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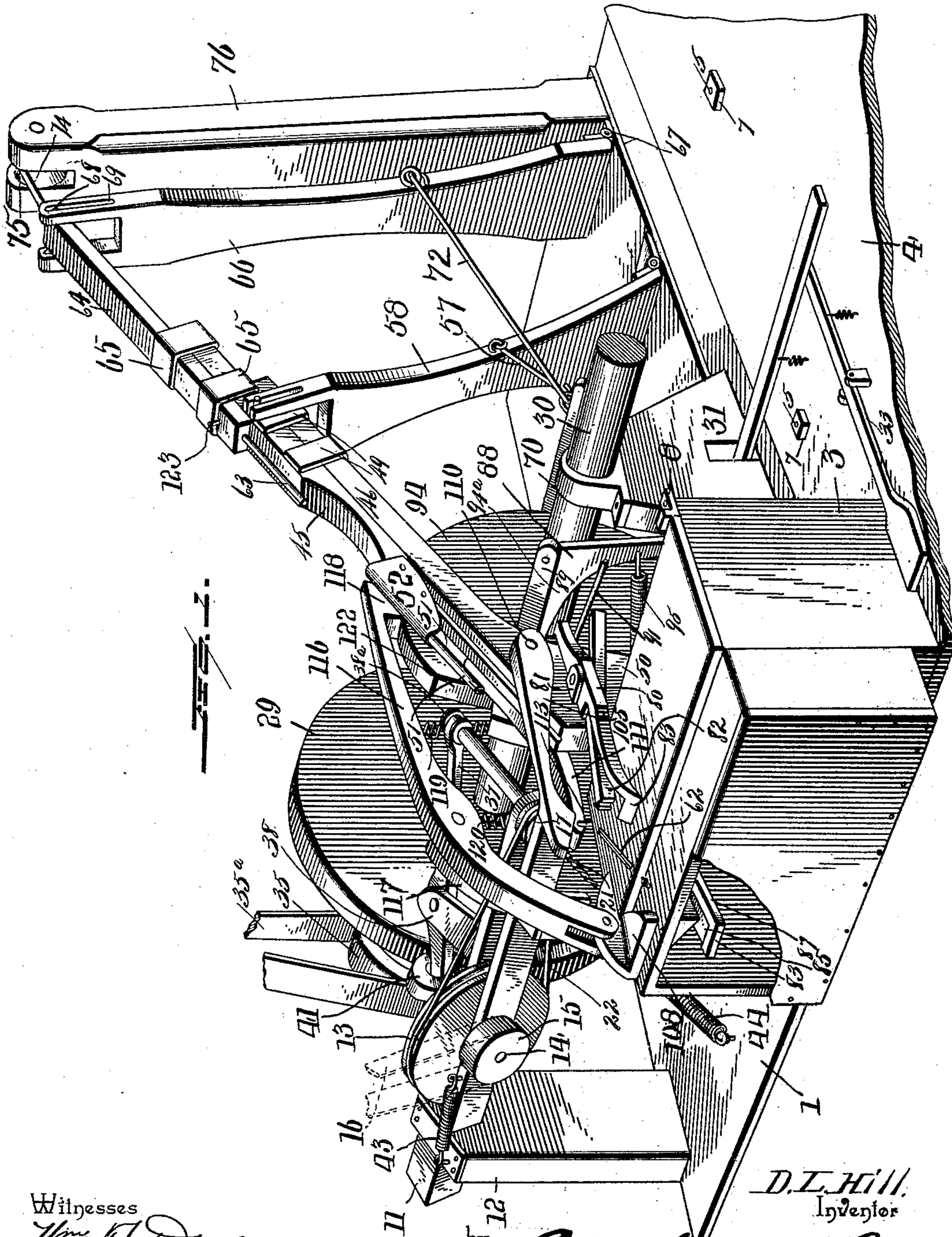
Patented Feb. 18, 1902.

D. L. HILL.
BOX HINGING MACHINE.

(Application filed Sept. 6, 1901.)

(No Model.)

7 Sheets—Sheet 1.



Witnesses

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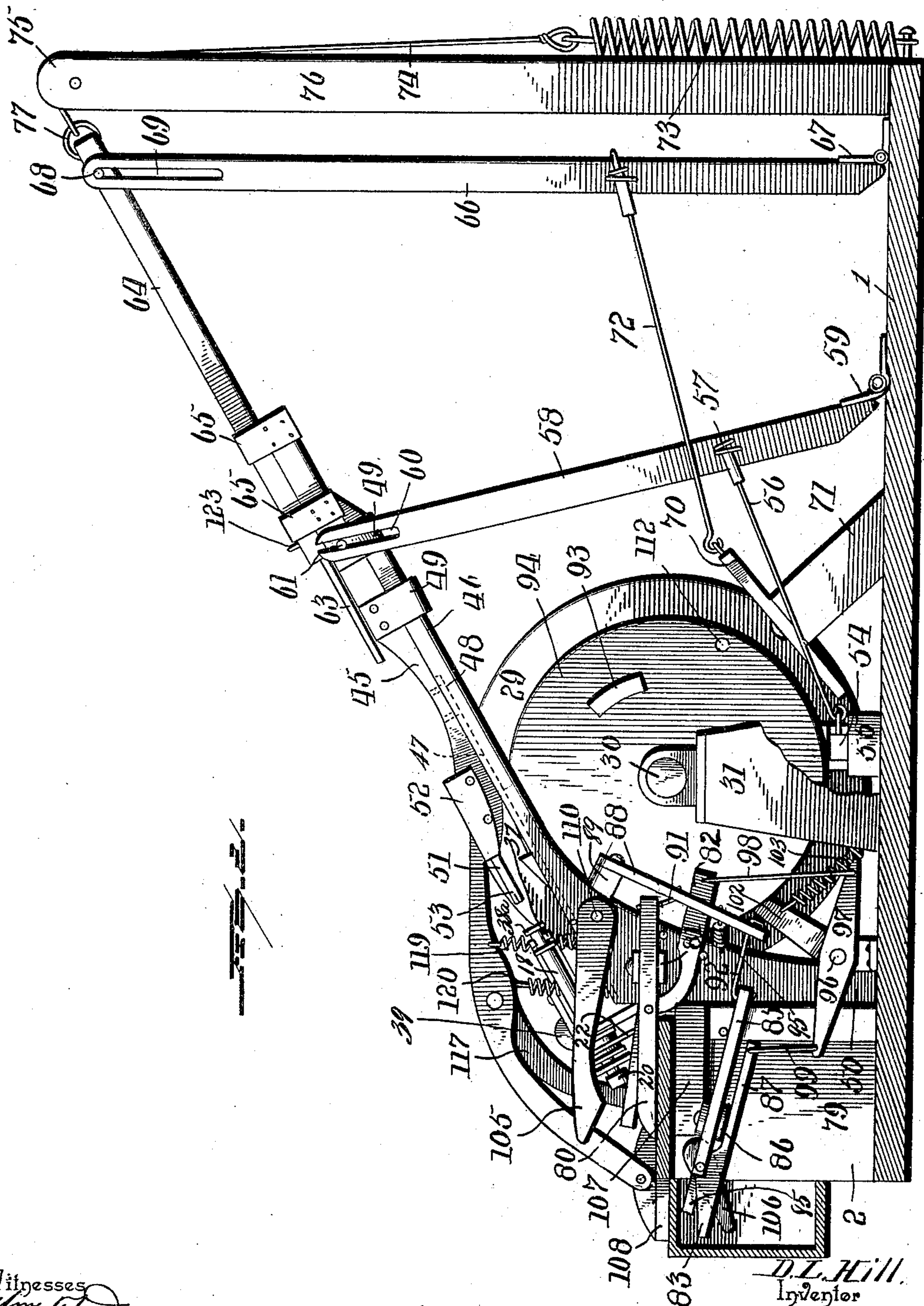
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7 Sheets—Sheet 2.



