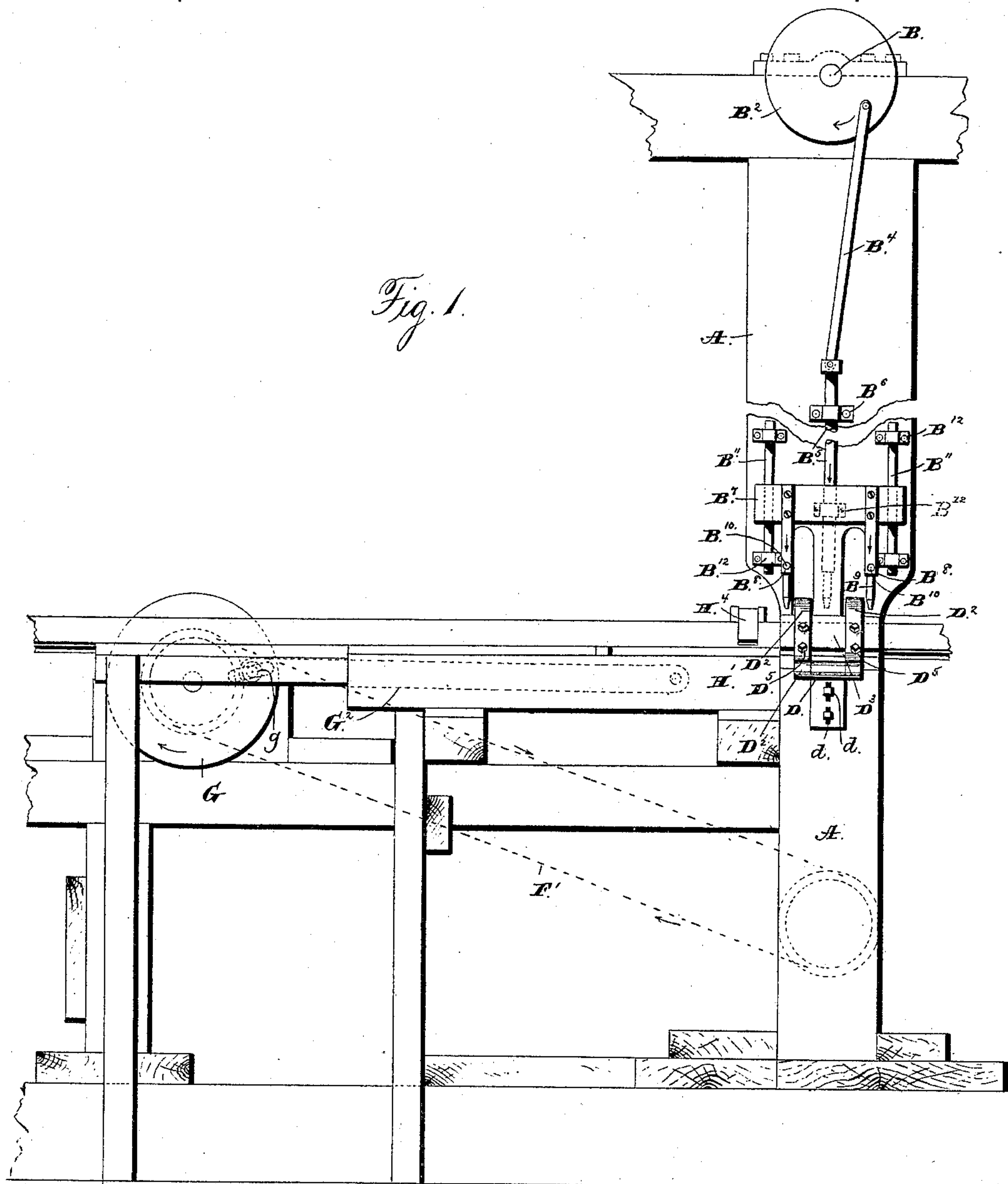


6 Sheets—Sheet 1.

Patented Mar. 25, 1890.



Witnessed:
Jas C Hutchinson
Chas J Williamson

Inventor.
August M. Schilling, by
Chindle and Russell, his Attys

(No Model.)

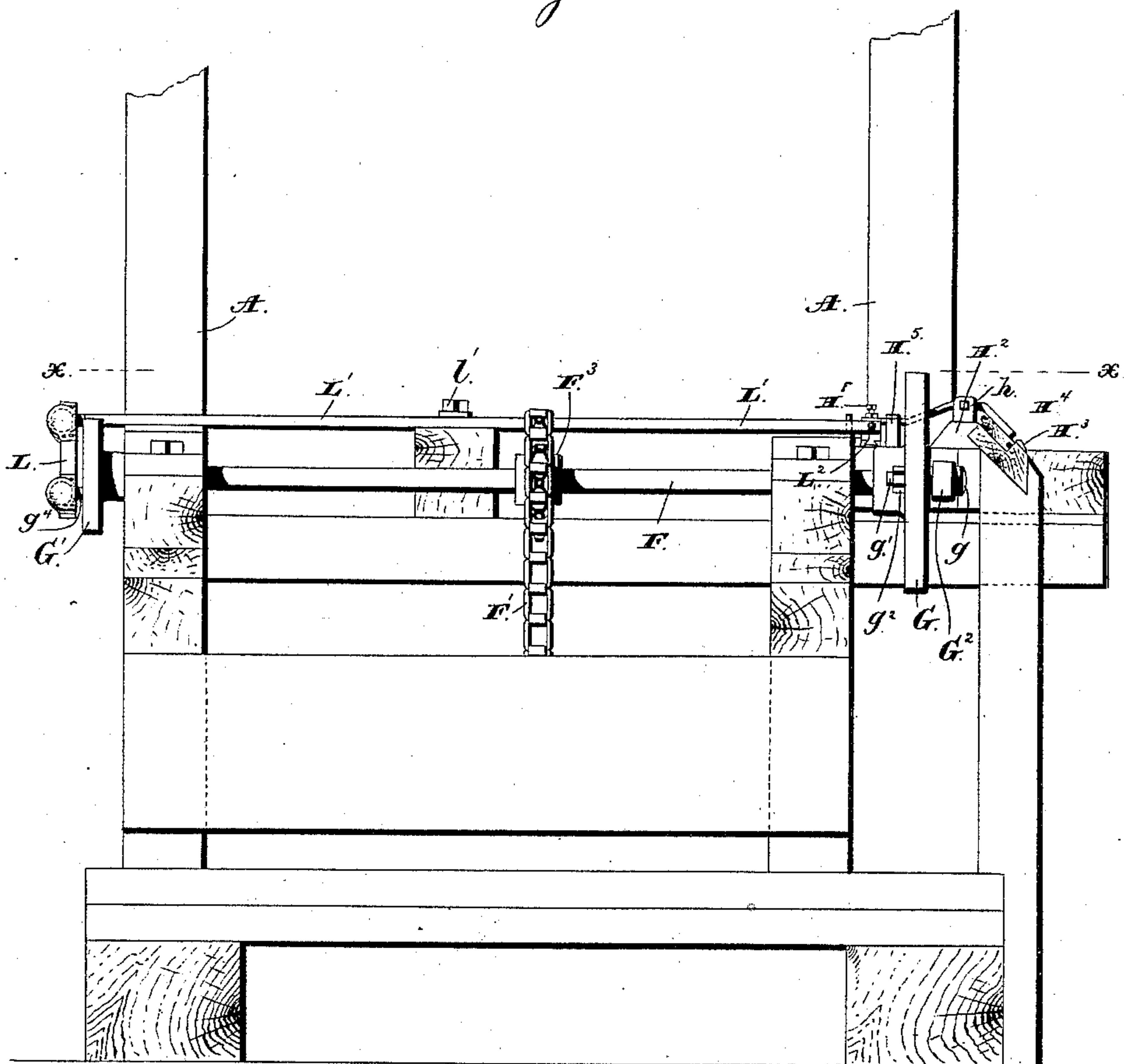
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A. M. SCHILLING.
MACHINE FOR PUNCHING HOLES.

