

No. 620,526.

Patented Feb. 28, 1899.

J. P. WRIGHT.
BOX FILLING MACHINE.

(Application filed Dec. 31, 1897.)

(No Model.)

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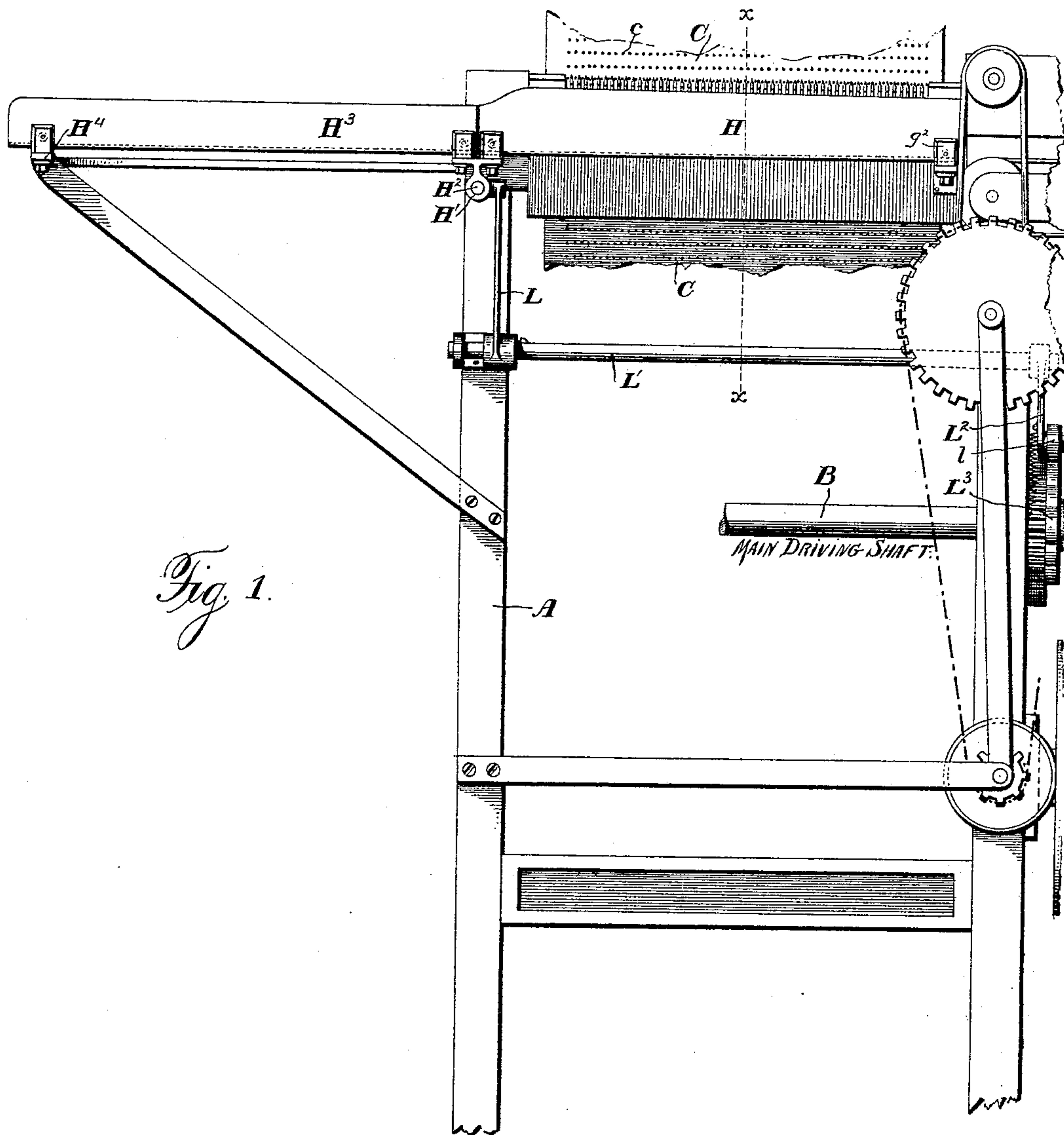


Fig. 1.

Witnesses:
Jas. E. Hutchinson.
Henry L. Hazard.

Inventor.
Jacob P. Wright
by Charles W. Russell
his Attorney

No. 620,526.

