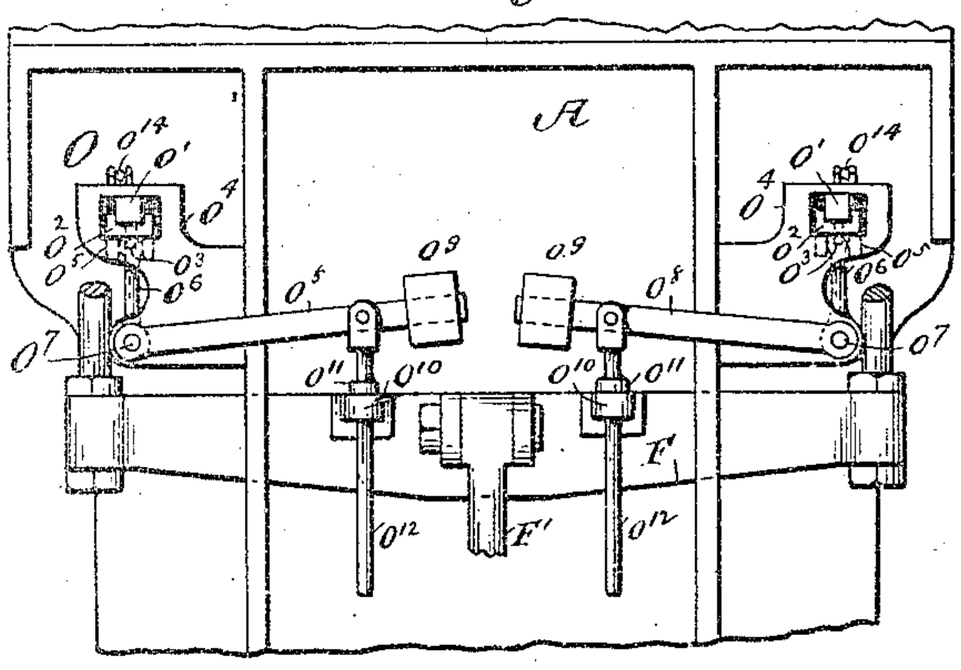


Fig. 17

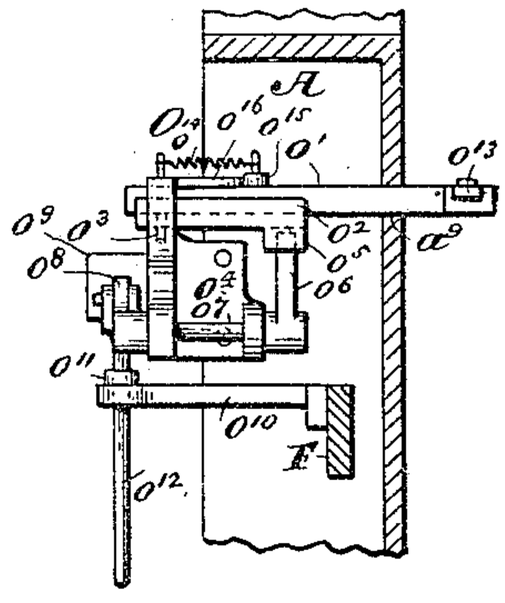
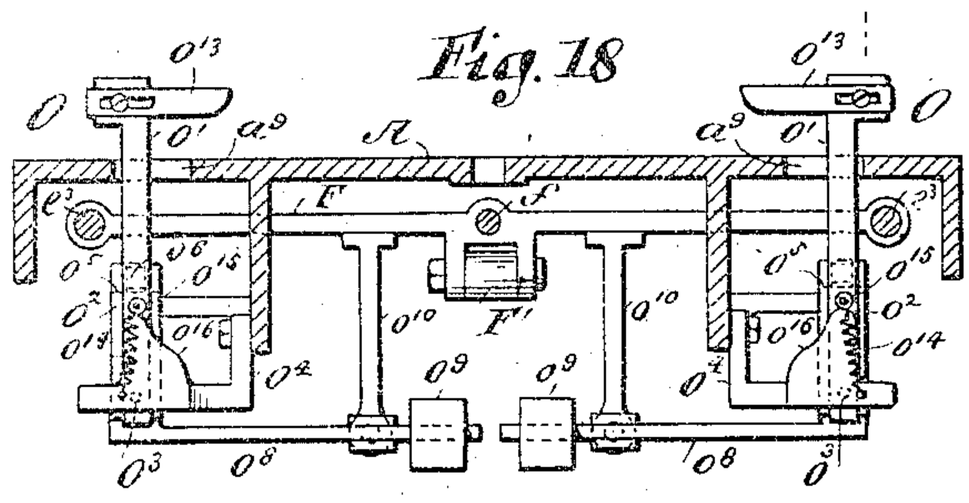


Fig. 18



Witnesses
Philbrick.
Villette Anderson.

Inventor
J. Casey
by E. W. Anderson
his
Attorney.

UNITED STATES PATENT OFFICE.

JEREMIAH CASEY, OF EDGEWATER, NEW JERSEY, ASSIGNOR TO THE CASEY MACHINE AND SUPPLY COMPANY, OF NEW YORK, N. Y.

BOX-NAILING MACHINE.

SPECIFICATION forming part of Letters Patent No. 432,477, dated July 15, 1890.