No. 424,358.

Patented Mar. 25, 1890.

Fig. 2.



Witnesses:

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Chas. J. Williamson.

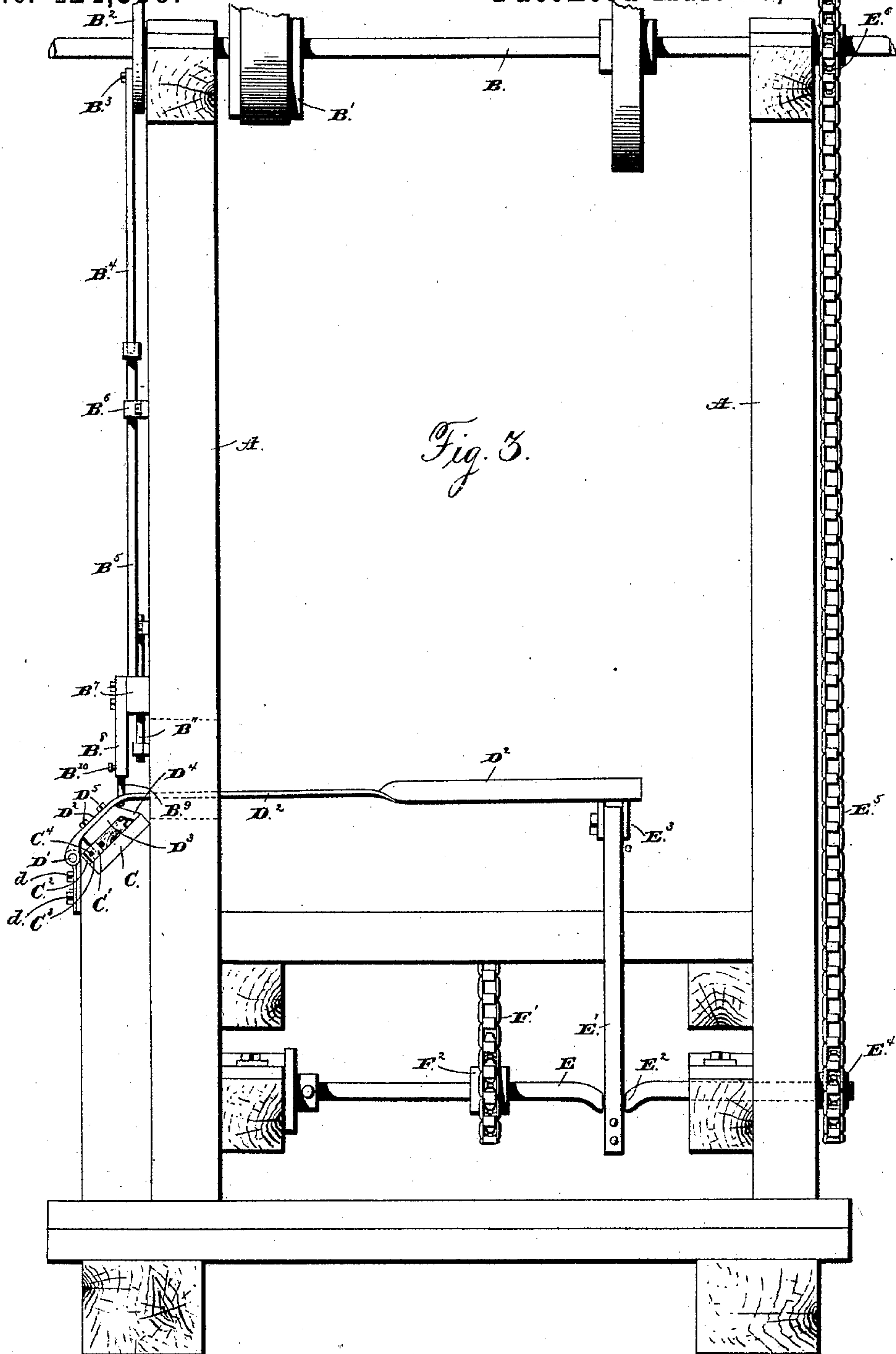
Inventor.

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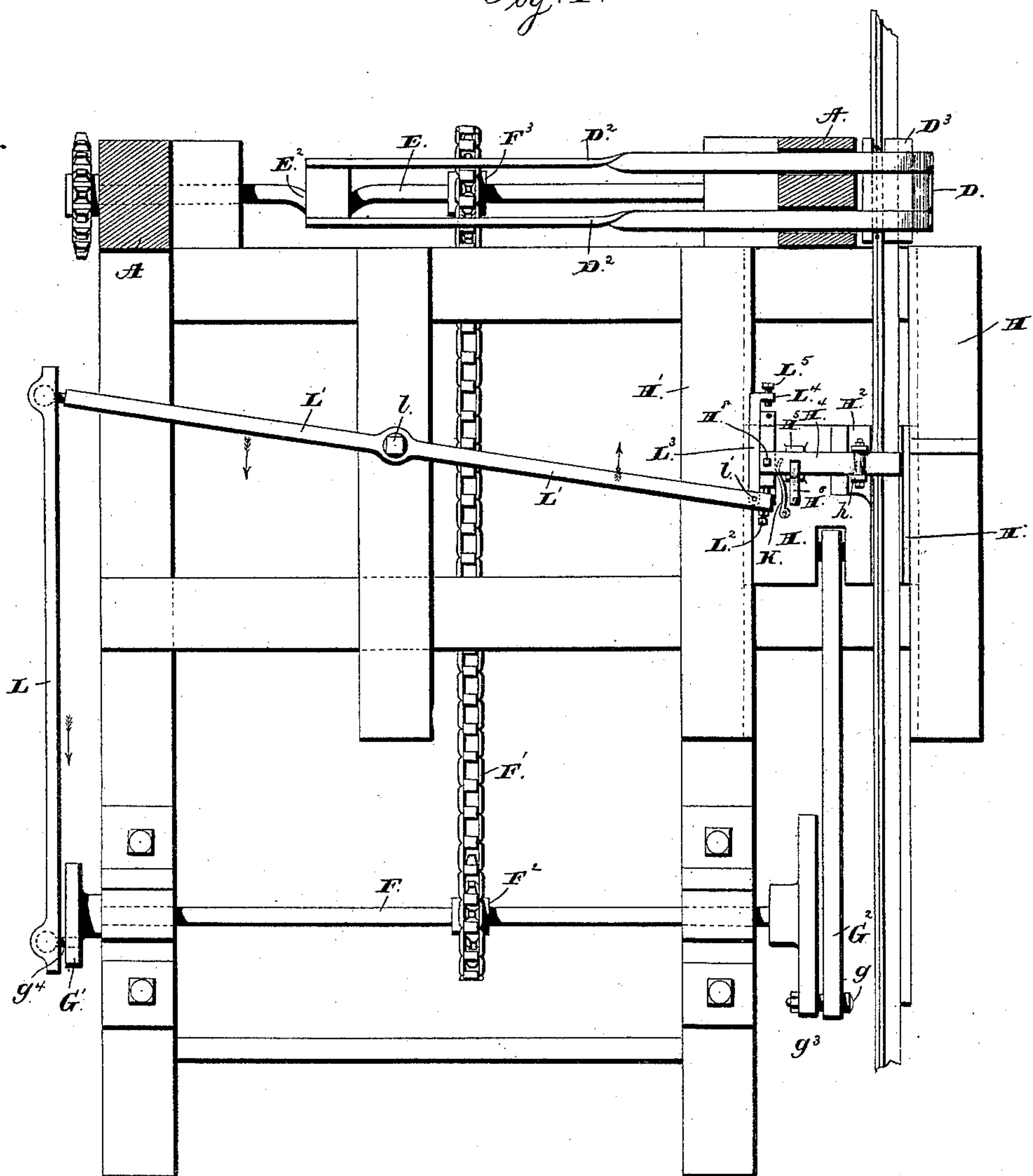
6 Sheets—Sheet 4.