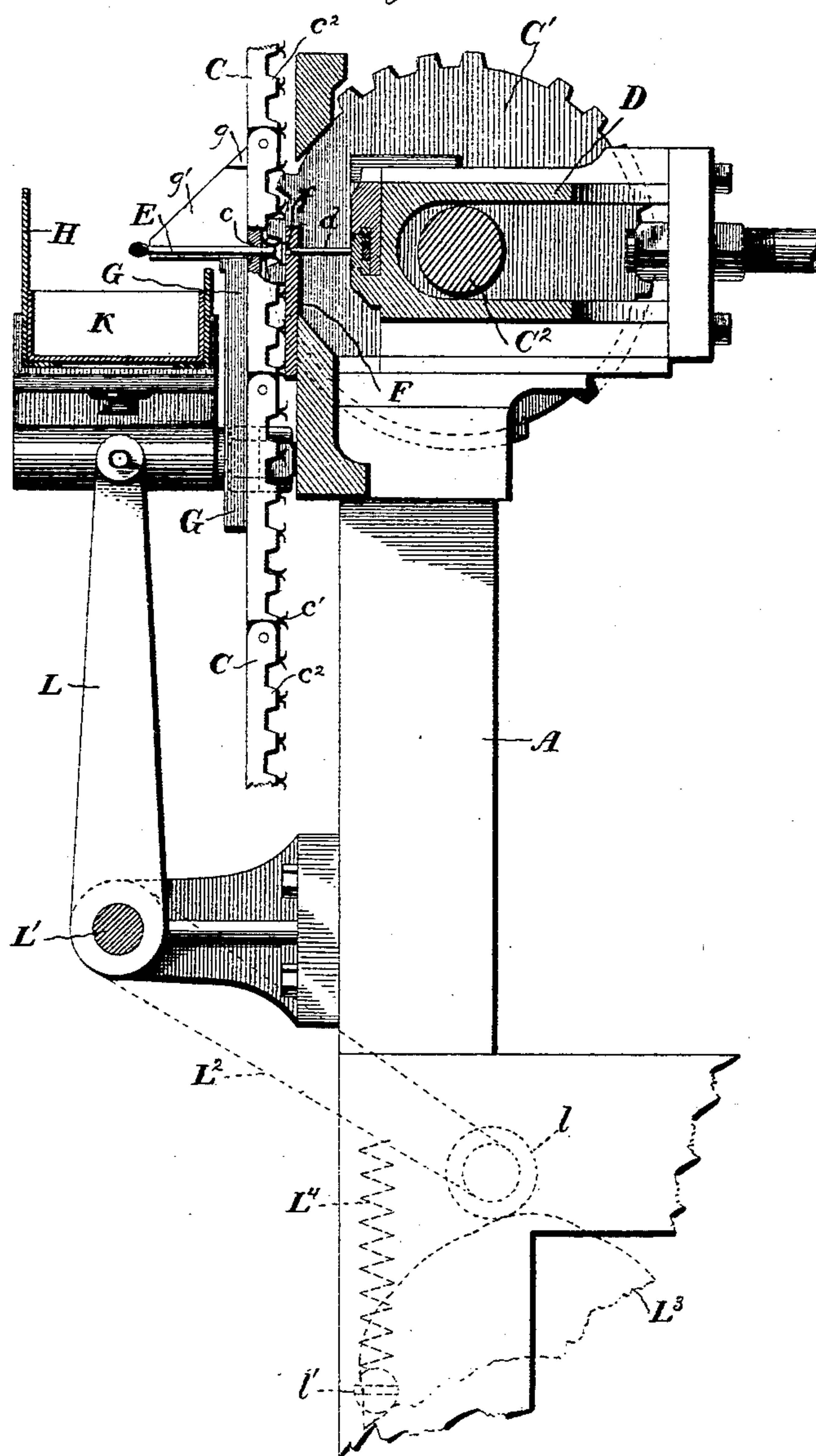
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Fig. 2.



Witnesses:
James Hutchinson.
Henry C. Hazard

Inventor.
Jacob P. Wright
by *Prindle and Russell*
his Attorneys

No. 620,526.