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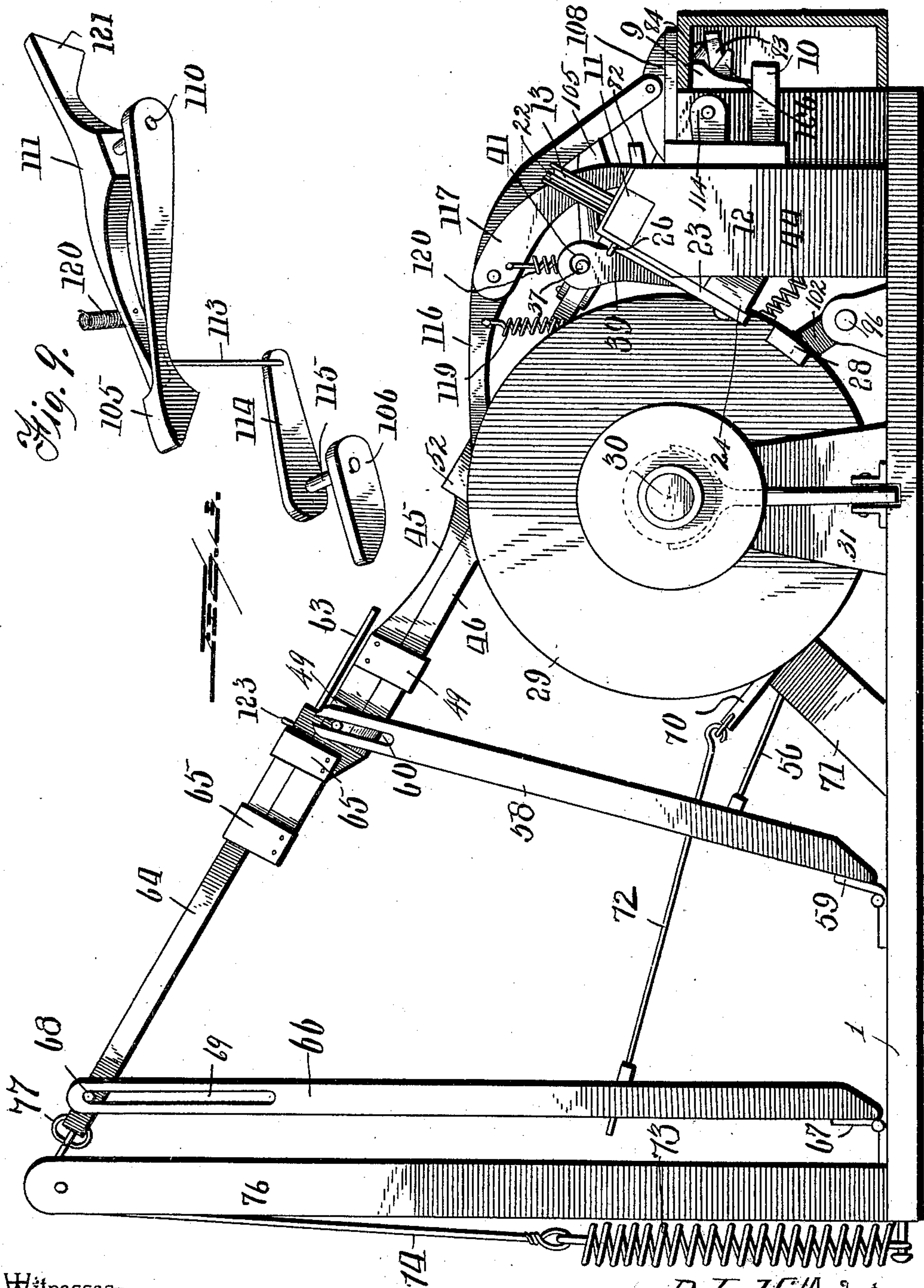
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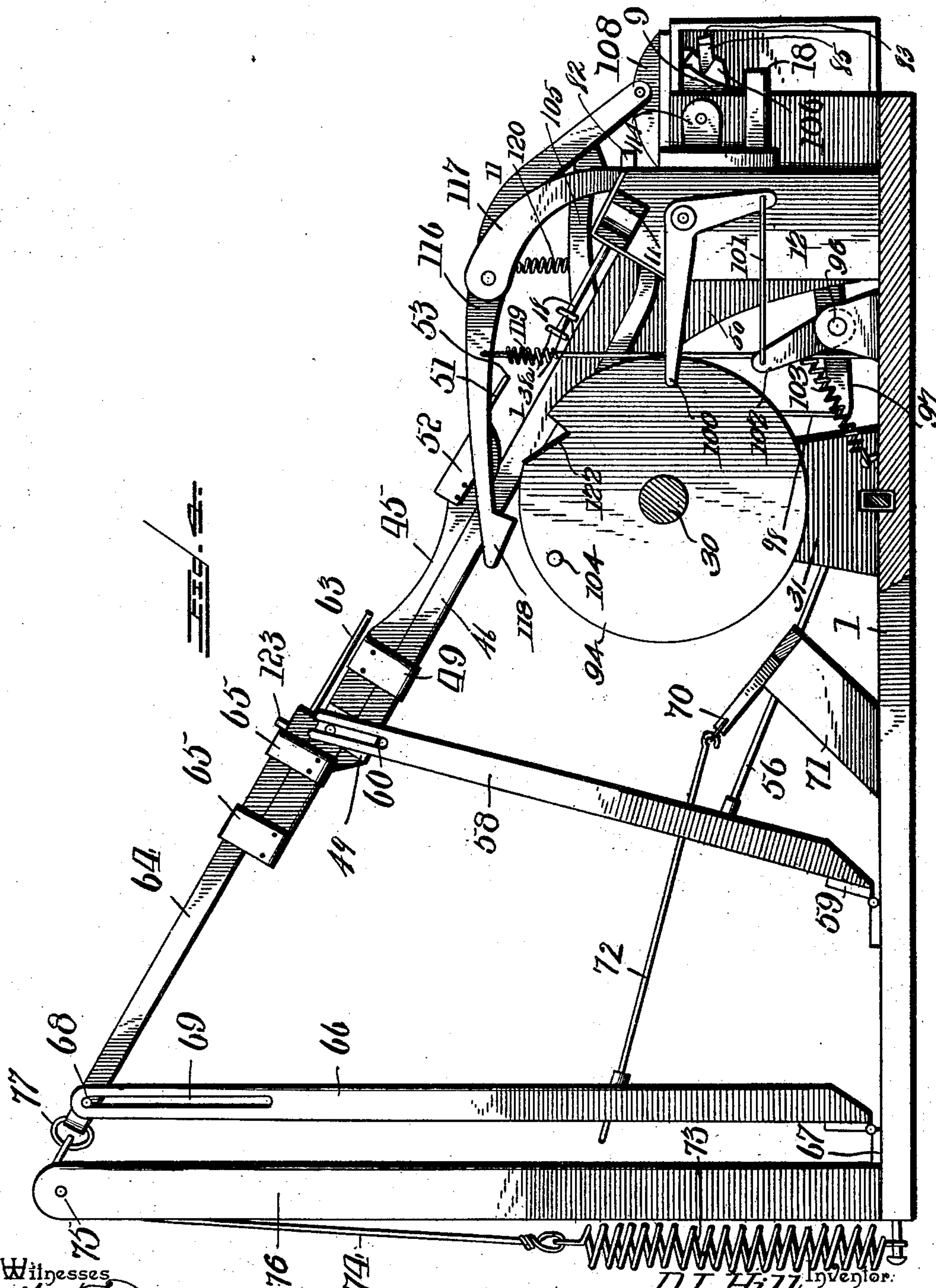
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7 Sheets—Sheet 4.