A. M. SCHILLING.
MACHINE FOR PUNCHING HOLES.

No. 424,358.

Patented Mar. 25, 1890.

Fig. 4.



Witnesses:

Jas. E. Hutchinson.
Chas. Williamson.

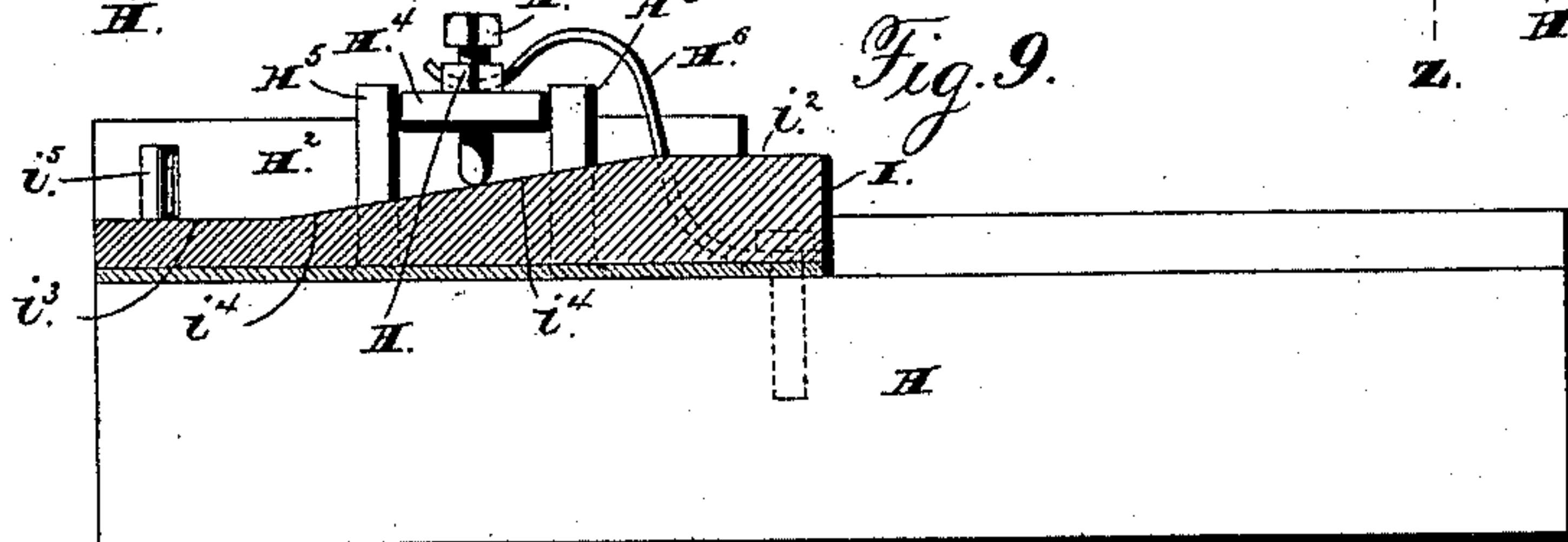
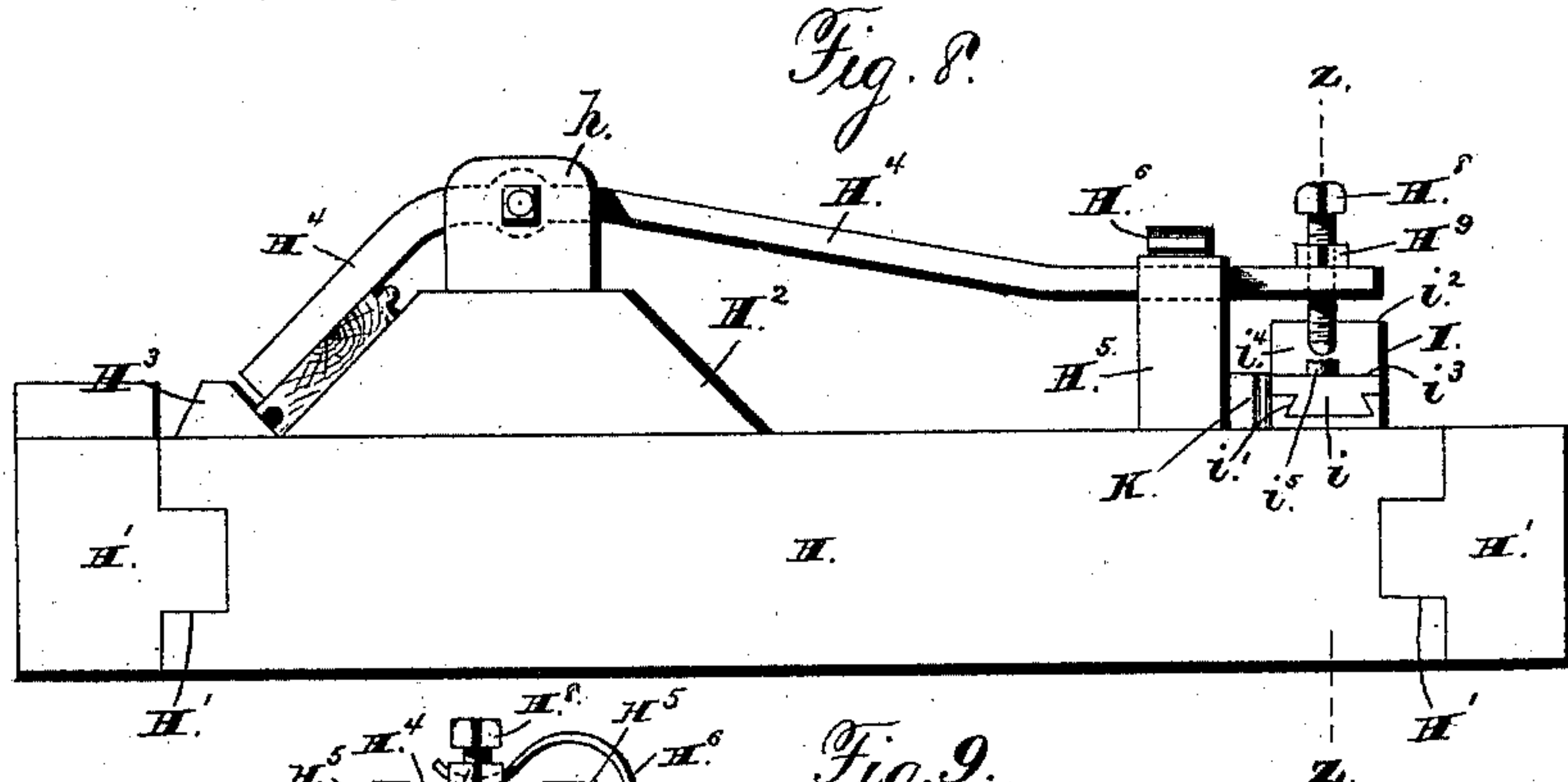
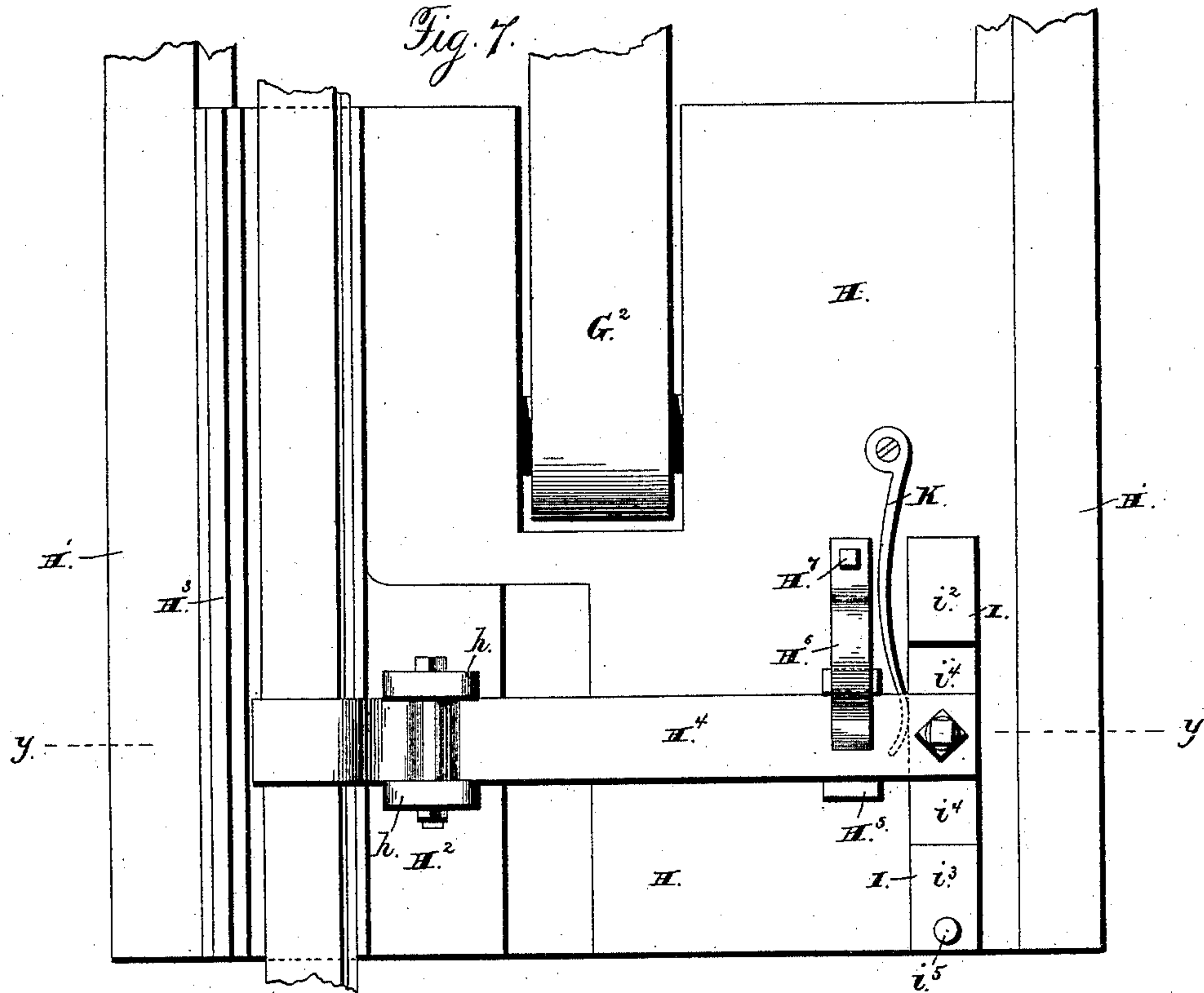
Inventor.