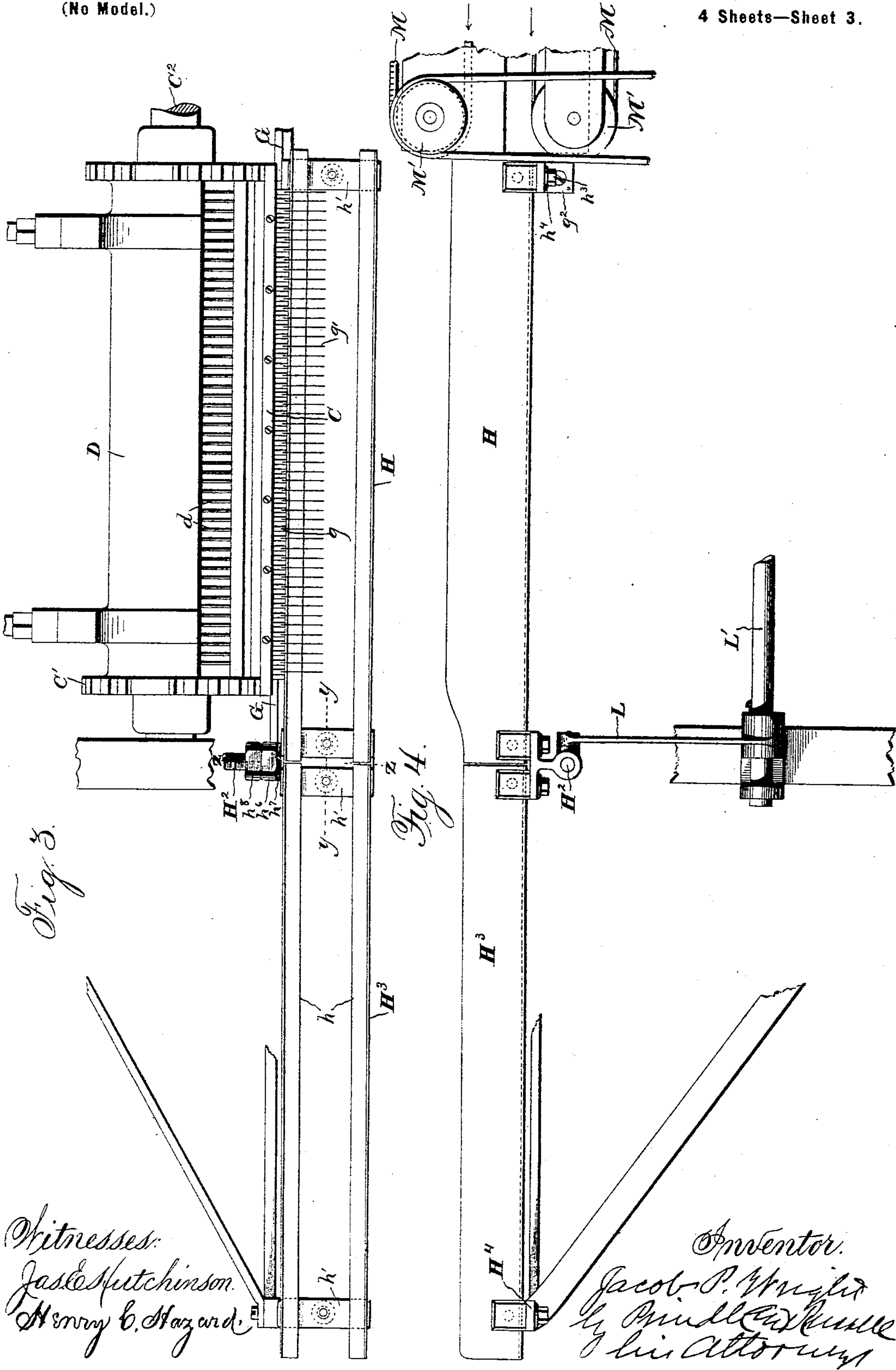
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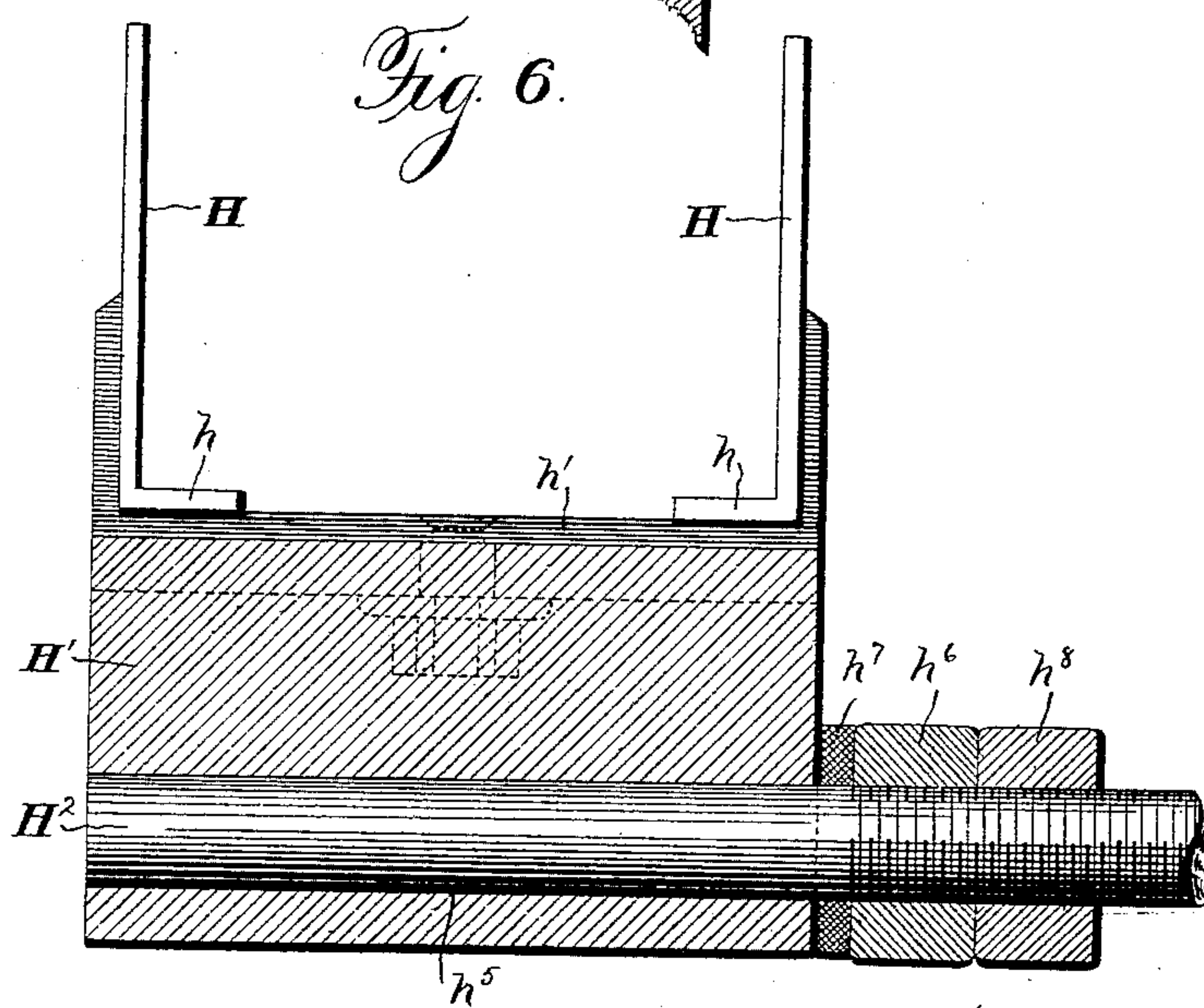