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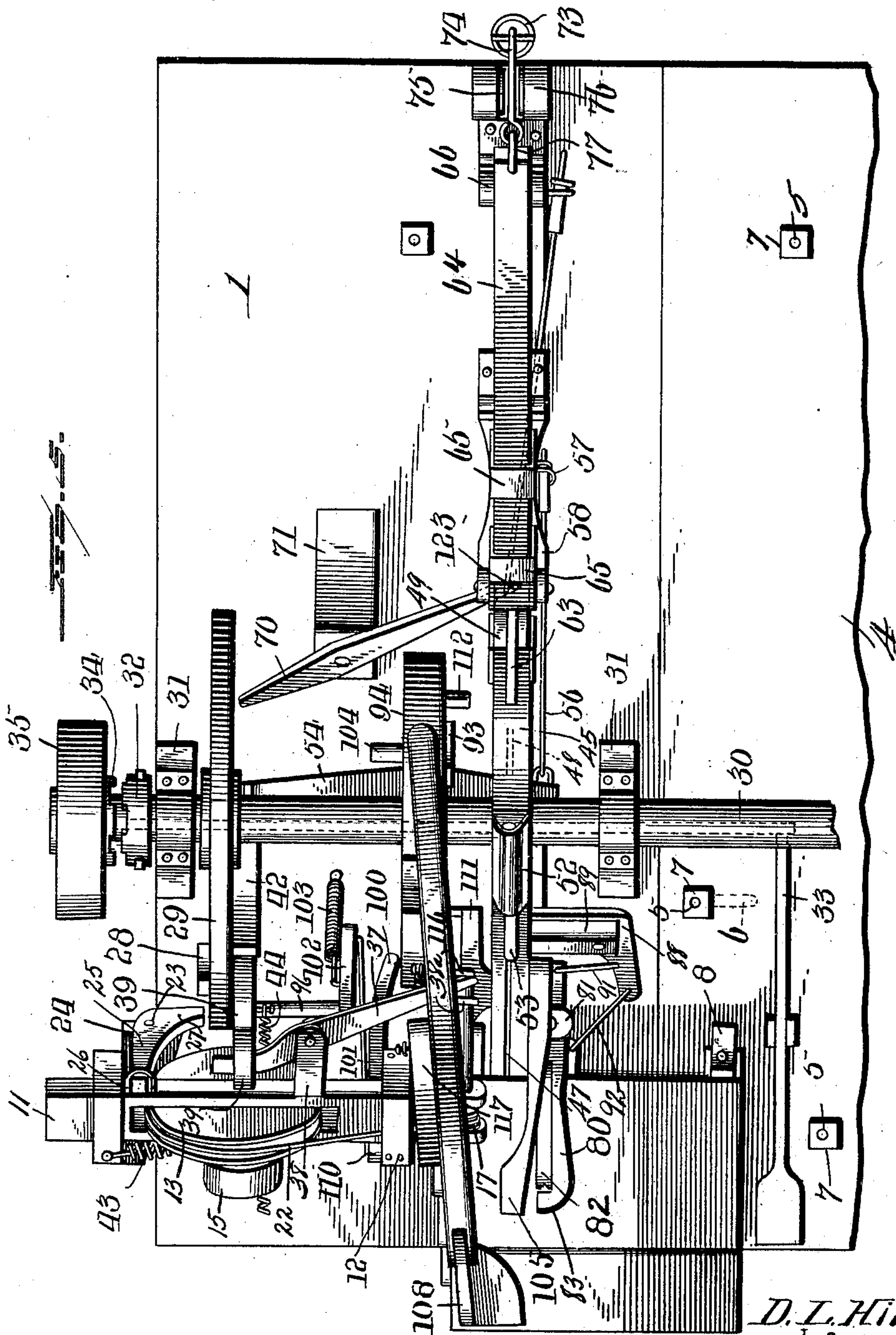
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7 Sheets—Sheet 5.



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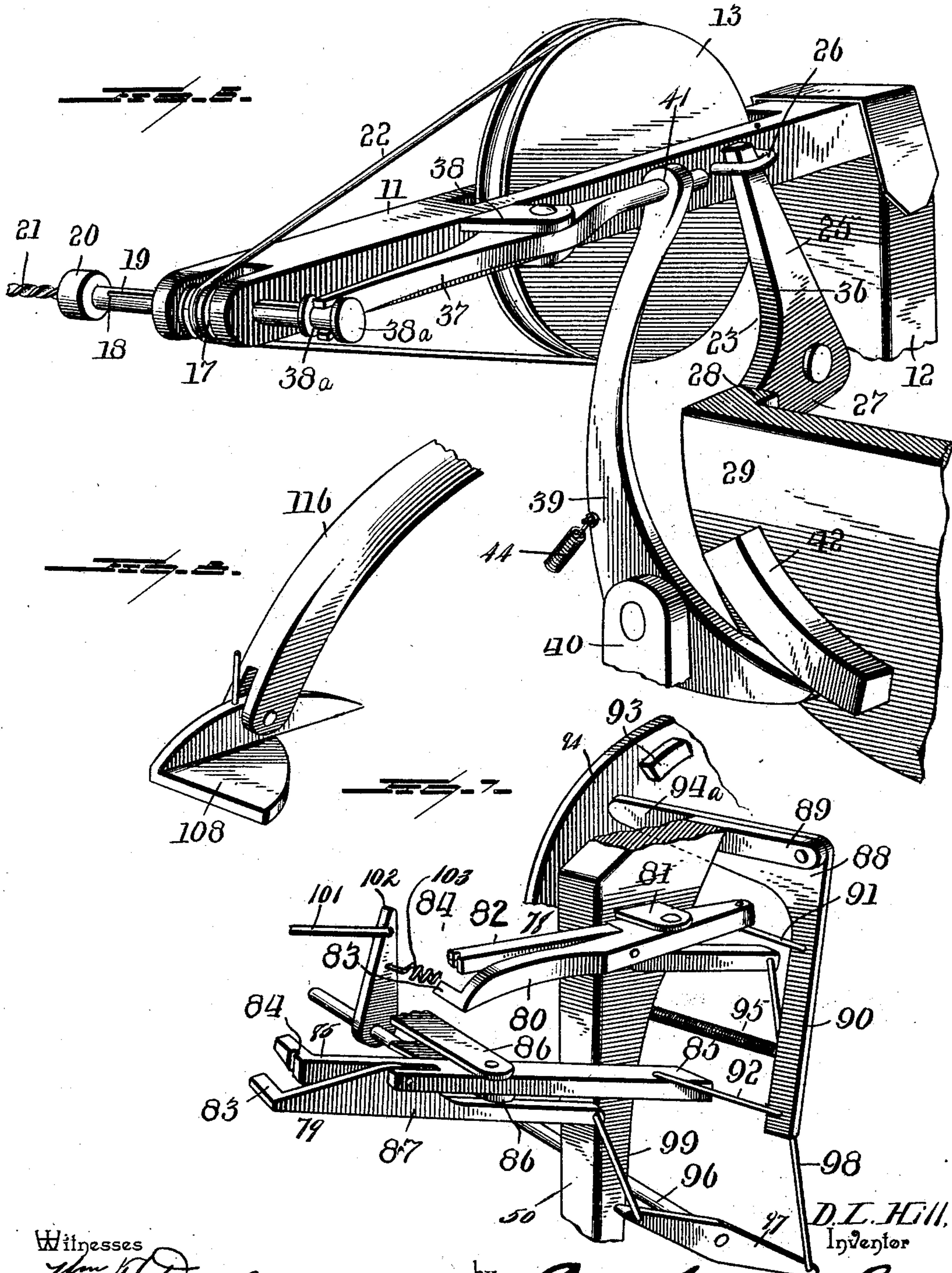
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(No Model.)