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Witnesses:

Jas E. Hutchinson.
Chas J. Williamson.

Inventor.
August M. Schilling, by
Crindle and Russell, his Attys

UNITED STATES PATENT OFFICE.

AUGUST M. SCHILLING, OF CHICAGO, ILLINOIS.

MACHINE FOR PUNCHING HOLES.

SPECIFICATION forming part of Letters Patent No. 424,358, dated March 25, 1890.

Application filed May 28, 1889. Serial No. 312,089. (No model.)

To all whom it may concern:

Be it known that I, AUGUST M. SCHILLING, of Chicago, in the county of Cook, and in the State of Illinois, have invented certain new and useful Improvements in Machines for Punching Holes; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 shows a view of my machine in front elevation; Fig. 2, a view of the same in end elevation, showing the feed end of the machine; Fig. 3, a similar view looking at the discharge end; Fig. 4, a plan view of the machine, with the driving-shaft-supporting upright shown in section on line *xx* of Fig. 2; Fig. 5, a detail view in end elevation of the holding-clamp on an enlarged scale; Fig. 6, a detail plan view of such clamp; Fig. 7, a detail plan view on an enlarged scale, showing the operation of the feed-clamp mechanism; Fig. 8, a view of a section on line *yy* of Fig. 7, and Fig. 9 a view of a section on line *zz* of Fig. 8.

Letters of like name and kind refer to like parts in each of the figures.

The object of my invention is to provide an improved punching-machine especially intended for punching nail-holes in wooden flooring-strips, but also adapted for use in punching holes in other materials to be used for other purposes; and to this end my invention consists in the machine and in the construction, arrangement, and combination of the parts thereof, as hereinafter specified.

In my application, Serial No. 302,704, for United States Patent I show and describe a flooring strip or plank provided with nail-receiving holes of a peculiar shape extending down at an angle into the strip from one side thereof.

It is the special object of my present invention to provide a machine for punching such holes in the strips or planks; but I desire it to be understood that the machine is adapted for use in punching other holes than the square or rectangular ones described in my said application. By a simple change in the punch or punches used the machine can be arranged to make any shaped holes in strips, bars, or planks of any required material.