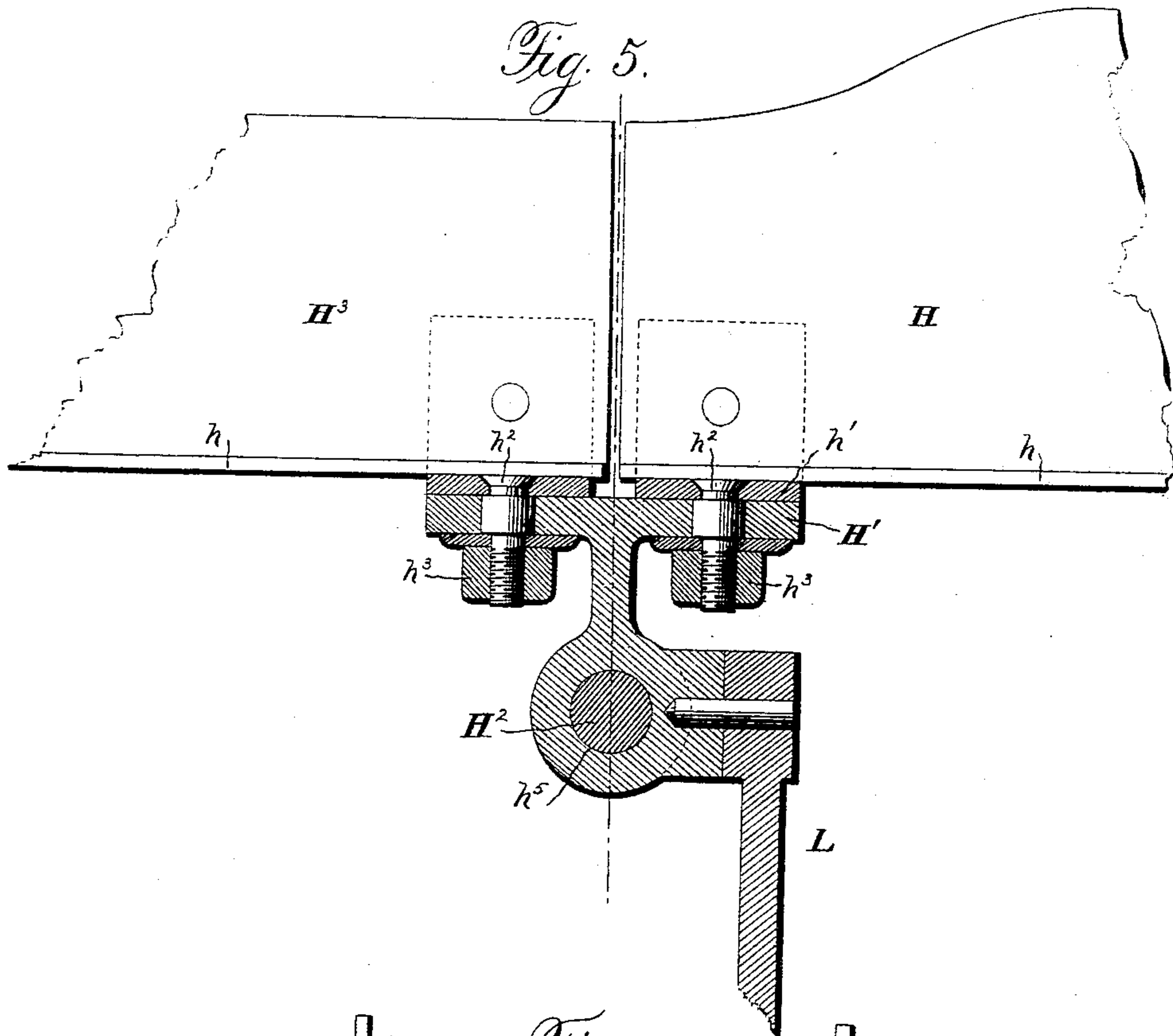
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4 Sheets—Sheet 4.