7 Sheets—Sheet 6.



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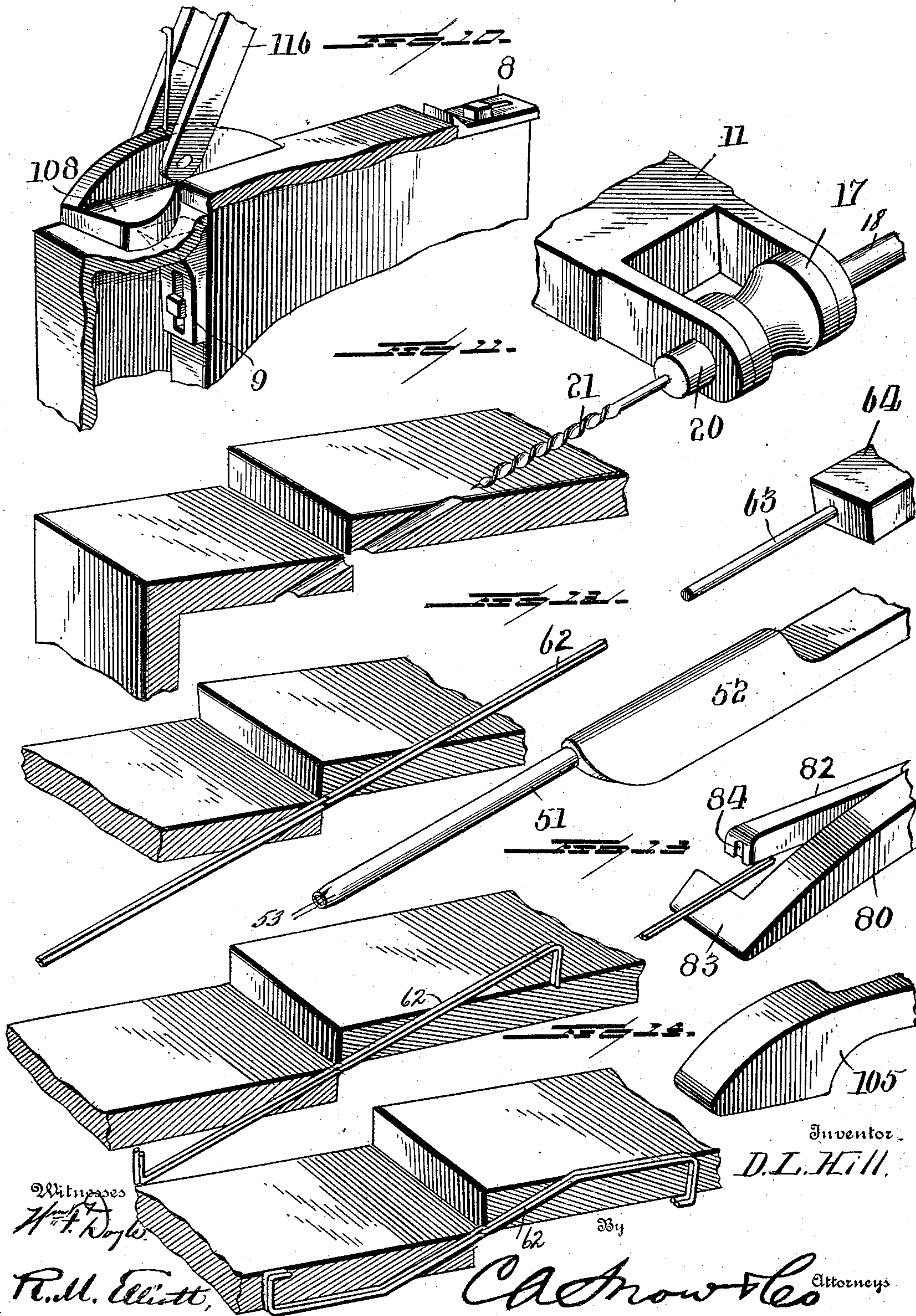
No. 693,519.

Patented Feb. 18, 1902.

D. L. HILL.
BOX HINGING MACHINE.
(Application filed Sept. 8, 1901.)

(No Model.)

7 Sheets—Sheet 7.



UNITED STATES PATENT OFFICE.

DAN L. HILL, OF KEENE, NEW HAMPSHIRE.

BOX-HINGING MACHINE.

SPECIFICATION forming part of Letters Patent No. 693,519, dated February 18, 1902.

Application filed September 6, 1901. Serial No. 74,590. (No model.)

To all whom it may concern:

Be it known that I, DAN L. HILL, a citizen of the United States, residing at Keene, in the county of Cheshire and State of New Hampshire, have invented a new and useful Box-Hinging Machine, of which the following is a specification.

This invention relates to box-hinging machines, and more particularly to that class employed for associating the hinge and lid by wire hinges, consisting of two staple-like interlocked members that are passed through the edge of the lid and of the box and have their ends upset.

The object of the present invention is to present a machine of the character specified in which the various steps necessary to accomplish the assemblage of the hinge with the box shall be mechanically effected—that is to say, in which the drilling of the holes through the lid and the box for the reception of the hinge, the insertion of the hinge within the holes thus provided, the bending down of the free ends of the hinge members, the forcing of these through the lid and the box, respectively, and the upsetting or clenching of the ends of the said members shall be accomplished solely by mechanical means and sequentially in the order named.

A further object is to provide a machine of this character in which the number of parts employed for effecting the results designed shall be reduced to a minimum and in which the parts shall be so constructed and assembled as to be of the highest durability in use and to be easy of replacement in case of damage or breakage.

The machine characterized by this invention is designed to associate both hinges with the box at the same time and will require the attendance of but one operator, a single lever operated by the foot of the operator serving to throw the coöperative mechanisms into operative position to perform in sequence the various steps of the operation.

With these and other objects in view, as will appear as the nature of the invention is better understood, the same consists in the novel construction and combination of parts of a box-hinging machine, as will be herein-after fully described and claimed.

In the accompanying drawings, forming a part of this specification, and in which like numerals of reference indicate corresponding parts, there is illustrated a form of embodiment of the invention capable of carrying the same into practical operation, it being understood that the elements therein exhibited may be varied or changed as to shape, proportion, and exact manner of assemblage without departing from the scope of the invention, and in these drawings—

Figure 1 is a view in perspective of the machine as an entirety, exhibiting a box associated therewith and a hinge passed through the lid and the box and positioned to be clenched through the lid and the box. Fig. 2 is a view in elevation, partly in section, viewed from the right-hand side of the machine. Fig. 3 is a similar view viewed from the left-hand side of the machine. Fig. 4 is a view in sectional elevation, showing certain parts hidden from view in Fig. 3. Fig. 5 is a view in top plan. Fig. 6 is a perspective detail view of the drill-frame and the mechanism coacting therewith. Fig. 7 is a fragmentary detail view in perspective of the hinge-bending mechanism, the hammers and anvils coacting therewith being omitted. Fig. 8 is a perspective detail view of a portion of a combined lid-clamp and anvil. Fig. 9 is a detached detail perspective view of the two hammers for driving the ends of the hinges through the lid and the box, respectively. Fig. 10 is a detached detail view in perspective, exhibiting the adjustable box-supports and the combined anvil and clamp for holding the box in position upon the supports. Fig. 11 is a fragmentary detail view showing the manner in which the drill forms a hole through the lid and through the box. Fig. 12 is a similar view showing the hinge positioned in the box and the lid and exhibiting also the hinge-blank carrier and the follower or plunger for forcing the blank from the carrier into the lid and box. Fig. 13 is a similar view showing the hinge after its ends have been bent to be forced through the lid and the box and showing also the blank-bending mechanism. Fig. 14 is a similar view showing the hinge after its ends have been bent and clenched into the wood of the

lid and the box and exhibiting also one of the hammers for driving a bent end of a hinge through the lid.