While, then, describing the machine as adapted for punching the square or rectangular holes in wooden flooring-strips, I do not intend to limit myself to such particular use or adaptation of the machine.

As the supporting frame or bed of my machine can be varied in construction as desired, I need not go into its details of construction.

Journaled in bearings on the upper ends of the upright beams *A A* is the shaft *B*, provided with the driving-pulley *B'* for receiving a driving band or belt connected with any desired source of power. On one end of this shaft, close to the outer face of one of the uprights *A*, is a crank-wheel *B²*, provided with a crank-pin *B³*, to which is pivotally connected the upper end of the connecting-rod or pitman *B⁴*, whose lower end is pivotally connected with the vertically reciprocating bar *B⁵*. Near its upper end this bar passes through and is guided in its reciprocations by the guide cleat or block *B⁶*, attached to the upright *A*. On the lower end of the bar is a cross-head *B⁷*, carrying the two punch-bars *B⁸ B⁸*, adapted at their lower ends to receive punches *B⁹ B⁹* of any desired shape. As indicated, each punch is to be fastened in place in its respective bar by means of a set-screw *B¹⁰*, engaging the shank of the punch within a socket in the bar. Such an arrangement is desirable as providing for change of the punches and their adjustment with reference to the bars, so as to regulate the depth of the holes punched.

The cross-head *B⁷* can be guided in any desired way without departure from my invention, while I prefer the way and means shown in the drawings. Attached to or carried by the head at its opposite ends are the bars *B¹¹ B¹¹*, extending above and below the head. Engaging each of such bars above and below the head, respectively, are two guide-blocks *B¹² B¹²* on the same upright beam *A* with the guide-block *B⁶*, which engages and guides the bar *B⁵* near its upper end, as already set forth.

I contemplate where it is desired to punch but one hole at a time placing but one punch-bar and punch on the cross-head *B⁷*, or dispensing with such head and placing the single punch or punch-holder directly upon the lower

end of the reciprocating bar B^5 . In such case a guide-block B^{12} should be provided, as indicated in dotted lines in Fig. 5, to engage and guide the bar near its lower end.

5 Suitably supported upon the frame of the machine close to the upright A, below the cross-head B^7 and the punch or punches carried thereby, is a support C for the strip or plank to be punched. Such support has
10 its face inclined upward and inward at an angle to the plane of travel of the punch-carrying head B^7 , so that a plank or strip resting upon it will present its inner edge in position for the punch or punches to strike
15 down into it in the desired direction, inclined to the upper and lower faces of the strip. The angle of inclination of the strip-supporting surface with reference to a horizontal plane depends upon the angle at which the
20 desired nail-holes to be punched are to stand with reference to the upper or lower face of the strip or plank. As shown in the drawings, the strip-supporting surface extends upward and inward toward the plane of the
25 travel of the punch-head at an angle of about forty-five degrees, though I do not, of course, desire or intend to limit myself to such angle of inclination. For supporting the lower
30 edge of the strip resting on support C, I provide the block or abutment C' , attached to support C, and preferably made adjustable toward and from the upper end of the inclined surface of the support, so as to adapt it for
35 holding strips of different widths in such way as to bring their upper edges or sides properly in the path of the punch or punches.

As shown, the support C consists of a plate or flat block of metal having an upwardly and outwardly extending lug C^2 at its lower
40 edge, to which the block C' is to be adjustably fastened. Arms C^3 C^3 on the block extend on opposite sides of the lug C^2 , and are provided with set-screws C^4 to engage the same. While
45 I show and describe such adjustable connection between the block C' and lug C^2 , I do not limit myself thereto, as any form of adjustment or adjustable support for the block can be used without departure from my invention.

50 Held in a socket or bearing D, at the lower outer side or edge of the plate forming support C, is a short shaft D' , upon which, on opposite sides of bearing D, are pivoted the outer ends of the spring-levers D^2 D^2 , which
55 extend upward and inward over the support C, and then inward or rearward through suitable upright slots in the upright A. At their inner ends, beyond such upright, they are both connected with the upper end of a connecting-
60 rod, to be described hereinafter. These spring-levers bear upon the under side of their inclined portions above support C, a plate D^3 having its under side inclined to correspond substantially with the inclination of such
65 support, and at its upper and inner end provided with a downwardly and rearwardly inclined portion D^4 , adapted to project down

over the upper and inner edge of a plank or strip resting on support C. The plate D^3 is preferably attached to the spring-levers D^2 70 D^2 by means of screws D^5 D^5 , two for each lever, as such form of attachment allows of adjustment of the plate with reference to the levers and the inclined face of support C. The inclined under and inner face of the 75 portion D^4 of the plate is so situated as to be in contact with the upper edge of the strip or plank to be punched when said edge is in proper position with reference to the path of the punch or punches used. As it 80 is inclined it will, by its engagement with the plank or strip edge, tend to move it into its proper position and seat the lower edge or side of the strip or plank against the abutment C' as the levers D^2 D^2 are moved toward 85 support C. The plate D^3 forms then a clamping-jaw to clamp and hold a strip or plank firmly in place on support C. Carried and actuated as it is by the spring-levers D^2 D^2 , it forms, with support C, a clamp or holder 90 which can adapt itself to variations in thickness and shape of the strips being operated upon. Power applied to the spring-levers to force the plates toward the strip-supporting surface causes such plate to engage the strip 95 firmly, but with a yielding pressure. The strip, if of wood, can by these clamping devices be held securely without danger of marring or injuring its upper or lower side, as where rigid or unyielding clamping-jaws 100 or toothed feed-wheels are used to hold the strip in place while being punched. If desired, the plate D^3 can be made of wood or of some semi-elastic or elastic material hard enough to secure a good hold upon a plank 105 or strip being clamped; but with the spring-levers carrying the plate the latter can be made of metal or other hard material without danger of marring either surface of the plank or strip. The levers will allow the plate to 110 yield enough so as to accommodate any slight variation in thickness or shape of the plank or strip.

As it is desirable to have the machine capable of being adapted to work upon strips or 115 planks of different thickness, the socket D or bearing which supports the pivot D' of the clamp-levers D^2 D^2 is made adjustable, so as to raise or lower the lever-pivot with reference to the inclined plank-supporting surface 120 of support C. For this purpose the socket or bearing D is fastened to its support, as shown, by set-screws d d , passing through vertical slots d' in a downward extension of such socket. The raising or lowering of the pivot 125 of the clamp-levers by the adjustment of the socket brings the clamping-plate D^3 further from or nearer to the inclined face of the plank-receiving support C, so as to adapt the clamp for thicker or thinner strips or planks. 130 The plate D^3 is preferably extended beyond the outer sides of the levers D^2 , in order to give as much bearing-surface to engage the clamped strip or plank as possible. To admit

the passage of the two punches, the upper and inner corners of the plate are cut away, as shown in Fig. 5, while for the passage of the single form of punch, where such is used, there is a notch in the edge of the plate midway between the two clamp-levers.