Witnesses:
James Hutchinson.
Henry L. Hazard.

Inventor.
Jacob P. Wright
by Charles W. Russell
Attorney

UNITED STATES PATENT OFFICE.

JACOB PULVER WRIGHT, OF NEW HAVEN, CONNECTICUT, ASSIGNOR TO
THE DIAMOND MATCH COMPANY, OF CHICAGO, ILLINOIS.

BOX-FILLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 620,526, dated February 28, 1899.

Application filed December 31, 1897. Serial No. 664,972. (No model.)

To all whom it may concern:

Be it known that I, JACOB PULVER WRIGHT, of New Haven, in the county of New Haven, and in the State of Connecticut, have invented certain new and useful Improvements in Box-Filling Machines; 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 in front elevation of my box-filling attachment as applied to a match-making machine; Fig. 2, a view showing, on an enlarged scale, a section on line *x x* of Fig. 1, the carrier-chain of the match-making machine being shown partly in side elevation and partly in section; Fig. 3, a plan view showing the mechanism on an enlarged scale; Fig. 4, a view showing in front elevation, on an enlarged scale, my jointed swinging trough with part of the means for actuating it; Fig. 5, a detail view showing, on an enlarged scale, a section on line *y y* of Fig. 3; and Fig. 6, a similar view showing a section on line *z z* of Fig. 3.

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

The object of my invention has been to provide improved means for filling boxes with matches or other material; and to this end my invention consists in the mechanism and in the construction, arrangement, and combination of the parts thereof, as hereinafter specified.

While the special purpose of my invention as set forth in this specification has been to provide improved means for filling boxes with matches as delivered from the traveling match-holding carrier of a match-making machine, I desire it to be understood that my invention is applicable also for the boxing of matches from other sources of supply and of other material than matches, particularly when the separate pieces of such material have an elongated strip or stick form.

In the drawings of this specification my invention is shown as applied to a match-making machine having a traveling carrier for the match-splints while being treated and made into matches which holds and conveys the matches after they have been completed to a point where they are to be discharged from

such carrier in rows. As shown, such carrier consists of a series of plates hinged together, so as to form a chain, and each having a series of transverse rows of small perforations to receive the match-sticks. Each plate, as shown, has spring clamping devices on its back to clamp and hold the projecting ends of the splints, all as more fully described and shown in United States Patent No. 586,890, dated July 20, 1897, for improvement in machines for making matches.

While my invention is shown herein as applied to the machine shown and described in said patent, I desire it to be understood that neither that particular form of machine nor the special kind of match-carrier employed therein is essential to the operation of my invention in the filling of boxes.

The box holding, supporting, and jarring devices of my filling mechanism can be employed to advantage with other forms of match-making machine and match-delivering devices.

In the drawings, A A designate a portion of the frame of the match-making machine to which my invention is shown to be applied, and B designates a rotary shaft of such machine, which can be the main driving-shaft of the latter or some other shaft driven therefrom.

C designates a portion of the carrier-chain of the machine set forth in the United States patent above referred to, such chain being given an intermittent or step-by-step movement, and consisting of a series of plates hinged together and each having a series of transverse rows of small perforations *c c*, adapted to receive and support portions of match-splints thrust through them, and a series of clamping devices *c' c'* to clamp and hold the ends of the splints projecting beyond the backs of the plates. This carrier, as in the machine of the patent referred to, has on its plates rack-teeth *c² c²*, which are engaged by the teeth of gear-wheels *C' C'*, carried on the shaft *C²*, journaled in suitable bearings on frame A A. This shaft is given a step-by-step rotation, as in the machine of the said patent, so as to cause the carrier-chain to move to bring the rows of perforations *c c* successively up to a certain point with a

short stop or delay as each row is so brought to such point.

The means for intermittently moving the shaft C^2 , so as to produce the above-described step-by-step travel of the carrier-chain C , is to be produced by the mechanism for that purpose shown and described in the patent hereinbefore referred to and need not, therefore, be described herein in detail. For a full description of its construction and working I refer to the aforesaid patent.

So far as the invention covered by the present specification is concerned, the shaft C^2 can be given its required intermittent partial rotation to produce the desired step-by-step feed of the carrier-chain by any suitable form of actuating mechanism without involving any departure from my invention.

D designates the reciprocating head of the match-discharging device for discharging the matches $E E$ from a whole row of the perforations $c c$ at a time, when the carrier C comes to rest after each one of the step-by-step movements. Such device is the same as that shown in the patent referred to, carrying a series of punch-pins $d d$ to enter the perforations of the carriers-plates and drive out the matches therefrom, and is to be reciprocated toward and from the carrier by the same actuating means that I have shown and described in such patent, which is here referred to for a full setting forth of the details of the discharging device and the means for actuating the latter.