Application filed October 9, 1889. Serial No. 326,477. (No model.)

To all whom it may concern:

Be it known that I, JEREMIAH CASEY, a citizen of the United States, and a resident of Edgewater, in the county of Bergen and State of New Jersey, have invented certain new and useful Improvements in Box-Nailing Machines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

In the drawings, Figure 1 is a front elevation of a box-nailing machine embodying my improvements. Fig. 2 is a side elevation. Fig. 3 is a rear elevation, certain parts being omitted. Fig. 4 is a central vertical section having some of the parts shown in a different position to that in Fig. 1. Fig. 5 is a horizontal section taken on the line X X, Fig. 3, and showing certain parts. Fig. 6 is a plan of the nail-feed box detached. Fig. 7 is a vertical section of the same, taken on the line Y Y, Fig. 6. Fig. 8 is a rear elevation, partly in section, of the same. Fig. 9 is a plan of certain nail-feedways and delivery mechanism. Fig. 10 is a vertical section of the latter taken on the line Z Z, Fig. 9. Fig. 11 is an enlarged view of a portion of a "picker" bar or feeding device. Fig. 12 is a vertical section of one of the chucks for holding the nails in position to be acted on by the drivers. Fig. 13 is a rear view of the same. Fig. 14 is a side view of a certain friction-clutch and adjacent parts. Fig. 15 is a vertical section of the same, showing a driving-pulley in connection therewith. Fig. 16 is a rear view of a device for straightening crooked boards, capable of being attached to the machine and worked automatically. Fig. 17 is a side view of the same, showing a portion of the same in section. Fig. 18 is a top view thereof, also showing a portion of the frame in section.

Similar letters refer to similar parts throughout the several views.

A designates the frame-work, herein shown as made in sections rigidly secured together.

B is a table composed of two sections B′ B^2, the latter being supported by rods *b*, secured thereto and passing through lugs formed on the section B′, whereby it may be drawn out to increase the capacity of the table.

b′ indicates bars secured to the section B^2 and fitted to slide in grooves in the section B′, forming a flush surface therewith. The table is vertically adjusted by means of the screw B^3, engaging a nut b^2, secured in a lug b^3. Motion is imparted to the screw by means of a hand-wheel b^4, secured to a sleeve b^5, loosely mounted to slide on and rotate a rod b^6, having a bevel-wheel at its extremity engaging a bevel-wheel secured to the screw. The sleeve b^5 and rod b^6 are supported in arms b^7, extending downwardly from the table, and are connected by means of a stud b^8, secured to the rod b^6, working in a slot b^9 in the sleeve. The sleeve b^5, with its slot and stud connection to the shaft or rod b^6, permits the sliding of the hand-wheel b^4 in under the table B, out of the way when not in use, and slid out from thereunder for convenience of manipulation. The surface of the table contains rectangular openings b^{10}, (shown in Fig. 5,) through which nails may fall and be received in drawers b^{11}, sliding on cleats beneath the table.

b^{12} is a rib cast on the front of the table and fitted to slide in a groove *a* in the frame, by which said table is guided and held in a horizontal position.

b^{13} is a bar secured to the rib b^{12} and extending on each side of the groove *a* to bear against the inner side of the frame, and thereby hold the table firmly against the front surface of the same.

C C are nail-chucks, and are each provided with an extension *c*, adapted to fit and slide between rails D D′, and are secured thereto at any desired distance apart by pins *c′*, loosely inserted in any of a series of holes *d* in the rail D, and passed through a corresponding hole in the extension *c*. The rails D D′ are secured to end plates D^2, fitted to slide a short distance vertically in ways formed in the frame A for the purpose of bringing the chucks down close on the work and withdrawing the same therefrom after the nails have been inserted. The downward motion of the rails is

limited by stops a', while the upward motion of the same is limited by the stop-pins d', projecting therefrom and striking on the under side of the frame portion a^2, which has a brace a^3 secured thereto.

d^2 d^2 are rods extending from the upper side of the slide-plates D^2, and provided with nuts d^3, vertically adjustable thereon, and against which certain moving parts of the machine act to lift the rails, as hereinafter described.

d^4 is a bar secured to the rails D D′ to serve as a brace.

c^2 c^2 are cylindrical jaws sliding in openings extending through the body of the chuck and meeting at the center of the bore c^3, at which point curved recesses c^4 are formed in the upper side to receive and direct the nails centrally through openings c^5. The opening c^5, through the upper pair of jaws, is sufficiently large to allow the largest-size nails used to fall through, while that of the lower pair of jaws is smaller in diameter than the diameter of the nail, which therefore rests thereon, as shown in Fig. 12. When short nails are used of a diameter smaller than the opening c^5 through the bottom pair of jaws, they will be suspended by their heads in the curved recess in the upper pair of jaws, and their points will rest on the bottom of the recess in the lower jaws. The jaws c^2 are maintained in a central position by means of springs c^6, inserted in sockets and bearing against curved plates c^7.

c^8 are pins projecting on one side of the jaws and fitted to slide in grooves c^9 in the chuck. They serve to limit the inward motion of the jaws to a central position and prevent any rotary motion thereof.

c^{10} is a portion of a converging tube capable of rocking on a pin c^{11}, attached to a spring c^{12}, secured to the chuck, and passing through an opening in an extension c^{13} of the conveyer, inserted between the chuck, and a plate c^{14}, secured to the latter.

c^{15} is a shoulder concentric with the center of the pin c^{11}, and upon which is fitted a corresponding shoulder of the conveyer, by which means a smooth surface is obtained at the joint of the two parts when the conveyer is rocked. By drawing out the free end of the spring c^{12} the pin c^{11} is withdrawn from the extension c^{13}, and the conveyer may therefore be detached when required from the chuck.