For operating the levers to make the plate D³ clamp and release a strip resting upon block C, I provide the crank-shaft E, supported in suitable bearings on the frame of the machine parallel to the driving-shaft, but below the ends of the levers. A connecting-rod or pitman E' is connected at one end with the crank E² on this shaft and at the other with a head E³, attached to the two levers D² D². On such shaft is a driving sprocket-wheel E⁴, driven by a sprocket-chain E⁵, passing over the sprocket-wheel E⁶ on driving-shaft B. With the crank-shaft for operating the clamp-levers thus driven from the same shaft which carries the crank-wheel B², which actuates the punch-carrying head, the proper relative timing of the clamping and punching operations can be insured.

In order to secure the proper feeding of the planks or strips being punched, so that the holes made will be the desired distance from each other, I provide the following mechanism, which takes the place of the old spur or toothed feed-wheels, which necessarily marred either one or both sides of a wooden strip, and were, from the wearing out of the spurs or teeth, liable to become uncertain and irregular in their feeding action. As it is desirable that the clamping or holding and the feeding devices should always act in the proper relative times, I drive the shaft F for actuating the feeding mechanism from the crank-shaft E by means of a sprocket-chain F', engaging sprocket-wheels F² and F³ on the respective shafts. On the front and rear ends, respectively, of shaft F are the crank-wheels G G'. The former of these two wheels is provided with a crank-pin g, which is made adjustable to and from the center of the wheel, for a purpose to be described. Such adjustment can be secured, as indicated in the drawings, by slotting the wheel radially and providing the pin g with a threaded portion g', projecting through the slot and having a nut g² on its inner end. With the pin provided with a shoulder, as at g³, to overlap the sides of the slot in the wheel, when the nut g² is tightened up, the pin will obviously be clamped firmly in any adjustment along the wheel-slot. Pivoted upon this pin g is one end of the pitman or connecting rod G², whose other end is pivotally connected with the horizontally-reciprocating head H, guided at its sides in the ways H' H', suitably supported on the machine-frame, so that the head in its reciprocations moves toward and from the holding-clamp and support for the strip or plank being punched, described hereinbefore.

Upon such head is a block H², extending along the top thereof in the direction of the reciprocation of the head. The front side of

such block is made inclined upward and inward in the same plane with the inclined strip-receiving face of support C of the holder-clamp, described hereinbefore. With this construction a strip or flooring-plank resting or held against the inclined front side of block H² will be supported at the proper angle and in the proper position to be moved over and in close contact with the inclined face of support C when the head H is moved toward such support. A second longitudinally-arranged block or strip H³ on head H in front of the lower edge of the inclined front side of block H² serves to engage the lower edge of a plank or strip resting upon such side of the block. The rear or inner side of block H³ is made inclined upward and outward at a right angle to the plane of the plank-receiving side of block H², so as to engage the lower edge of the plank squarely, as shown in Figs. 7 and 8.

I contemplate making the guide-block H³ adjustable on head H to and from block H², so as to adapt it for properly guiding planks or strips of different widths with their upper and inner edges always in the same plane, so that such edges will, as they reach the holding-clamp below the punch, be in the proper or desired position with reference to the punch.

The adjustment of the block H³ is to agree with that of the block C' on the holding-clamp described hereinbefore, so that the plank-engaging faces on the two blocks will be in line with each other or in the same plane.

Pivoted in ears h h on top of block H² is the clamping-lever H⁴, arranged transversely with reference to head H and swinging in a vertical plane. The forward end of this lever is bent downward at an angle, so as to extend down over the inclined plank-receiving face of block H² in position to clamp firmly a plank or strip resting against such face. The angle of the downward bend of the lever is substantially that of the inclination of the plank-supporting face, in order that the plank-engaging portion of the lever may rest squarely in contact with the inclined outer side of the plank when it is down. The inner end or arm of the lever extending rearward above the head H is made of spring-steel, so as to be capable of springing or yielding just as are the clamp-levers D² D², and for the same purpose—that is, so that with power applied to the lever to cause it to clamp a plank or strip there can be some yielding of the strip-engaging portion enough to prevent any marring of the strip, and to accommodate any small irregularity in the strip-surface. Near its rear end the lever passes between upright guides H⁵ H⁵ on the head H, adapted to steady and guide the lever end in its up and down movements. A spring H⁶, attached to head H by screw H⁷, extends up over and bears down upon the lever H⁴, so as to force its rear end downward.

Tapped down through such end of the lever to the rear of the guides H^5 H^5 is the screw H^8 , provided with a lock-nut H^9 , to fix it at any desired adjustment up or down with reference to the lever. The lower end of this screw is in position to be engaged by the reciprocating wedge-block I, moving longitudinally upon head H. Such wedge-block can be guided in any desired way in its movements upon the head. As shown, it is guided by a rib i on its under side fitting a dove-tailed groove or way i' on the head H, though I do not intend to limit myself to such an arrangement. The upper side or face of this wedge-block has the upper and lower horizontal plane surfaces i^2 and i^3 , respectively, at the rear and forward ends of the block, with reference to the movement of head H toward the holding and punching mechanism, and the inclined face i^4 joining such upper and lower surfaces. With the screw H^8 on lever H^4 engaging the wedge-block I and the lever end pressed down by spring H^6 , as indicated hereinbefore, as the wedge-block is moved forward under the lever end, the latter will be forced upward by the incline i^4 riding under its screw H^8 , so that the plank-clamping arm of the lever will be depressed to clamp a plank or strip firmly against the inclined supporting-surface on block H^2 . As the forward motion of the wedge-block I is continued, the upper plane surface i^2 on the block is brought under screw H^8 , so as to hold the latter, and consequently the lever end, as elevated. Upon movement of the block in the opposite direction the upper surface i^2 and the incline i^4 pass successively under the screw H^8 , and the spring H^6 forces the rear end of the lever down, so as to raise its front plank-clamping end to release the plank previously clamped thereby. The screw H^8 then rests upon the lower surface i^3 on the wedge-block until the latter is again moved forward.

Instead of the set-screw H^8 to engage the wedge-block, I contemplate using, where it is desirable to avoid the friction of the screw end upon the surface of the block, a roller carried by the lever in position to properly engage the wedge-block. Such roller can be attached to the lever by an adjustable clamp or other means allowing adjustment of the roller to raise or lower the same with reference to the lever. Such adjustment of the roller, as of the screw H^8 , is to regulate the height to which the wedge-block will raise the lever end, and so the position of the clamping end of the lever, when the rear end thereof is raised. The lever can thus be adapted for clamping planks or strips of different thickness. The amount of its pressure upon a plank or strip of a given thickness can also be regulated by the adjustment of the wedge-block engaging device on the lever to cause the spring portion of the lever to be forced upward to a greater or less height. A spring K, attached to head H and bearing against the side of wedge-block I, serves to prevent