Just behind the carrier C is a transverse plate F , supported at its opposite ends in frame $A A$ and having a series of holes $f f$ to act as guides for the pins $d d$. Another plate G , supported from frame $A A$, extends across in front of the carrier-chain, with the upper edge of its body just below the point where the matches are ejected from the carrier, and has a series of narrow fingers $g g g$ extending upward close to the carrier and arranged so that the matches in each row of perforations $c c$ in the carrier-plates will pass down between them as the matches approach and reach the place of their discharge from the carrier. These fingers $g g g$ carry the upright outwardly-extending plates $g' g'$, adapted to guide the matches and prevent their being swung to one side or the other as they are being ejected from the carrier and begin to fall free from the latter.

The construction, operation, and function of the plate G , fingers $g g g$, and plates $g' g'$ are fully shown and described in the United States Patent No. 595,234 and need not, therefore, be described in detail herein. For a full showing of this construction and operation I refer to the drawings and specification of the patent last above mentioned.

Beyond and below one end of the series of fingers and plates $g g g' g'$ the plate G has attached to it a bracket g^2 , having a horizontal outwardly-extending portion, upon which is pivotally supported one end of the box sup-

porting and guiding trough H , which extends across in front of the carrier C , close to the plate G , and has its upper edge just below the point where the matches are discharged from the carrier and under the lower ends of plates $g' g'$. As shown, this trough preferably consists of the two parallel upright plates, forming its sides, with inturned horizontal portions or strips $h h$ to form supports for the sides of the bottoms of the boxes $K K$ to be filled, which are to be fed to and through the trough in the manner to be described. The trough sides, with their inturned portions or strips $h h$, are connected together close to their opposite ends by the cross-pieces $h' h'$, extending across below such strips and secured to the outer faces of the trough sides by riveting or otherwise, as desired. One of these cross-pieces rests upon the bracket g^2 and has a pivot pin or stud h^2 passing down through an opening in the horizontal part of such bracket and provided on its lower end with a nut h^3 , engaging the under side of a washer h^4 on the stud just below the part of the bracket through which the stud or pin passes, the construction being such that the cross-piece of the trough is held securely down upon the bracket, while being free to swing thereon horizontally. The other cross-piece h' , at or near the other end of the trough, is similarly connected with a reciprocating piece H' , supported upon a horizontal stationary rod H^2 , extending outward from plate G , so that it can move in and out on such rod, so as to swing the trough toward or from the plate G . This rod H^2 , being supported from a portion of the frame $A A$, engages an opening h^5 in the piece H' and carries between the plate G and such piece a screw-nut h^6 , between which and the inner or rear side of the piece H' is a washer h^7 , of leather or other soft elastic material, to form a limiting-cushion to limit the inward movement of the piece and the end of the trough connected with the latter. A locking-nut h^8 is also screwed upon the rod, so as to engage and lock the nut h^6 at any point to which it may be screwed in or out on rod H^2 .

The form of pivotal connection which I prefer to use for connecting both of the cross-pieces $h' h'$ with the piece H' and the bracket g^2 , respectively, is shown in detail in Fig. 5. As shown there, the pin or stud h^2 , being riveted to the respective cross-piece h' , has an enlarged cylindrical portion engaging the pivotal opening in the horizontal part of the piece to which the trough is to be pivoted, such cylindrical portion extending through the pivotal opening to the upper side of the washer h^4 , resting on the nut h^3 , screwed on the threaded lower part of the stud or pin h^2 . The reciprocating piece H' has on its other side a second horizontal portion, to which the inner end of a second trough H^3 is pivotally connected in the same way that the trough H is connected with its supporting part of said piece. This second trough is similar in con-

struction to the first trough, having the same sides and strips or inturned portions h h and the same form of cross-pieces h' h' .

The first trough extends well across and beyond the path of the carrier C, while the second trough, forming a continuation of the first trough for the reception and guidance of the boxes as they are fed along, extends onward and outward and is at or near its outer end pivotally supported upon a bracket H^4 , attached to and extending out from the frame A A. This bracket has a horizontal plate-like piece, upon which the cross-piece h' of the trough is supported and to which such piece is pivoted in the same manner that the inner cross-piece is pivoted to the reciprocating piece H' , as already described.

To give the piece H' a series of short outward and inward reciprocations on the rod H^2 , so as to cause the ends of the two troughs connected with such piece to have a series of short sidewise movements during the operation of the machine and the passage of the boxes K K along through the trough, I pivotally connect with such piece the upper end of a swinging arm L, carried by a rock-shaft L' , journaled in suitable bearings in frame A A and having just beyond one side of such frame a second arm L^2 , provided with a bearing preferably in the form of a roller l , engaging the waved periphery of a rotating cam L^3 , fixed on and rotating with shaft B. As shown in Figs. 1 and 2, this cam has its periphery provided with a series of short rounded projections, with intervening projections, and the arm L^2 is held swung toward it to keep the roller l pressed in the path of the cam projection by the spring L^4 , secured at one end to such arm and at the other to a part of the frame at L' . The construction is such that as the cam L^3 revolves the projections of the cam will successively move the arm L^2 upward to swing the arm L outward and cause the piece H' and the trough ends connected therewith to swing out away from the plane of the outer face of carrier C, and as each projection passes roller l the spring L^4 will swing the arm L^2 down to rock the shaft L' and swing the arm L inward again to return the piece H' until it strikes the cushion or washer h^7 . Any desired form of connection between the end of arm L and the piece H' can be used; but I prefer that shown, consisting of a pin on the piece engaging the slightly-elongated opening l^2 in the arm end. The quick out-and-in swings of the two trough ends thus produced will give the boxes passing through the troughs a series of quick short sidewise movements or jars, the extent of which will increase from the inner end of trough H, where it is pivoted to bracket g^2 and where the side movement of the trough is nothing toward the inner end of the trough, where it is pivoted to the piece H' . From this point the sidewise movement of the second trough H^3 , and consequently the sidewise jarring of the boxes passing through such trough, de-