E E are the drivers, having head portions e carried in T-shaped grooves formed in the bottom of a bar E′, along which they may be moved to correspond with the position of the chucks C. At about the center of the bar E′ the lower portion of the groove is enlarged to admit of the insertion and withdrawing of the heads of the drivers. The ends of the bar E′ are secured to end plates E^2, fitted to slide in the grooves of the frame portion a^2 against the end plates D^2 of the rails D D′.

e' e' are lugs formed on the plates E^2 E^2, and through which pass loosely the rods d^2 d^2.

e^2 e^2 are lugs projecting from the plates E^2 E^2, and into which are secured rods e^3 e^3, connected to a cross-head F, the latter being guided by a rod f, working in bearings f' f'.

F′ is a connecting-rod pivoted to the cross-head F and reciprocated by a crank F^2, deriving motion from the driving-pulley G. At each rotation of the crank the drivers E are forced down through the chuck onto the work, driving the nails therein. The jaws c^2 are forced apart by the nail-heads acting on the concave sides of the recess c^4 during the passage of the drivers. As the end plates E^2 are raised after each operation of the drivers, the lugs e' e' come in contact when near their upper position with the nuts d^3, thereby lifting the rails D D′ and chucks from the work to facilitate the removal and insertion of the latter. The pins d' prevent additional upward motion of the latter parts that might otherwise ensue from the impetus imparted thereto by the lugs e'.

H is a nail-feed box adapted to rock on pivots a^3 a^3, which have a screw-threaded connection with lugs a^4, formed on the frame A. This box is rocked by means of the crank I, secured to a shaft i, deriving motion from the main shaft G′ through the gear-wheels i', i^2, i^3, and i^4. The motion of the crank is transmitted to the box through the connecting-bars h' and rock-levers h^2 h^3, pivoted to the frame. The lever h^2 has an arm h^4, to which a rod is connected, having a weight h^5 suspended thereto, by which the weight of the box and its contents is approximately counterbalanced. Additional weights h^6 may be added when necessary, and for this purpose a stud h^7 is provided.

The gear-wheels are so proportioned in diameter that the crank I makes but one quarter-revolution to one revolution of the crank F^2, so that the box H, which is shown tilted to its highest position in Fig. 4, will be brought to a position indicated by dotted outlines at h^8 after the first downward and upward motion of the drivers. At the next motion of the drivers the box will be brought to its lowermost position, as at h^9, also shown dotted. By this movement of the box the nails are caused to roll to and fro within the same and arrange themselves in grooves contained therein.

The box H is composed of four portions h, rigidly secured together, and a bottom portion constructed in sections concave in cross-section, each section having a pair of downwardly-extending arms on its under side. Some of these sections are stationary, while others are horizontally adjustable to form a series of grooves $h^\times$, having a width corresponding to the diameter of the nails to be used, and in which grooves the nails are caused to arrange themselves and be suspended by their head portions within the box.

The two side portions h^{29} h^{29} of the bottom may be cast integral with the sides of the box.

h^{31} indicates intermediate stationary sections having their arms h^{41} h^{41} secured to bars h^{51}, whose ends are secured to the arms h^{61}, beneath the two outside portions of the box, by which means these sections are supported and held stationary. The sections h^{71} h^{71} have their arms h^{81} rigidly secured to bars h^{91}, while the sections h^{10} have their arms h^{11} similarly secured to bars h^{12}. The bars h^{91} h^{12}, attached to the arms of the movable sections, are supported on pins h^{13}, projecting on both sides of two of the arms h^{41} of the stationary sections and passing through slotted openings in the bars h^{91} h^{12}, by which motion sidewise thereof is afforded to form the grooves $h^{\times}$ of more or less extent in width. Each pair of movable sections has a lap-joint h^{14}, where they meet, having a rounded and smooth finish on their upper surfaces to allow nails to slide freely over them. The side edges of these movable sections are adjusted to and form the edges of the stationary sections to form grooves by means of levers h^{15}, secured to a shaft h^{16}, journaled in the arms h^{41} of the stationary sections, and one of these levers is provided with a handle h^{19}.

h^{17} h^{18} indicate pins projecting from the lever and extending through slotted openings in the arms h^{41} into bars h^{18}, rigidly secured to the levers h^{91}, and having a slotted opening to admit of the shaft h^{16} passing through the same. On turning the handle in one direction the bars h^{91} h^{12} are reciprocated in opposite directions, causing all the grooves to be enlarged simultaneously, while the reverse motion of the link will diminish their width of opening. In order to regulate this degree of opening, I provide a stop h^{20}, secured to the arm h^{41}, and between which and the side of the lever h^{15} a nail of the diameter to be used is inserted, as shown dotted in Fig. 7.

h^{21} is a spring having one end attached to the handle h^{19} and the other end to the pin, and serves to hold the nail in place, and consequently a uniform width of grooves is maintained.