accidental movement of such block and to prevent its jumping or moving too rapidly when engaged by the actuating means to be described. A pin i^4 on the forward end of the wedge-block serves to limit the rearward movement of the block, so as to prevent its being moved or thrown out from under the end of lever H^4 . The crank-wheel G' on the rear end of the shaft F, which, as set forth hereinbefore, carries the crank-wheel G for actuating the head H, is provided with a crank-pin g^4 , situated so as to travel ahead of crank-pin g on wheel G. The relative arrangement of these pins is such that as the pin g is carrying the end of connecting-rod or pitman G^2 past its outer dead-center, and the head H is consequently at rest, the crank-pin g^4 on wheel G' has passed its inner dead-center and is moving back outward. As the pin g , with the end of the pitman G^2 , is passing its inner dead-center, and the head H is consequently at rest at the inner end of its throw, the crank-pin g^4 is moving inward again. Attached to the latter pin by a ball-and-socket connection, as shown, is the rod L, which at its other end is connected by a similar ball-and-socket or universal joint with the end of the horizontally-swinging lever L' , pivoted at l upon the frame-work of the machine. The forward end of this lever projects into the path of the rear end of wedge-block H^2 as the latter is carried rearward or outward by the movement of head H, and is so arranged as to strike and move such block forward as the lever is swung by its connecting-rod L, while the head H is at rest in its outer position. With the relative arrangement of the crank-pins g and g^4 described, while the rod or pitman G^2 is at the outer limit of its motion and is holding the head H still, the rod L is carried outward, so as to swing the inner or forward end of the lever L' toward the forward end of head H. The wedge-block H^2 is then by the engaging end of the lever slid forward under the end of clamping-lever H^4 , so as to force the latter lever upward and cause its outer end to clamp a strip or plank against block H^2 , as fully described hereinbefore. By the engagement of the upper plane surface on the wedge-block H^2 with the end of screw H^8 on the clamping-lever H^4 such lever is securely held in its clamping position until the wedge-block is moved back again.

In order to provide for the regulation of the forward movement of the wedge-block by the lever L' , there is a set-screw L^2 on the end of the latter adapted to engage the block end, as shown in Fig. 4. Connected with lever L' , near its inner or forward end, by pin l' , is the sliding bar L^3 , extending in the direction of the forward movement of head H and suitably guided so that its inner or forward end reciprocates close beside wedge-block H^2 . Upon such end of the bar is an arm or hook L^4 , extending outward across the path of the forward end of the wedge-block. Such hook or arm is so situated that as the bar L is

moved backward or outward by the swing of lever L' , while the head H is at the forward limit of its motion, it will engage the wedge-block and force it rearward under the set-screw on the clamping-lever H^4 , so as to bring the lower surface on the block under such screw, thus allowing the clamping-lever to open and release the previously-clamped plank or strip.

For the purpose of providing for the adjustment of the wedge-block by the bar L^3 , I provide the hook or arm on such bar with a set-screw L^5 , having its inner end in position to abut against the end of the block.

The punches, which are, as already indicated, preferably of a rectangular form in cross-section, so as to punch the rectangular nail-holes, as fully set forth in my pending application, are held in their respective punch-bar sockets by means of set-screws, whereby they can be fixed at any desired adjustment in their bars. For making the holes of the particular form and shape desired, each punch is made rectangular in cross-section and of greater thickness but less width than the nails to be used in fastening the strip.

Where the double form of punch is used, I prefer to set the two punches four inches apart and then give the head H a forward movement of eight inches. Such movement of the head can be secured, as desired, by adjustment of the crank-pin g on the wheel G , in the manner already described. As the machine is operated, a series of holes will then be punched four inches apart.

By varying the number and the relative positions of the punches and the length of stroke of the cross-head H holes of any desired number and arrangement or spacing can be punched by the machine.

Where one punch only is used, the desired spacing of the holes is secured simply by the adjustment of the crank-pin g to or from the center of crank-wheel G , so as to give the feeding-head H a shorter or longer throw.

The operation of my machine, as shown and described, is briefly as follows: While the head H is at the inner or forward end of its travel toward the holding and clamping devices, a plank or strip to be punched is held with its end resting upon the inclined face of the block H^2 on the head. Just before the head starts backward or outward, the bar L^3 is moved by lever L' , so that the bar-hook or the set-screw thereon moves the wedge-block H^2 rearward. This movement of the block releases the clamping-lever H^4 , which is at once thrown by spring H^6 so as to raise its clamping portion away from the block H^2 . As the head travels rearward, the clamping portion of said lever will then be elevated so as to pass over the plank or strip, placed as described. As the head reaches the end of its outward travel and remains there while the dead-center is being passed by the crank-pin g and the end of the connecting-rod or pitman which actuates the head, the lever L'

is swung forward so as to engage and push the wedge-block H^2 forward on the head to cause the end of the clamping-lever H^4 to be cammed up and held in elevated position. Such motion and holding of this clamping-lever causes its outer end to press upon and securely clamp the strip or plank against the inclined face on block H^2 . With the lever made of spring-steel or other spring material, as described, the clamping-pressure exerted upon the strip or plank can be made sufficiently great to hold the plank firmly without danger of marring or bruising it. The amount of such pressure can be regulated, as desired, by adjusting the set-screw or other adjustable device on the lever engaging the wedge-block, such adjustment, of course, having as its result the regulation of the height to which the inner end of the lever will be raised, and consequently of the amount of bending or springing of the lever. The head H , with the strip or plank firmly clamped thereon, is now moved by crank-wheel G , pin g , and pitman forward, so as to carry the end of the strip or plank between the inclined support C and the plate D^3 , carried by the spring-levers D^2 D^2 . As the head H reaches the limit of its forward movement, the levers D^2 D^2 are drawn down by the action of the crank-shaft and connecting-rod E' , so as to clamp and hold the plank or strip firmly in its proper position below the punch-head. As the spring-levers are drawn down, the inclined portion or flange D^4 on the upper edge of plate D^3 engages the upper edge of the strip or plank, and if it is not down in exactly its proper position will force it down. As already described hereinbefore, the spring-levers as drawn down cause the plate to clamp the strip or plank firmly against the inclined support with a strong though yielding pressure, which will not cause marring of either surface of the plank. As the plank or strip is grasped by the holding-clamp, as described, the punch-head descends, so as to force the punch or punches into the same at the desired angle. Meanwhile the lever L' moves to draw the hooked bar L^3 outward and slide the wedge-block H^2 back under the end of the clamping-lever, so as to bring the lower surface on the block under the screw or other bearing device on the lever. The rear or inner end of such lever is then forced down by the spring H^6 , so as to raise the clamping portion of the lever away from the plank or strip. As the head H now travels outward, the strip or plank is held by the clamping-plate D^3 , and the clamping end of lever H^4 passes out over it into position to clamp it at another point, when the head reaches the outer limit of its motion and the lever L' again actuates the wedge-block I , as already described above. Before the clamping-lever H^4 is actuated to clamp the strip or plank again the punching operation is finished and the spring-levers D^2 D^2 are raised to cause plate D^3 to release the plank or strip,

so as to have it free to be slid along as the head H travels forward again.

The means and manner of adjusting the various parts of the machine to regulate their operation has been fully set forth hereinbefore in the description of the machine.

Having thus described my invention, what I claim is—

1. In a punching-machine, in combination with the punching mechanism, the support for the article being punched, a clamping-piece for engaging such article and clamping it upon the support, one or more levers of spring material, to which such piece is attached, and means for actuating the levers to move the clamping-piece to and from the support, substantially as and for the purpose described.

2. In a punching-machine, in combination with the punching mechanism and a bed or support for the article being punched, the clamping-piece for clamping the article upon such support, having an inclined portion or flange to engage the edge of the article and insure its proper position with relation to the punching devices as the clamping-piece is brought down upon it, substantially as and for the purpose specified.