Referring to the drawings, 1 designates the base, which may be a floor of a room, supporting the mechanism, upon which base is rigidly secured one of a pair of box-supports 2, (clearly shown in Fig. 2,) the other support 3 being secured to an adjustable platform 4, having a sliding connection with the base and being held at any desired adjustment by bolts 5, which pass through slots 6 in the base and carry at their upper ends nuts 7, by which the platform may be secured in any desired position, the object for providing the movable platform carrying the box-support being to permit the support to be adjusted to fit any size of box to be operated upon. The box-supports carry adjustable gages 8 and 9, secured, respectively, to their upper edges and their front edges, as clearly shown in Fig. 10, by which to permit accurate adjustment of the lid and the box to the supports, while one of the supports will be provided with one or more side stops 10, (shown in Fig. 3,) by which lateral movement of the box will be obviated.

But one half of the machine is herein shown, that in this instance for securing the hinges to the left-hand side of the box, the other half of the machine being an exact duplicate of that herein shown, except that the arrangement of the parts is transposed, and as this will be readily understood detailed illustration is deemed unnecessary.

The order observed in securing a hinge to a box is as follows: An opening for the reception of the hinge is first drilled through the lid and through the box. A hinge-blank is then brought opposite the openings thus made, and a follower or plunger forces the blank into said openings. The projecting ends of the hinge-blank are then bent at right angles to their length. The bent ends of the hinge-blank are then forced respectively through the lid and through the box, and finally the bent ends of the hinge-blank are clenched into the lid and into the box. In describing the mechanism of this apparatus the construction and manner of assemblage of the elements for effecting the above results will be divided into sections under the headings indicating the parts of the machine being described and in the order named, and afterward a full and explicit explanation of the successive steps leading up to the final result will be given.

In order to avoid confusion in defining the location of parts, the term "front" will be employed to designate that part of the apparatus opposite which the operator stands, the term "rear" to designate that part of the apparatus farthest removed from the operator, and the terms "inner" and "outer" to designate the parts of the apparatus, respectively, on the right and on the left hand side of the operator.

Drilling mechanism.—The drill-frame (des-

ignated generally 11) is mounted for lateral sliding movement in bearings formed in the upper ends of two uprights 12, suitably secured to the base 1, and is disposed at an angle with relation to such support, as clearly shown in Figs. 1, 2, 3, and 4, in order to bring the drill at the proper angle with relation to the work to be operated upon. The frame comprises two spaced plates, between which is mounted a sheave 13, carried by a shaft 14, journaled in the plates, one end of the shaft (the outer one in this instance) having secured thereto a pulley 15, around which passes a belt 16, (indicated by dotted lines in Fig. 1,) which leads to a suitable source of overhead power. The means here shown for driving the sheave 13 is merely illustrative of one form of mechanism that may be employed for accomplishing this result, and for this reason it is to be understood that in connection with this part of the apparatus and with other parts thereof, hereinafter to be described, the invention is not to be limited to the precise arrangement of parts exhibited, as other forms of devices where such alternative forms are obvious and perform the desired results in the same or in substantially the same manner may be employed without departing from the spirit of the invention.

The inner end of the drill-frame is bifurcated, and between the bifurcations is mounted a sheave 17, in which is slidably mounted a drill-carrier 18, the same comprising a rod provided with a longitudinal groove 19, (clearly shown in Fig. 6,) to be engaged by a spline in the opening of the sheave, by which arrangement the drill-carrier will be free to move through the sheave, but will be caused positively to turn therewith, the front end of the drill-carrier being furnished with a chuck of any preferred construction for clamping therein a drill 21. The sheave 17 is driven from a belt or chain 22, which passes around the sheave 13, as clearly shown in Figs. 1, 3, and 5.

The mechanism for imparting lateral movement to the drill-frame to bring the drill in proper position opposite the work and for automatically bringing the drill into engagement with the work to effect drilling thereof comprises a shifting-lever 23, the same being pivoted to a shoulder or boss 24, carried by the outer box-support, the lever being approximately L-shaped in elevation, as shown in Fig. 5, and has its long arm 25 projected through a staple or bearing 26, carried by the drill-frame, the short arm 27 of the lever being disposed in the path of movement of a cam projection 28, Figs. 3, 5, and 6, carried by the outer face of a disk 29, mounted upon a shaft 30, constituting the operating-shaft, the said shaft being supported by pedestals or uprights 31, suitably bolted to the base 1. The shaft carries a slidable clutch member 32, which is adapted to be moved, through the medium of a pedal 33 and ordinary connections leading from the pedal to the member,

into engagement with a fixed clutch member 34, rigid with the shaft or with the drive-pulley 35, carried by the outer end of the shaft, this pulley being driven by a belt 35^a, leading from any suitable source of power. When the pedal 33 is depressed to bring the clutch members into operative engagement, the cam projection 28 rides down the inner curved face 36 of the shifting-lever 23, thereby projecting the lever toward the inner end of the machine and imparting thereby the requisite lateral movement to bring the drill 21 into line with the work. As the drill assumes this position it is projected toward the work through the medium of a rocking lever 37, pivoted intermediate of its ends upon a bearing 38, carried by the rear side of the drill-frame. The inner end of the rocking lever 37 is bifurcated and straddles the rear end of the drill-carrier 18, the carrier at this point being provided with two disks 38^a, which serve to keep the bifurcated ends of the lever 37 in operative relation thereto and also to form abutments against which the said ends will bear, thereby to effect positive shifting of the said carrier. The lever 37 is rocked on its bearing through the medium of a rock-lever 39, pivoted intermediate of its ends upon a standard 40, Fig. 6, secured to the base of the apparatus, the upper or longer arm of the lever 39 being provided with an opening 41 of greater diameter than and to fit over the outer end of the lever 37, whereby to permit the drill-frame to have lateral movement independently of the lever 39. The lower or short arm of the lever 39 is engaged by a cam projection 42, Figs. 5 and 6, carried by the inner face of the disk 29, and this projection is of greater length than the cam projection 28 in order that the lever 37 may be moved through an arc requisite to cause the drill to pass through the lid and through the box. The drill-frame has connected with it one end of a returning-spring 43, the other end of which is secured to the outer upright 12, as clearly shown in Figs. 1 and 5, and the lever 39 has connected with it one end of a spring 44, the other end of which is secured to the base, the latter spring serving to keep the lower end of the lever 39 always projected into the path of the cam projection 42.

Hinge-carrying mechanism.—After the drill has operated to pierce the lid and the box, as above described, the shifting-lever 23 is released from engagement with the cam projection 28 and the carrier is automatically returned to its normal position through the medium of the returning-spring 43, and the lid and box are now ready to receive the hinge. The hinge-carrying mechanism comprises a plate 45, mounted for sliding movement upon a guide or support 46, the upper face of which is provided with a groove 47 to be engaged by a spline 48, carried by the plate 45, thereby to cause the plate always to move in a right line, the rear end of the plate carrying two yokes or guides 49, adapted to embrace the

rear portion of the support 46, whereby the said support and the plate are held operatively assembled. The support 46 is provided with a vertical member 50, Figs. 1 and 2, which is securely bolted in this instance to the outer box-support, the guide 46 being disposed at an angle to the said vertical member corresponding to the angle assumed by the drill with relation to the work, and by this arrangement the hinges are readily inserted within the openings formed in the lid and the box. The front end of the plate 45 carries a hinge-carrier, comprising a tube 51, suitably held assembled with the plate 45 by a yoke or strap 52, (clearly shown in Fig. 2,) the front end of the hinge-tube 51 being formed with resilient fingers 53, Fig. 12, normally flexed inward and operating to hold the hinge from dropping out of the tube. The means for projecting the hinge-tube into the opening made in the lid of the box comprises a rocking lever 54, pivoted intermediate of its ends upon a block or standard 55, secured to the base, the outer end of the lever being projected in the path of movement of the cam projection 42 on the disk 29, as clearly shown in Fig. 4. The inner end of the lever 54 has connected with it in any suitable manner a rod 56, the other end of which passes through a keeper 57, carried by an approximately vertically disposed lever 58, the lower end of which is hinged to the base, as at 59, and its upper end is bifurcated and straddles the rear yoke 49 of the support 46, and is provided in its bifurcated portions with slots 60, through which passes a pin 61, the latter serving to hold the lever 58 associated with the said guide. Now as the disk 29 rotates the cam projection 42 will engage with the outer end of the lever 54 and push its inner end toward the front of the machine, thereby drawing upon the rod 56, which latter rocks the lever 58 toward the front of the machine, bringing the hinge-tube, which has previously been supplied with a hinge, in line with the openings in the lid and in the box. The hinge 62, as shown in Figs. 12, 13, and 14, consists of two lengths of wire bent upon themselves at the center to present a staple-like structure, the two staples being associated at their joints, as clearly shown in said figures. The hinge being in this position, the mechanism for inserting it into the lid and the box with the joint disposed at the meeting edges of the lid and the box, as shown in Fig. 12, is now brought into play and will be explained.