The surface of the sections is curved both longitudinally and transversely, forming depressions $h^{\times\times}$ at the forward ends of said sections, as clearly seen in Fig. 7, in order to scatter the nails and cause them to fall in the grooves when the box is rocked.

h^{22} h^{22} are openings in the rear side of the box, and through which the latter may be emptied when tilted.

h^{23} h^{23} are covers for the openings h^{22}, sliding in grooves and provided with finger-pieces having extensions to enter notches in the side of the box, whereby the said covers are supported.

h^{24} are grooves for receiving partitions h^{25} when it is desired to use nails of different sizes simultaneously, each size being therefore required to be kept separated in the box.

h^{26} are stops to prevent the nails suspended in the front portion of the grooves from sliding backwardly therein when the box is rocked downwardly.

L is a device for clearing the front portion of the grooves of nails which may have assumed a position tending to clog the passage of nails through the orifices h^{28} in the front of the box. It consists of a bar l, pivoted to the sides of the box and having arms l', concave on their under side and arranged to cover the grooves $h^{\times}$ at a sufficient distance above the same to allow of the free passage of the nail-heads. Should nails enter this concave opening above the grooves irregularly, as end foremost, the exit from the box is clogged, and to remedy this the arms l' are adapted to rock a short distance upwardly when the box has nearly reached its lowermost position and then return to its normal position immediately after the box has commenced to ascend. It is operated by means of an arm l^2 on the bar l, extending through the front of the box and upwardly in front of the same. The latter portion contains a cam-surface l^3, between which and the front of the box is a pin l^4, extending from an arm l^5, pivoted to the frame-work at l^6. As the box approaches its lowermost position the pin l^4 comes in contact with the cam-surface l^3, causing the arm l^2 to be forced outwardly, and thereby rotating the bar, and consequently raising the arms l' and releasing all nails that may have got in irregularly.

l^7 is a spring serving to restore the arms l' to their lower position during the commencement of the upward motion of the nail-box.

h^{27} are stop-pieces pivoted to swing over the orifices h^{28} to prevent the feed of nails from any one or more grooves h' when not required. The two outside orifices in Fig. 1 are thus shown closed.

K denotes mechanism for delivering the nails after passing from the feed-box to a picker-bar M, which picks a set of nails therefrom each time the drivers ascend. This mechanism consists of a series of bars, some of which are stationary while others are movable, in order to form grooves corresponding in width to those in the nail-box for the passage of nails of the required diameter.

k' are the stationary bars secured to the frame A, which has upwardly extending posts a^5, between which the nails slide. These posts have their top surface inclined sufficiently to allow the heads of the nails resting on the plates forming the grooves to slide down the same by gravity. The plates k^2 are rigidly secured to a cross-bar k^3, while the plates k^4 are secured to a cross-bar k^5, both of which bars are fitted to slide in keepers k^6, secured to the posts a^5.

k^7 is a lever pivoted to the frame and connected by pins to the bars k^3 k^5, whereby motion imparted to the bars k^3 will cause the bar k^5 to move in an opposite direction. By this means the width of all the grooves may

be enlarged simultaneously or simultaneously diminished, as desired.

k^8 is an adjusting-screw having a neck portion working in a bearing k^9, so as to prevent longitudinal movement of the same, and is screw-threaded into the bearing k^{11}.

k^{12} is a lug on the bar k^3 to serve as a gage to obtain the proper width of opening in the grooves or nail-slides, and between which lug and the keeper k^6 a nail n of the required diameter is placed. The stops k^8 k^{10} will then prevent any accidental displacement of the plates.

The picker-bar M is supported in guides m, secured to the frame, and is caused to slide a short distance crosswise of the machine by means of a wedge-shaped cam m', secured to one of the end plates E^2 and acting on a roller m^2, attached to the picker-bar M. The motion of the latter in a reverse direction is caused by a spring m^3, surrounding a fixed rod m^4 and bearing on a cross-bar m^5, having one end resting against the frame and its other end against the picker-bar M. The rod m^3 is provided with nuts, whereby the tension of the springs may be varied.

The picker-bar M is made in two sections m^6 m^7, a part of which is shown on an enlarged scale in Fig. 11. The section m^6 extends the entire length of the device and has the anti-friction roller m^{19} journaled to it at one end, and the bar m^5 bearing against it at its other end.

m^8 indicates openings opposite the nail-slides for the passage of nails.

m^9 designates angular plates detachably secured to the upper surface of this section, in order that they may be renewed when necessary.

The top section m^7 is preferably made in two parts m^{10} m^{11}, in order that nails of two different diameters may be used simultaneously, if desired. These two portions of the sections m^7 are loosely connected to the bottom section by pins m^{12}, fitting slots arranged at such an angle that when the said portions are drawn forward parallel and angular grooves m^{13} are formed, through which the nails are forced and allowed to drop through openings m^8 into suitable receptacles beneath the bottom section. The side edges of the two sections normally coincide and are held in this position by springs m^{14}, attached to the parts m^{10} m^{11} and having their ends secured to the frame. In order to set the picker-bar for use, the upper section is drawn forward and nails of the diameter to be used inserted at m^{15}, causing the pointed end of the plates m^9 to project beyond the adjacent side of the upper section. Nails may therefore slide against the latter, as shown at m^{16}, Fig. 9, and on the crosswise motion of the bar M will be carried to the opening m^8, while the edge m^{17} acts as a stop to the advance of other nails, as shown in Fig. 11, which also shows in dotted line the position of the plate k k and nails n. By this yielding action of the upper section nails in any particular groove that may vary a trifle in diameter or form may be conveyed by the picker-bar to the chucks without injury to the parts or affecting the feed of nails in the other nail slides or grooves. When nails of two different diameters are to be used simultaneously, one part of the upper section is set by two nails of one size and the other part by two nails of the other size.