3. In a punching-machine, in combination with the punching devices and the bed or support for the article to be punched, provided with a guide for the article, a movable clamping-piece for clamping the article upon the support, having an inclined portion to engage the article as the piece moves to clamp it, so that such article will, if out of position, be forced into position against the guide, substantially as and for the purpose shown.

4. In a punching-machine, in combination with the punching devices and the bed or support for the article being punched, a guide to guide the article, as moved upon the support, into proper position with reference to the punching devices, and the clamping-plate for holding the article upon the bed, having the inclined surface adapted to engage the side of the article opposite to the guide as the plate is moved down into clamping position, substantially as and for the purpose set forth.

5. In a punching-machine, in combination with the bed or support for the article being punched, the clamping-piece to hold the article upon the bed, one or more levers attached to and actuating such piece, means for actuating the lever or levers, and an adjustable bearing or support for the lever-pivot, substantially as and for the purpose specified.

6. In a punching-machine, in combination with the bed or support for the article being punched, the clamping-plate, one or more spring-levers attached to and carrying such plate, means for actuating the same, and an adjustable pivotal support for the lever or levers, whereby the position of the clamping-plate with reference to the bed or support can be adjusted, substantially as and for the purpose shown.

7. In a punching-machine, in combination with the bed or support for the article to be punched, the two spring-levers extending over such bed, an adjustable support for the pivotal ends of such levers, the clamping-plate carried by the levers, a crank-shaft, and a connecting-rod connecting the crank on such shaft with the lever ends, substantially as and for the purpose set forth.

8. In a machine for punching strips of material, in combination with the punch-carrying head and the strip-supporting bed inclined with reference to the plane of travel of such head, a guide to engage the outer edge of the strip, a clamping-plate to clamp the strip upon the bed or support, and means for actuating such plate connected therewith through spring-connections, substantially as and for the purpose shown.

9. In a machine for punching strips of material, in combination with the punch-carrying head and the strip-supporting bed or surface inclined with reference to the plane of travel of the punch-head, a guide to engage the lower and outer edge of the strip on the bed, a clamping-plate above such bed, having its upper edge turned or inclined downward toward the bed, and one or more spring-levers attached to such plate for actuating the same, substantially as and for the purpose set forth.

10. In combination with the reciprocating feed-head provided with a supporting-surface to receive a strip, the clamping-lever on the head and a reciprocating wedge-block, also on the head, adapted to engage a suitable bearing-piece on the lever, so as to move the latter to cause it to clamp a strip upon the supporting-surface on the head, substantially as and for the purpose shown.

11. In combination with the reciprocating feed-head for carrying a strip, the strip-clamping lever thereon, the reciprocating wedge-block on the head, a suitable bearing piece or abutment on the lever to engage such wedge-block, and a spring to move the lever in the direction opposite to that in which it is moved by the wedge-block, substantially as and for the purpose set forth.

12. In combination with the reciprocating head and the strip-clamping lever thereon, the sliding wedge-block, also on the head, engaged by a suitable bearing-piece on the lever, a spring pressing the lever to hold such piece in engagement with the wedge-block, and means for moving the block with reference to the lever, substantially as and for the purpose described.

13. In combination with the reciprocating head and the strip-clamping lever thereon, the sliding wedge-block, also on the head, and an adjustable piece on the lever engaging such wedge-block, substantially as and for the purpose specified.

14. In combination with the reciprocating head and the strip-clamping lever thereon, the sliding wedge-block on the head below the

lever, having the upper and lower plane surfaces connected by an inclined face, a suitable bearing on the lever engaging the wedge-block, and the spring pressing the lever down toward such block, substantially as and for the purpose shown.

15. In combination with the reciprocating head and the strip-clamping lever thereon, the sliding wedge-block, also on the head below the lever end, having the inclined surface, and the upper and lower horizontal surfaces at the opposite ends of the incline, a set-screw in the lever end adapted to engage the wedge-block, and the spring pressing such end of the lever down toward the block, substantially as and for the purpose set forth.

16. In a punching-machine, in combination with the punching devices, the reciprocating head, the strip-clamping lever thereon, the sliding wedge-block, also on the head, having the lower and upper plane surfaces, with an incline connecting them, means on the lever for engaging the wedge-block, a spring pressing the block-engaging end of the lever downward, and means for reciprocating the block in opposite directions when the head is at opposite ends of its travel, substantially as and for the purpose described.

17. In a punching-machine, in combination with the punching devices, the reciprocating head moving toward and from such devices, a movable wedge-block on such head, the clamp-lever on the head actuated by such block, and the lever and connected hook-bar for moving the block in opposite directions, substantially as and for the purpose specified.

18. In combination with the feed-head and the clamp-lever thereon, the sliding wedge-block and a friction-brake engaging such block, substantially as and for the purpose shown.

19. In combination with the feed-head and the clamp-lever thereon, the sliding wedge-block and a spring pressing upon the block, so as to act as a brake thereon and hold it from accidental movement, substantially as and for the purpose set forth.

20. In combination with the feed-head, the clamp-lever thereon, the spring engaging the lever, the wedge-block, the friction-spring engaging such block, and the block-actuating lever and connected hooked rod, substantially as and for the purpose described.

21. In combination with the reciprocating feed-head and means for moving the same, a clamp thereon, a movable wedge-block for actuating the clamp, a lever adapted to move the block in one direction, and a bar connected with the lever having a portion to engage the wedge-block and move it in the

other direction, and means for moving the lever in opposite directions while the feed-head is at opposite ends of its movement, substantially as and for the purpose specified.

22. In combination with the feed-head, the clamp, and the wedge-block, the lever and connected bar provided with adjustable bearings to engage, respectively, opposite ends of the wedge-block, substantially as and for the purpose shown.

23. In combination with the sliding block on the feed-head, the means for moving such block in opposite directions, consisting of the lever and connected bar, each having a set-screw to engage a portion of the block, substantially as and for the purpose set forth.

24. In combination with the reciprocating feed-head and means for actuating it, the clamp-lever and movable wedge-block on such head, a lever pivoted outside of the head adapted to engage and move the block, a bar connected with the lever, also adapted to engage and move the block, but in an opposite direction, and means for moving the lever end in one direction as the head is at one end of its stroke and in the other direction when the head is at the other end of its stroke, substantially as and for the purpose described.

25. In combination with the punching mechanism and the reciprocating feed-head provided with suitable clamping mechanism, the means for actuating such head, made adjustable, so as to regulate the stroke of the head, substantially as and for the purpose specified.

26. In combination with the punching mechanism and the reciprocating feed-head provided with suitable strip-clamping mechanism moving toward and from the same, a crank-wheel with its pin made adjustable to or from its center, and the pitman connected with such pin and the feed-head, substantially as and for the purpose shown.

27. In a punching-machine, in combination with the punch-head carrying the two punches, the reciprocating feed-head moving toward and from the punch-head, and having suitable strip-clamping mechanism, the crank-wheel provided with the crank-pin made adjustable to and from the wheel-center, and the pitman-rod connecting such pin with the head, substantially as and for the purpose specified.

In testimony that I claim the foregoing I have hereunto set my hand this 29th day of April, A. D. 1889.

AUGUST M. SCHILLING.

Witnesses:

ALBERT H. LARNED,
HENRY H. DREW.