creases in extent toward the outer end of the latter, where it is pivoted to bracket H^4 . The boxes K K to be filled, and which to get the best effect of my filling mechanism have a length less than the width of the carrier C or the length of the rows of matches discharged from the carrier-plates, are to be fed into that end of the trough H which is pivotally supported on bracket g^2 , and consequently has no sidewise movement by any suitable feeding mechanism.

In the drawings I have shown a portion of two parallel traveling belts M M, which, running over rollers M' M' and moving in the directions indicated by the arrows, engage the tops and bottoms, respectively, of boxes placed between them, and so force such boxes onward and deliver them into the trough H, those already on the trough being forced onward by the forward pressure of those engaged by said belts, so that when the boxes have been once started along into trough H said trough and the second trough H^3 will be kept filled, with a line of boxes forced continually onward by the action of the feeding-belts. As the boxes are thus passed along through the first trough H they travel across the stream of rows of matches ejected from the carrier-plates and, falling down between and below the plates, become gradually filled by such matches, the rate of travel of the boxes being so regulated that the amount of matches desired to fill any box will be deposited therein by the time that it passes beyond the farther side of the carrier-way and out of the stream of matches.

For driving the box-feeding belts M M, I prefer the mechanism for such purpose fully shown and described in the United States Patent No. 595,234, hereinbefore referred to, though I do not intend to limit myself to such belt-driving mechanism, but contemplate using instead, where desired, any suitable means of supporting and actuating the belts M M to cause them to feed the boxes along. Nor do I intend to limit myself herein to the two-belt form of box-feed described. Any other form of means for delivering the boxes in series to the trough H and causing them to pass through the latter can be employed without involving any departure from my invention.

For a full explanation of one form of means suitable for driving the belts M M during the operation of the machine I here refer to the United States Patent last above mentioned.

In order to allow for the necessary slight movement of the adjoining ends of the two troughs H and H^3 with reference to the piece H' as the latter is reciprocated, the pivotal openings in such piece, which are engaged by the pivot pins or studs h^2 h^2 , should be elongated slightly, as indicated in the drawings. (See Fig. 5.)

The operation of my box-filling mechanism, as hereinbefore described, and shown in the drawings, is briefly as follows: With the boxes K K continuously fed to and through the

troughs H and H³ by the action of the feed-belts M and M or other feed devices used, which are to be kept supplied with boxes from any desired source of supply, with the carrier C given a step-by-step forward movement, as and by the means hereinbefore set forth, so as to bring the rows of matches held in the plate perforations successively up to the point where they are to be discharged from the carrier, and with the described discharging device, with its match engaging and ejecting pins, moved forward to eject a row of matches each time that the carrier comes to rest after one of its forward step-by-step movements, the matches will fall from the carrier down into the passing boxes in a stream of rows closely following each other. The division-plates $g'g'$, between which the matches of each row pass, serve to prevent such matches from swinging to one side or the other as they are ejected from the carrier, and so insure that as they fall down from the carrier they shall have their sticks in substantially parallel vertical planes at right angles to the carrier, and therefore will when they reach the boxes K K, traveling through the trough H across the face of the carrier, fall into positions therein substantially at right angles to the line of travel of the boxes. The only shaking or jarring of the boxes which is then necessary to get the matches in the boxes parallel with each other and settle them down in the containing-boxes is one transverse to the line of travel of the boxes through the trough H or substantially parallel to the matches as they are to lie in the boxes. Such a shaking or jarring of the boxes is secured by the short quick side swings of the trough H, caused by the in-and-out short reciprocations of the piece H', actuated by the arm L on the rock-shaft L', which is rocked back and forth by the action of the cam L³ and spring L⁴ upon its second arm L².