n' n' are arc-shaped plates rigidly secured to the lower section m opposite each nail-slide and afford a support and guide for the tubes n^2, having funnel shape openings to receive nails from the picker-bar as they fall through the openings m^8. These tubes have a sliding connection with other tubes n^3, secured to the base portion c^4.

n^4 are set-studs secured to the front side of the funnels and passing loosely through the plates n', in which they are secured by a split or other pin. By this arrangement the tubes may be swung sidewise to correspond with the position of their respective chucks.

P is a device applied to operate on each nail-slide independently for stopping the feed of nails from any number of them at regular intervals during the strokes of the drivers, and is used chiefly when nailing the bottom pieces of a box to the side and end pieces. It is essential to provide means to vary the number of nails used at each stroke of the drivers, for the reason that more nails are required to secure the bottom piece to the end portions than to the side portions of a box. The former may require eight nails, while four will suffice for the sides. It is also essential to provide means whereby the bottom piece may be either nailed to both end pieces first and then to the two side pieces, or to an end piece first and then to a side piece alternately. It may be done either way by the following-described cams acting in conjunction with the device P.

The device P consists of a bar p, mounted to rock in bearings a^{10}, attached to the frame, and having arms p' secured thereto and extending upward opposite each nail-slide. The arms p' are provided with ordinary spring-barrels at their upper extremities.

p^2 are rods pointed at their tips to enter the grooves of the nail-slides in front of the nails and prevent them from descending when otherwise free to do so. These rods pass centrally through the spring-barrels and have pins extending through a slot in the same, which slot has a shoulder at both ends, whereby on turning the rod p^2 slightly by its head portion the pin will engage with a shoulder and be locked in a position to either stop the feed of nails or not effect the same when rocked toward them. By disengaging the pin from the foremost shoulder in any one or more of the spring-barrels the rod p^2 is forced rearwardly toward the nail-slides by the spring within the barrel and stops the feed of the nails when the device is rocked. The bar p

is rocked by a cam p^3, secured to the shaft i and acting on a roller p^4, connected to a rod p^5, pivoted to an arm p^6 of the bar p. The bottom end of the bar p^5 is bifurcated to pass over the shaft i, which acts as a guide for it. Two forms of cams p^3 p^7 are here shown, forming one piece capable of being removed from the shaft and replaced in a reverse position, so that either one of the cams may be used. The cam p^3 has two high and two low faces, each extending around one-quarter the circumference, and their peripheries are concentric with the center of the shaft. By the use of this cam the feed of nails is stopped from any one or more nail-slides at every alternate stroke of the drivers. The cam p^7 has one high and one low face, each extending around one-half the circumference, and by its use the feed of nails is simultaneously stopped during two strokes of the driver's in succession and allowed to feed during two strokes alternately. With the former cam the bottom portion of a box may be nailed first to a side and then to an end alternately, while with the cam p^7 the bottom is nailed to the two sides first and afterward to the two ends. When this automatic action is not required, the device is rendered stationary by means of a hook p^8.

p^9 is an arm mounted to rock on a stud p^{10}, and is acted on by a spring p^{11}, against a stop p^{12}, to hold the cams p^3 p^7 on the shaft and facilitate their reversal when required.

Q is a gage against which the work is placed to be operated on. It is caused to follow the vertical movements of the chucks, in order that portions of boxes of thin material may not slip over it when the chucks are raised. It has also a horizontal movement to and from the face of the machine. The vertical motion to this gage is caused by the cross-head F acting on rods q, working in guides q', and having blocks q^2 secured thereto. These blocks are provided with grooves, in which loosely slide bars q^3, connected to the gage Q. The latter is free to stop by gravity until the bar rests on the bottom of slots a^6 in the frame. When the cross-head is near its upper position, it acts on the rods q, carrying the gage Q upwardly with it. The horizontal movement of this gage may be effected automatically or by hand. In nailing portions of boxes together, each portion being of equal thickness, no horizontal movement is required; but when the sides of boxes are of thinner material than the ends some adjustment is necessary after each stroke of the hammers when nailing the bottom portions on, in order to centralize the different thicknesses under the chucks. To effect this, I provide the following mechanism: q^4 is a shaft journaled in the frame A and provided with arms q^5, which bear against the ends of the bars q^3. q^6 is an arm secured to the shaft q^4, and has pivotally connected thereto a slotted segment q^7, provided with a graduated index.

q^8 is a rod connected to an arm of the segment, and pivotally connected at its lower extremity to a frame q^9, carrying a pair of rollers q^{10}, either one of which is capable of being swung in a position to be acted on by cams q^{11} q^{12}, similar in construction to those already described.