Hinge-inserting mechanism.—The mechanism for inserting the hinge within the lid and the box comprises a plunger 63, carried by a plate 64, the same being associated for sliding movement independently of the guide 46 and of the plate 45 by yokes 65, secured to the rear end of the plate 45, as clearly shown in Figs. 1, 2, 3, and 4, there being a groove provided in the upper face of the plate 45 to be engaged by a spline in the under face

of the plate 64 to cause the latter to move in a predetermined direction. As the disposition of the groove and spline will be readily understood, detailed illustration is deemed unnecessary.

The means for projecting the plate 64 forward to cause the plunger 63 to force the hinge from the hinge-tube and into the openings provided for its reception in the lid and in the box comprises a vertical rock-lever 66, the lower end of which is pivoted to the base of the apparatus, in this instance by a hinge 67, the upper end of the lever being bifurcated to straddle the plate 64, a pin 68, passed through the rear end of the plate 64 and through slots 69 in the bifurcated portion of the lever, serving to hold the parts in operative relation to each other. The lever 66 is swung toward the front of the machine through the medium of a rocking lever 70, pivoted intermediate of its ends upon a standard 71, secured to the base of the apparatus, the outer end of the lever being disposed in the path of movement of the cam projection 42 and the inner end of the lever having connected with it one end of a rod 72, the other end of which is suitably connected with the lever 66. It will be seen that when the cam projection 42 engages with the lever 54 the hinge-tube will be projected forward to its operative position, while the plunger 63 remains stationary, and by reason of the timing of the parts by the time the hinge-tube has reached its operative position the lever 70 is then actuated to project the plunger into the hinge-tube and force the hinge to its seat. At the instant this is effected the lever 70 is released from engagement with the cam projection 42, whereupon the parts carrying the hinge-tube and the plunger are automatically returned to their normal position or that shown in Figs. 1 to 5. The means for returning these parts after operation consists in this instance of a coiled spring 73, one end of which is secured to the base of the apparatus and the other end has connected with it a rope or chain 74, which is passed over a sheave 75, carried by an upright 76, the free end of the flexible connection 74 being secured to a ring or projection 77, carried by the rear end of the plate 64. While a spring is herein shown for returning the described parts to their normal positions, it will be obvious that a weight may be employed in lieu of the spring and still be within the scope of the invention. The hinge being now seated in the lid and the box it is essential that the protruding ends thereof should be bent at right angles to the length of the hinge in order that they may be driven through the lid and the box and subsequently be clenched, thereby effectively preventing separation of the hinge members from the parts with which they are associated. The mechanism for bending the ends of the hinges will now be described.

Hinge-bending mechanism.—Before describing the mechanism for bending the pro-

truding or terminal ends of the hinge members it must be borne in mind that one of the hinge members has its terminal projecting above the upper surface of the lid, while the other hinge member has its terminal projecting below the under surface of the back of the box, as shown in Fig. 12, so that to bend the protruding ends in opposite directions, as shown in Fig. 13, it is necessary that the bending means should be oppositely operable—that is to say, the said means must be so constructed as to bend the terminals of the two hinge members in diametrically opposite directions.

The bending mechanism comprises in part two pairs of pliers or pincers 78 and 79, respectively, supported for swinging movement in a horizontal plane, or substantially so, and having one jaw stationary with relation to the other. The pair of pliers for bending the protruding ends of the hinge in the lid comprises a lever 80, pivotally mounted between ears 81, carried by the vertical member 50 of the support 46, and a lever 82, pivoted to the lever 80 and having a rocking movement with relation thereto. The lever 80 is provided with a beveled projection 83, extending at right angles to the length of the lever and constituting a jaw upon which the protruding end of the hinge member passing through the lid will rest, as shown in Fig. 13, the lever 82 having its front end provided with a recess 84, adapted to engage the members of the said protruding ends of the hinge and thereby prevent them from spreading, so that each will be bent at exactly the same angle with relation to the length of the hinge and will be held closely assembled in parallel relation to each other. The ends of the levers 85 and 87 of the pliers 79 are constructed in the same manner as that just described, with the exception that they operate in the opposite direction from that shown in Fig. 13—that is to say, instead of the lever 85, which corresponds to the lever 82, moving downward to effect bending of the protruding end of the hinge member over the jaw the lever 87, which corresponds to the lever 80, is moved upward, as will readily be understood by reference to Fig. 7. The lever 85 is pivoted between ears 86, carried by the outer box-support, and the lever 87 is pivotally connected with the lever 85 in any preferred manner, both the levers 80 and 87 being associated with the levers 82 and 85, preferably by the usual plier-joint commonly employed. Normally the pinching or bending ends of the pincers or pliers are disposed to one side of the terminals or protruding ends of the hinge, and to effect lateral movement of the pliers to bring them under the hinge-terminals, as shown in Fig. 13, an L-shaped rock-lever 88 is provided, as clearly shown in Figs. 1, 2, and 5, the lever being pivoted to a projection 89, extending from the vertical member 50 of the support 46, the vertical arm 90 of which lever has connected with it two rods 91 and 92, the rod 91 being

connected with the rear end of the lever 80 of the pair of pincers 78 and the rod 92 being connected with the rear end of the lever 85 of the pair of pincers 79. These rods being connected with the lever 88 on the same side of its fulcrum will cause both of the pincers to move laterally in the same direction when the said lever is rocked. To effect rocking of the lever at the proper time, a cam projection 93 is provided which is carried by a disk 94, mounted upon the drive-shaft 30, as clearly shown in Figs. 2 and 5. The cam-projection 93 is a flat surface and is of such length that in passing the arm 94^a of the lever 88 it will cause the pincers 78 and 79 to move laterally to meet the hinge-terminals and to be held there until the said terminals are bent in the manner shown in Fig. 13. The lever 88 is rocked on its fulcrum against the stress of a spring 95, one end of which is secured to the arm 90 of said lever and the other end to the vertical member 50 of the support 46, so that upon release of the arm 94^a of the lever from the cam projection 93 the pincers will immediately be moved to one side, and thus away from the hinge-terminals. In order to bend the hinge-terminals to the position shown in Fig. 13, it is necessary while the stationary jaws of the pliers are under the terminals to rock the movable jaws toward each other. To effect this, there is provided a shaft 96, upon which is secured, intermediate of its ends, a rock-lever 97, to the respective ends of which are connected rods 98 and 99, respectively, the rod 98 being connected with the rear end of the lever 82 of the pliers 78, and the rod 99 with the rear end of the lever 87 of the pliers 79. To effect rocking of the lever 97, thus to cause closing of the jaws of the two pairs of pincers, a rock-lever 100 is provided, (clearly shown in Fig. 4,) which is pivoted at its bend to the inner upright 12, supporting the drill-frame, the lower end of the lever having connected with it one end of a rod 101, the other end of which is connected with an arm 102, rigidly mounted upon the shaft 96 and inclined toward the rear of the machine and being normally held in this position by a spring 103, one end of which is secured to the base of the machine and the other end to the arm 102. The tension of this spring operates normally to hold the rock-lever 97 in the position shown in Fig. 2, whereby the jaws of the pliers are held open. In order to effect closing of the jaws, thus to bend the terminals of the hinge, the outer face of the disk 94 is provided with a pin or projection 104, which is arranged in the path of the upper arm of the rock-lever 100 and upon contacting therewith will depress the arm, thereby drawing upon the rod 101, which in turn, through the medium of the arm 102, will rock the shaft 96 and with it the lever 97, thereby depressing the plier-bearing end of the lever 82 of the pair of pliers 78 and lifting the plier-bearing end of the lever 87

of the pair of pliers 79, effecting bending of the terminals of the hinge in the manner described. As soon as the bending is effected the mechanism is so timed that the rock-lever 88 is free from the cam 93 and the lever 100 is free from the pin 104, whereupon the spring 103 will exert its tension and return the pliers to their normal position or to one side of the hinge. The terminals of the hinge being thus bent are now ready to be forced through the lid and the box and to be clenched by mechanism now to be described.