When the gage is required to move in and out horizontally and alternately with each stroke of the hammers, the cam q^{12} is used, and when the gage is required to remain in a forward position during two strokes of the hammer and back during two strokes alternately the cam q^{11} is used. The change is effected by means of a handle extending from the frame q^9, and which is capable of being sprung over projections in a sector connected to the bar q^8, and thereby held in either position.

q^{13} is a link pivotally connected to the bar q^8 and to a support secured to the frame, and serves to support the bar q^8. When this horizontal movement of the gage Q is not required, a spring-actuated stop q^{14} is arranged to enter a recess in the joint-pin of the bar q^8, thereby holding the latter in its uppermost position, and therefore free from the action of the cams. To set this gage in order to centralize the thinnest sides of the box under the chucks, the screw of the segment q^7 is loosened and the latter rotated until the pointer on the stationary arm is opposite a mark on the graduated scale corresponding to the thickness of the side pieces of the box. During this time the roller q^{10} will rest on the high part of the cam. The screw is then tightened and the gage will be advanced to the proper position each time afterward automatically to suit any number of sides of similar thickness. The ends of the box, which are usually thicker than the sides, may be centralized under the chuck by another gage hereinafter described, or this may be effected by the same gage, as follows:

R is a cam secured to a shaft r', having a handle r, also secured thereto. The shaft r' is journaled in a slotted segment r^2, secured to the frame A. The cam R may be rotated and secured in position by means of a screw passing through the slot in the segment into the handle. The segment is provided with a graduated scale, and the handle has a pointer whereby the proper position of the cam to limit the backward movement of the gage to correspond with the thickness of the material is readily effected.

q^{15} are springs tending to draw the gage rearwardly when released by the cams.

S is a gage adapted to be used for boxes, having one or both of its ends set in beyond the side portions. It projects through the face of the machine in two parts, connected at the back.

s indicates rollers supporting the rear of the gage. This gage is set forward in any position by means of a crank s', connected to a shaft s^2, having a slotted segment s^3 secured thereto. The shaft s^2 is supported in a bracket

s^4, secured to the frame and provided with an arm having a pointer in connection with a graduated scale on the slotted segment. The gage is secured in position by a screw s^5.

T is a gage extending across the machine at a suitable distance above the table, so as to leave a space between its lower edge and the surface of said table, and it may be used in conjunction with either of the above gages. It is secured to slotted end pieces t, working on studs and also on a shaft t', extending across the machine and having levers t^2 secured thereon, provided with pins which enter slotted openings t^3. One of the levers t^2 is provided with an arm, having a hand-piece t^4 attached thereto, with a pointed extremity to indicate on a graduated scale the proper position of the gage to centralize boards of any thickness. By the use of this gage the side pieces of a box may be nailed to the end pieces in cases where one of the ends is set in, as shown dotted in Fig. 4. The gages S and T are shown in line to adjust the position of the end centrally under the chuck, while the gage Q is set to adjust the distance the side is to project. After one side has been nailed it is turned over to have the other side secured, and, as shown, the opening below the gage T allows the projection of the side to pass through. When nailing the opposite flush end of the box, the gage Q is advanced to a position flush with the other two gages.

T′ is a treadle mounted on bars t^5, secured by set-screw in sockets t^6, the latter being mounted on a shaft t^7, journaled in the frame. The bars t^5 rest on flattened portions of the shaft and impart motion thereto on depressing the treadle. A lever secured to the shaft and jointed to a post serves to operate a lever t^8, fulcrumed to a stationary support.

t^9 is a spring to balance the weight of the treadle when extended outwardly, and works in conjunction with a spring attached to the lever t^8 to lift the treadle.

V is a clutch adapted to transmit motion from the driving-pulley G to the machine during one complete revolution of the former, and automatically to disconnect and allow the driving-pulley to become a loose pulley. It consists of a central portion v and an annular plate v', both secured to the shaft G′.

v^2 is a sleeve having segmental portions projecting within a recess in the hub of the pulley.

v^3 indicates rollers, which on rotating the sleeves are carried up on the high part of cam-surfaces in the portion v, thus bringing them in contact with the hub of the wheel and causing motion to be transmitted from the pulley to the shaft.

v^4 is an annular groove extending around the face of the sleeve, and within which is placed one or more coil-springs v^5, having one end fastened to a pin projecting from the plate v' and the other end attached to a pin secured to the sleeve. This spring tends to rotate the sleeve and carry the rollers up on the high part of the cam. The sleeve has a projection v^6, against which acts a yielding stop device, consisting of a lever v^7, pivoted to a stud v^8 and having a rod v^9, containing a head portion v^{10}, working in a recess in the lever. A spring v^{11} tends to press the head portion against a stop-shoulder v^{12}. v^{13} is a spring tending to press the stop constantly against the periphery of the sleeve.

v^{11} is a rod pivoted to the bar t^8 and extending through a slotted opening in the arm of the stop-lever v^7. This rod is notched at v^{15} to allow a steel plate v^{16}, secured to the arm v^{17}, to enter, whereby on depressing the rod v^{14} by the treadle the stop is drawn out of engagement with the projection of the sleeve. The latter is then free to turn by the action of the coil-springs causing the rollers to make a frictional contact between the pulley and the shaft.

v^{17} is a rod projecting from the shaft, which on turning will strike on the rod v^{14} and rock it sufficiently to allow the stop-lever v^7 to disengage therefrom and bear against the sleeve, in order to stop the motion of the latter as soon as the projection makes contact therewith.

v^{18} is a foot-lever adapted to lock the parts and prevent accidental starting of the machine.

The spring v^{13}, being connected to the rod v^{14}, serves to draw it toward the clutch.

V′ is a device for imparting a backward motion to the machine, and consists of a slide-piece v^{19}, fitting a recess in the hub of the wheel and having a pin v^{21}, extending through a slot v^{22} and connected by a spring v^{23} to a support. This spring tends to keep the slide v^{19} from engaging a recess in a collar g, secured to the shaft G′.

G^2 indicates apertures in the pulley for the insertion of a lever to rotate the same. When it is required to reverse the motion of the machine, in order to rectify any disarrangement of parts, the slide v^{19} is inserted in the recess of the collar and the spring v^{23} detached therefrom. This clutch affords a useful substitute for power when the latter is not obtainable, since by disconnecting the spring v^{23}, actuating the stop v^7, and inserting a lever in one of the apertures G^2 the machine can be operated by imparting a to-and-fro motion to the wheel, after the manner of a ratchet-drill.

W is a nail-supply box resting on supports w. w' are pins projecting from the box to enter notches in the arms of the support to admit of the box being tilted and emptied.

O is a device for drawing boards that may be warped straight against the face of the machine, and is adapted to be attached to the machine when required. It consists of a bar o', mounted to slide in a groove formed in a carrier-bar o^2 and projecting through slots o^3 in the frame. It is provided with a roller o^{15} and drawn against a cam-surface o^{16} by means of a spring o^{14}. The bar o^2 is piv-

oted at o^3 to a bracket o^4, secured to the frame, and has at its front end downward-extending lugs o^5, between which works the upper end of a lever o^6, secured to a shaft o^7. This shaft is rocked in one direction by means of a lever o^8 and weight o^9, and in the other direction by an arm o^{10}, extending from the cross-head F, which engages a collar o^{11} on a rod o^{12}, pivotally connected to the said lever o^8. o^{13} is a bar sliding in ways formed in the bar o', and is adjustably connected thereto.

The operation of the device is as follows: As the cross-head leaves its uppermost position, as shown in Fig. 16, it permits the weight o^9 to rock the carrier-bar o^2 on its pivot, causing the bar o' to slide rearwardly against the cam o^{16} by reason of the spring o^{14}, thereby causing the bar o^{13} to impinge on the bent-out end portions of the boards, and draw the same flat against the face of the machine, after which the drivers, having descended far enough to reach the nails in the chucks, will drive the latter in the work. As the cross-head approaches its upper position it will come in contact with the collar o^{11} and restore the parts to their normal position, as shown in Fig. 16. Two of these devices are used, one on each side of the machine.

Having described this invention, what I claim, and desire to secure by Letters Patent, is—

1. In a box-nailing machine, the feeding box or holder having a series of stationary and movable bottom sections, arms connected to said sections and bars, two of which are connected to the arms of the movable sections and supported on pins projecting on the sides of two of the arms of the stationary bottom sections, and passing through slotted openings in the said two bars, substantially as set forth.

2. In a box-nailing machine, the feeding box or holder comprising series of separate bottom sections having between them feeding-slots provided with stops or offsets near the front of said box, substantially as specified.

3. In a box-nailing machine, the feeding box or holder having a series of movable and stationary concave bottom sections, the edges forming the ridges between which having lapping joints, substantially as set forth.

4. In a box-nailing machine, the feeding box or holder having a series of concave bottom sections, which are also formed with downward-curved portions or depressions at their forward ends, substantially as set forth.

5. In a box-nailing machine, the feeding box or holder, having a series of stationary and movable bottom sections, arms connected thereto, bars, two of which are connected to the arms of the movable sections and supported on pins projecting on the sides of two of the arms of the stationary bottom sections and passing through slotted openings in the said two bars, and the levers applied to an arm of a stationary section and adapted to actuate said two bars of the arms of the movable sections, substantially as set forth.

6. In a box-nailing machine, the feeding box or holder having a series of stationary and movable bottom sections, arms connected thereto, bars, two of which are connected to the arms of the movable sections and supported on pins projecting on the sides of two of the arms of the stationary bottom sections and passing through slotted openings in the said two bars, the levers, one having a handle, and the spring connected to said handle and to one of said pins, substantially as set forth.

7. The combination, in a box-nailing machine, of the sets of chucks, each consisting of spring-pressed jaws or cylinders having opposite or meeting concavities and apertures, the apertures of the upper set of chucks being larger than the apertures of the lower set of chucks, substantially as set forth.

8. In a box-nailing machine, the combination, with the chutes and drivers, of the two sets of chucks having apertures of different capacities, substantially as set forth.

9. In a box-nailing machine, the combination of the chucks, the chutes connected to said chucks, the rails having connection with said chutes, the end plates secured to said rails, and guideways in the supporting-frame, said end plates sliding vertically a limited distance in said guideways, substantially as set forth.

10. In a box-nailing machine, the combination of the chucks, the chutes leading to the chucks, the rails having connection with said chutes, the end plates secured to said rails, stops to limit the downward movement of the rails, pins carried by one of the said rails, and the supporting-frame having a portion against which said pins strike to limit the upward movement of said rails, the guide-rods having stop-nuts at their upper ends, the drivers carried by a cross bar or head secured to end plates of the rails, said end plates of the driver cross bar or head having lugs through which pass said guide-rods, substantially as set forth.