Hinge-terminal seating and clenching mechanism therefor.—The terminals of the hinge are now positioned with relation to the lid and to the box as shown in Fig. 13, and to complete the operation of hinging the box it is necessary that the bent terminals should be seated in the respective parts of the box and that their ends or points should be upset or clenched into the lid and the box. To effect this, two hammers 105 and 106 are provided, and also two anvils 107 and 108 to coact, respectively, with the hammers to effect clenching of the points of the hinge-terminals. The two hammers 105 and 106 are oppositely operable for the same reason as are the pliers, and each comprises an arm having a flat outer end to contact with the bend of the hinge-terminals. The hammer 105 is carried by a shaft 110, journaled in the upper portion of the vertical support 50, said shaft carrying at its outer end a rock-lever 111, (shown in detail in Fig. 9,) the rear end of which is located in the path of movement of a pin 112, carried by the inner face of the disk 94, so that upon contact with the lever 111 by the pin 112 the said lever 111 will be raised, thereby throwing down its inner end. To this inner end of the lever is secured one end of a rod 113, the other end of which is connected to an arm 114, the outer end of which is rigidly secured to one end of a shaft 115, journaled in bearings formed in the upper portion of the outer box-support, the other end of the shaft having rigidly secured to it the hammer 106. The anvil 107, which coacts with the hammer 105, is rigidly secured to the inner side of the outer box-support, while the anvil 108 is carried by a curved arm 116, pivoted intermediate of its ends upon a curved standard 117, carried by the inner drill-frame standard and being provided with an angular head 118, bearing upon the periphery of the disk 94, being held in yielding engagement therewith by a spring 119, one end of which is secured to the arm 116 and the other end to a fixed part of the machine, preferably the base, whereby the said head will always engage with the periphery of the disk 94. The lever 111 has its front end normally held raised by a spring 120, one end of which is secured to the curved standard 117, as shown in Fig. 3, and the other end to the said lever, by which means the beveled end 121 of the lever is always held in the path of movement of the pin 112. The coaction between the arm 116 and the disk 94 serves to hold the

anvil 108 rigidly clamped upon the box, whereby the latter will be firmly seated upon the outer box-support during the operation of securing the hinge in place. The disk 94 is
 5 provided in its periphery with an angular recess 122, into which the head 118 will spring at each complete revolution of the disk 94, thereby freeing the anvil 108 from engagement with the box and permitting the same
 10 to be removed from the box-support. The manner in which driving of the terminals of the hinge through the lid and the box and the clenching of the points thereof is effected is as follows: After the pliers have been shifted
 15 laterally to one side of the hinge-terminals the lever 111 is engaged by the pin 112, whereby the outer end of the lever is depressed against the stress of the spring 120, and by reason of the rigid connection of the hammer
 20 105 with the shaft 110 this will be depressed or rocked at the same time as is the lever 111, thereby forcing the terminal of the hinge that is in the lid down through the same and the points of the terminal by engagement with
 25 the anvil 107 are deflected and bent or clenched into the wood of the lid. At the same time that the hammer 105 descends the hammer 106, through the medium of the rod 113 and arm 114, is raised, thereby forcing the terminal of the member of the hinge that is in the
 30 box through the box and the points of the terminal by engagement with the anvil 108 are deflected and bent or clenched into the wood of the lid. At the instant this is effected the head 118 of the arm 116 enters the recess 122, thereby permitting the anvil 108 to lift, and thus permit the box to be removed from its supports.

In order that the plates 48 and 64 may be
 40 returned at the same time, through the medium of the spring 73, the plate 64 is provided in front of the front yoke 65 with a stop 123, the disposition of the stop being such as upon backward movement of the plate 64
 45 to draw the plate 46 with it, thereby to move the hinge-tube back to its normal position.

It will be seen from the foregoing description that the successive operations of this apparatus are in sequence, one step beginning
 50 at the instant the preceding one is completed, so that no loss of time is involved in the operation of the machine.

As herein shown, the hinges are supplied to the hinge-tube one at a time by the operator; but it will be obvious that, if preferred, an automatic feed attachment may be combined with the hinge-tube, and as this will be obvious and well understood detailed description and illustration thereof are deemed
 60 unnecessary.

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

1. In a box-hinging machine, means for
 65 holding a box and lid in coöperative relation, means for drilling openings in the lid and the box, and means operating independently

of the drilling means for seating a hinge in the said openings.

2. In a box-hinging machine, means for
 70 holding a box and lid in coöperative relation, a drill for forming an opening in the lid and the box, means for seating a hinge in the said openings, and means for bending the terminals of the hinge members to present prongs. 75

3. In a box-hinging machine, means for
 holding a box and lid in coöperative relation, a drill for forming an opening in the lid and the box, means for seating a hinge in the
 80 said openings, means for bending the terminals of the hinge members to present prongs, and means for forcing the prongs through the lid and the box.

4. In a box-hinging machine, means for
 85 holding a box and lid in coöperative relation, a drill for forming an opening in the lid and the box, means for seating a hinge in the said openings, means for bending the terminals of the hinge members to present prongs, means for forcing the prongs through the lid
 90 and the box, and means for clenching the ends of the prongs into the said parts.

5. In a box-hinging machine, a drill having lateral movement to bring it opposite the work to be done and forward movement to
 95 cause it to effect boring of openings through the box members, a hinge-carrier movable to position in line with the openings made, and means for forcing the hinge from the carrier into the said openings. 100

6. In a box-hinging machine, a drill adapted for lateral and forward movement, a hinge-carrier movable to position in line with the openings made, and a plunger coacting with the carrier to force the hinge therefrom and
 105 seat it in the said openings.

7. In a box-hinging machine, the combination with means for holding a box and lid in coöperative relation, of the following elements each operating automatically and in the sequence named: a drill for forming an opening
 110 in the lid and in the box-body, a hinge-carrier to bring a hinge opposite the openings, a plunger to seat the hinge in the openings, means for bending the terminals of the hinge
 115 members at right angles to their length to present prongs, means for forcing the prongs through the lid and the box, and means for clenching the prong ends into the said parts of the box. 120

8. In a box-hinging machine, the combination of means for holding a box and lid in coöperative relation, means for forming an opening in the box and lid, means for presenting a hinge opposite the openings made, means
 125 for seating the hinge in the said openings, means for bending the terminals of the hinge members at an angle to their length to present prongs, means for forcing the prongs through the lid and the box, and means for clenching
 130 the prong ends into the said parts of the box.

9. In a box-hinging machine, means for holding a box and lid in coöperative relation, a laterally and forwardly movable drill, a for-

wardly-movable hinge-carrier and plunger coacting therewith, and laterally and vertically movable pliers.

10. In a box-hinging machine, means for holding a box and lid in coöperative relation, a laterally and forwardly movable drill, a forwardly-movable hinge-carrier and plunger coacting therewith, laterally and vertically movable oppositely-operable pliers, and hammer and clenching mechanism.

11. In a box-hinging machine, means for holding a box and lid in coöperative relation, a drill adapted for lateral and forward movement, a hinge-carrier movable to position in line with the openings made, means for seating a hinge in the openings, and means for bending the terminals of the hinge members to present prongs.