11. In a box-nailing machine, the combination, with the nail-feeding box, of the clearing device arranged over the nail slots or grooves, which consists of a pivoted bar having arms concave on the under side and an arm having a cam-surface, a rocking arm having a pin engaging the cam-surface of the latter arm, and a spring controlling or returning the device to its original position, substantially as set forth.

12. The combination, with the nail-feeding box or holder, of the picker-bar comprising the two main sections or plates arranged parallel, and one having endwise movement upon the other, and a series of interspaced oblique passages, which passages connect with discharge-openings, below which are applied arc-shaped plates, to which are loosely connected conducting-tubes having a sliding connection with tubes applied to the upper ends of the

chutes discharging into the chucks, substantially as set forth.

13. In a box-nailing machine, the combination, with the feeding box or holder, of the picker-bar comprising the main sections or plates, having interspaced oblique passages connecting with discharge-openings, one plate having an endwise movement upon the other, the wedge-shaped cam acting upon said movable plate or section, the cross-bar or yoke having one end bearing upon said movable section or plate, and the spring-encircled rod passing through said bar or yoke, the spring bearing upon said rod and said bar or yoke, substantially as set forth.

14. In a box-nailing machine, the combination, with the nail-feeding box, of the nail-delivering contrivance comprising longitudinal parallel bars arranged upon an inclined base and in keepers secured to the base, a centrally-pivoted lever engaging pins or projections on said bars, each of said bars having applied at one end a screw, and one of said bars having a gage, and movable and stationary parallel cross bars or slides, the movable bars or slides being connected to said longitudinal bars, substantially as specified.

15. The combination, with the nail-feeding box, of the feed-regulating device having the rocking bar provided with arms secured and arranged opposite each nail-slide, of the picker-bar, spring-barrels applied to said arms at their upper extremities, pointed rods having a pin-and-slot connection with said spring-barrels and entering the grooves of the nail-slides, and mechanism for actuating said feed-regulating device, substantially as set forth.

16. In a box-nailing machine, the combination, with the drivers, of the horizontally and vertically movable gage, against which the box or work rests, the cross-head of the machine, the bars connected to said gage, blocks having grooves in which loosely slide said bars, and rods acted upon by said cross-head and connected to said blocks and guides in which said rods work, substantially as set forth.

17. The combination, with the drivers, of the horizontally and vertically movable gage, a shaft bearing an arm connected with the aforesaid and having connection with a slotted graduated segment, and a lever connected with an arm of said segment and actuated from the driving mechanism, substantially as set forth.

18. In a box-nailing machine, the combination, with the work-table, of slotted gage T, having slotted end pieces which receive studs projecting from the sides of the table, and a shaft passing across the machine, said shaft having levers provided with pins engaging slotted openings in said end pieces, one of said levers having an arm provided with a hand-piece and pointed to register with a graduated arc on one side of the table, substantially as set forth.

19. In a box-nailing machine, the combination, with the box-supporting frame, of the table made in two sections, one section sliding in a surface recess or depression in the stationary section, and having a rod sliding in a sleeve or eye upon the under side of the stationary section, substantially as set forth.

20. In a box-nailing machine, the combination, with the box-supporting frame, of the work-table provided with a rib to slide in a groove in said frame, the upright screw-shaft engaging a nut supported in a bracket of the frame and having its upper end bearing in the under side of the table, the slotted hand-wheel sleeve, and the shaft or rod geared to the aforesaid shaft, and having a projection or stud engaging the slot of said sleeve, substantially as set forth.

21. In a box-nailing machine, the combination, with the driving pulley or wheel and the shaft bearing the latter, of the clutch mechanism and its shifting treadle, said clutch mechanism comprising a hub or sleeve carrying in a series of circularly-arranged cavities frictional rollers, and upon its outside a cam-ring, the spring-pressed lever carrying a spring-pressed head engaging a recess in said lever, a slotted sleeve fast to said shaft and engaged by a spring-pressed slide carried by said pulley or wheel, substantially as set forth.

22. The combination, with the driving pulley or wheel and the shaft bearing said pulley or wheel, of the clutch mechanism and its shifting treadle, said clutch mechanism comprising a hub or sleeve carrying a series of circularly-arranged frictional rollers and a cam-ring, the spring-pressed lever carrying a spring-pressed head engaging a recess in said lever, a slotted sleeve fast upon said shaft and engaged by a spring-pressed slide carried by said pulley or wheel, and a spring-held pivoted rod engaging a plate on said lever, and itself engaged by a rod projecting from said shaft, substantially as set forth.

23. In a box-nailing machine, the combination, with the driver-actuating cross-head, of the warped board drawing or straightening device, consisting of a sliding bar carrying an adjustable bar and mounted in a pivoted carrier-bar, and pressed by the action of a spring against a cam-surface, which carrier-bar has lugs, between which works the upper end of a lever carried by a rock-shaft, to which is connected a weighted lever, and an arm extending from said cross-head and connected to a collar on a rod pivotally connected to said weighted lever, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JEREMIAH CASEY.

Witnesses:
JAMES B. LOCKWOOD,
JOSEPH J. BOWMAN.