12. In a box-hinging machine, means for holding a box and lid in coöperative relation, a drill adapted for lateral and forward movement, a hinge-carrier movable to position in line with the openings made, means for projecting a hinge from the carrier and seating it in the said openings, means for bending the terminals of the hinge members to present prongs, means for forcing the prongs through the lid and the box, and means for clenching the ends of the prongs into the said parts.

13. In a box-hinging machine, a drill for forming an opening in the lid and the box, means for seating a hinge in the said openings, means for bending the terminals of the hinge members to present prongs, means for forcing the prongs through the lid of the box, and anvils against which the points of the prongs are forced, thereby to effect bending and clenching of the said points.

14. In a box-hinging machine, a support for holding the box lid and body at right angles to each other, in combination with a drill disposed at an angle to the support and operating to drill an opening through the box-lid and the box-body, means for seating a hinge in the said openings with its joints between the meeting edges of the lid and the box, and means for firmly securing the terminals of the hinge to the lid and to the box-body.

15. In a box-hinging machine, means for holding a box and lid in coöperative relation, a drill and means for moving the drill laterally to boring position, in combination with means operating automatically to project the drill into the work, to withdraw it therefrom, and to return it to its normal position.

16. In a box-hinging machine, a laterally-movable drill and means operating automatically to project it into the work, to withdraw it therefrom and to return it to its normal position, in combination with means operating automatically and independently of the drill to insert a hinge in the openings formed by the drill.

17. In a box-hinging machine, a laterally-movable drill and means operating automatically to project it into the work, to withdraw

it therefrom, and to return it to its normal position, in combination with means operating automatically to insert a hinge in the openings formed by the drill, and to seat and clench the terminals of the hinge members within the lid and the box.

18. In a box-hinging machine, the combination with a laterally and forwardly movable drill, of forwardly-movable hinge feeding and seating mechanism, laterally and vertically movable mechanism for bending the terminals of the hinge members into prongs, rocking means for driving the prongs through the lid and the box, and stationary means for clenching the ends of the prongs into the parts of the box.

19. In a box-hinging machine, means for holding a box and lid in coöperative relation, a frame, a laterally-movable drill carried thereby and disposed at right angles thereto, a rotary disk carrying a cam projection, and a rock-lever operatively connected with the drill-frame and having a part arranged in the path of the cam projection.

20. In a box-hinging machine, means for holding a box and hinge in coöperative relation, a drill, a supporting-frame therefor and movable at right angles thereto, a rotary disk carrying a cam projection, a rock-lever operatively connected with the drill-frame and having a part arranged in the path of the cam projection, a pivoted arm carried by the frame and having one end operatively connected with the drill-carrier, and a second rock-lever operatively connected with the other end of the arm and having a part arranged in the path of movement of a second cam projection on the disk.

21. In a box-hinging machine, means for bending the terminals of the hinge members at right angles to each other, comprising two pairs of pliers, one lever of each of which is mounted for swinging movement in a horizontal plane, and each of the other levers mounted for movement in a vertical plane, the forward ends of the latter levers, by coaction with projections carried by the forward ends of the first-named levers, effecting bending of the hinge terminals, a rotary disk carrying on one side a cam projection, and on the other side a pin, a rock-lever having one member arranged in the path of the cam projection and the other member connected by interposed mechanism with the swinging levers, whereby upon rocking, the lever will impart lateral movement to the pairs of pliers, a rock-lever having a part in the path of the said pin, and connections between the latter rock-lever and the vertically-movable levers whereby to cause bending of the ends of the hinge-terminals.

22. In a box-hinging machine, the combination with a drill, of a hinge-carrier comprising a plate supported at an angle coincident with that of the drill, a tube carried by the lower end of the plate in which the hinge-blank is placed, and means for moving the hinge-car-

rier to and from the work, comprising a hinged support having its upper end operatively connected with the plate, a rotary disk carrying a cam projection, and a rock-lever having one end arranged in the path of the said projection, and its other end operatively connected with the said support.

23. In a box-hinging machine, the combination with a drill, of a hinge-feeder and hinge-seater comprising a fixed support disposed at an angle coincident with that of the drill, a plate mounted for sliding movement on the support, a tube carried by the lower end of the plate in which the hinge-blank is placed, a second plate mounted upon the tube-carrying plate and adapted for movement independent thereof, a plunger carried by the second plate and adapted to enter the said tube to force the hinge-blank therefrom, means for projecting the hinge-feeder and hinge-seater, comprising two hinged supports operatively connected with the respective plates, a disk bearing a cam projection, two pivoted rock-levers, the outer ends of which are arranged in the path of the said projection, and the inner ends of which are operatively connected with the two hinged supports, and means connecting with the plunger-carrying plate to effect automatic return of the two plates.

24. In a box-hinging machine, a combined clamp and anvil, comprising a pivoted arm, one end of which carries the anvil and the other end a head, and a rotary disk normally bearing against the head to hold the anvil depressed, and provided with a recess into which the head will spring to permit the anvil to rise and thus release the box.

25. In a box-hinging machine, the combination of a drill, a hinge feeding and seating device, and oppositely-operable pliers for bending the terminals of the hinge into prongs.

26. In a box-hinging machine, the combination of a drill, means for automatically projecting the same into position for operation, automatically-operating means for seating a hinge in the openings formed by the drill, automatically-operating means for bending the terminals of the hinge into prongs, and automatically-operating means for forcing the prongs through the appropriate portions of the box and for clenching the same.

27. In a box-hinging machine, means for holding a box and lid in coöperative relation, a drill for forming an opening in the lid and the box, means for inserting a hinge in the openings made, and laterally-shiftable pliers for bending the terminals of the hinge to present prongs.

28. In a box-hinging machine, means for holding a box and lid in coöperative relation, a drill for forming openings in the box and the lid, means for conveying a hinge into alinement with the openings made, and means for projecting the hinge into the opening, in combination with means for bending the ter-

minals of the hinge to present prongs, and for forcing the prongs through the parts of the box and clenching the same.

29. In a box-hinging machine, means for holding a box and lid in coöperative relation, a drill for forming openings in the parts, a carrier for conveying a hinge to the openings made, an independently-operable plunger for projecting a hinge from the carrier into the opening, and means for automatically returning the carrier and the plunger to their normal positions.

30. In a box-hinging machine, means for holding a box and lid in coöperative relation, a pair of pliers normally disposed to one side of the work-holding means, and having its plier-bearing ends normally separated, and in combination with means operating automatically to shift said ends laterally to bring them into operative position and vertically to close the same, and then to return the pliers to their normal position.

31. In a box-hinging machine, a two-part box-support, one of which is fixed and the other movable, in combination with a combined clamp and anvil coöperating with the fixed part and comprising a pivoted arm, one end of which carries the anvil and the other end a head, and means for bringing the anvil into and moving it out of engagement with the box to be operated upon.

32. In a box-hinging machine, means for holding a box and lid in coöperative relation, a drill adapted for lateral and forward movement, a hinge-carrier movable to position in line with the openings made, a plunger coacting with the carrier to force the hinge therefrom and seat it in the said openings, and laterally-movable pliers for bending the terminals of the hinge to present prongs.

33. In a box-hinging machine, the combination with means for holding a box and lid in coöperative relation, of the following elements each operating automatically and in the sequence named: a laterally and forwardly movable drill for forming an opening in the lid and in the box-body, a reciprocatory hinge-carrier to present a hinge opposite the openings made, a reciprocatory plunger to force the hinge from the carrier and to seat it in the said openings, laterally and vertically movable pliers for bending the terminals of the hinge members at right angles to their length to present prongs, hammers for forcing the prongs through the lid and the box, and anvils for clenching the prong ends into the said parts of the box.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

DAN L. HILL.

Witnesses:

LEWIS W. HOHNA,
EARL G. B. HILL.