By practice I have found it undesirable to give the boxes any material amount of side shake or jarring when the first matches enter them and lie upon their bottoms. This is especially so where, as is often the case, the bottoms of the boxes to be filled are not flat, but concave on their upper sides. Any substantial jarring of a box of this kind when a match first reaches it and before there are several matches lying with it is apt to cause such match to swing around to one side or the other, so as to get into a position at an angle to that which it should have transverse to the box. Even with the flat-bottomed box I have found that the amount of jarring needed to settle a collection of matches down in the box if given when the first matches reach and lie separately or loosely on the box-bottom is, because of the head ends of the matches being larger than the other ends, apt to cause the matches to swing around out of their desired positions at right angles to the box length. To prevent this objectionable swinging of the first matches within the boxes be-

ing filled, I make the boxes enter that end of the trough H which is pivoted to the bracket g^2 and can therefore not have any sidewise movement to jar or shake the boxes from side to side and arrange for the reception of a quantity of matches from the carrier by each box before such box reaches a portion of the trough H having any considerable amount of sidewise jarring because of the motion of the trough. With such trough pivoted where it is—to bracket g^2 , close to the point where each box begins to receive a quantity of matches from the stream of rows descending from the carrier—it is clear that a box cannot receive any material amount of sidewise vibration or jarring due to motion of the trough when the matches first reach and lie upon its bottom or until the box has gone far enough through the stream of falling matches to have its bottom substantially covered by matches, so that there is no longer danger of such matches being shaken around on the box-bottom into positions at an angle to those which they are to have in the filled boxes. As a box travels on through trough H and receives more and more of the matches it can be safely given a considerable amount of sidewise jarring or shaking, necessary to settle the matches well down into the box. Such shaking is given the boxes in my machine by the increasing side swing of the trough H as the boxes travel onward toward that end of the trough which is connected with the piece H', the extreme amount of shaking or jarring being given the box at the trough end beyond the point where the boxes leave the stream of matches from the carrier. From this point as the filled boxes pass onward through the second trough H³ they are at first given the same shaking as when they are in the end of trough H, so as to shake the matches well down, and then a constantly-diminishing amount of shake as they proceed toward the outer end of trough H³.

The result of the operation of my mechanism as described has been found to be a remarkably good and uniform filling of the boxes even where the box-bottoms are not flat, but bent or concaved. The two troughs being long and the amount of their swing being slight, the jarring or shaking given the boxes is substantially in a line at right angles to the length of the boxes or to the line of travel of the boxes. There is of course a slight curve in the travel of each trough end, but not enough to give any objectionable movement to the boxes, particularly as the two adjoining trough ends swing on opposite curves, so that the boxes will when passing from one trough to another be given a series of side shakes in a direct line parallel with the movement of piece H', and consequently parallel with the matches as they are to lie in the filled boxes. The decreasing of the amount of shaking of the box after it has received its full complement of matches and is passing through trough H³ has also been found desirable as

insuring a leveling off of the top of the mass of the box contents not easily attainable where the box is only given a uniform extent of shaking, such as is necessary for the straightening out of the matches and settling down of the mass in the box during the filling operation. The extent of the throw of the two troughs H and H^3 can be increased or diminished at will by screwing the nut h^6 in or out on the rod H^2 to adjust the position of the cushion-washer h^7 . The position of this washer determines the inward travel of the piece H' under stress of the spring L^4 , exerted upon it through arm L^2 , rock-shaft L' , and arm L , and consequently determines the extent of movement of the troughs between their extreme inner and outer positions. As the piece H' and the trough ends pivotally connected therewith are forced inward by the stress of spring L^4 after each projection on the cam-wheel L^3 has passed the roller l on arm L^2 the piece H' will bring up suddenly against the washer h^7 in such way that the troughs will be given a sudden quick jar especially well adapted to settle the splints in the boxes on the troughs and cause such splints to get into proper position parallel with each other and at right angles to the length of the box. The troughs are then at the limit of their inward swing and stand in or nearly in a line parallel to the face of the carrier C and at right angles to the matches therein, so that the jarring shock produced by the piece H' striking the elastic washer h^7 , which stops it and causes it to rebound a little, is transmitted to the boxes substantially in a straight line parallel with the matches as they are to lie in the filled boxes. The boxes and troughs are of such relative widths that the boxes fit the troughs loosely enough to allow easy passage of them from trough H to trough H^3 without binding, but closely enough to cause the boxes to have substantially the same movement as the parts of the troughs in which they may be at any time.

45 Having thus described my invention, what I claim is—

1. In a machine for filling boxes, in combination with a source of supply of the material to be boxed, a pivoted swinging support for the boxes, while being filled, means for swinging such support, and means for feeding boxes upon and over the latter, substantially as and for the purpose described.

2. In a machine for filling boxes, in combination with a source of supply of the material to be boxed, a pivoted swinging trough for the boxes, while being filled, means for swinging such trough, and means for feeding boxes upon and through the trough, substantially as and for the purpose described.

3. In a machine for filling boxes, in combination with a source of supply of the material to be boxed, a pivoted sidewise-swinging trough for supporting the boxes, while being filled, a second pivoted sidewise-swinging trough, through which the boxes pass

after leaving the first trough, means for swinging the two troughs, and means for feeding boxes to and through the first trough, substantially as and for the purpose described. 70

4. In a machine for filling boxes, in combination with a source of supply of the material to be boxed, a swinging trough having one end pivoted to a suitable support, means for feeding the boxes to be filled into the trough at such end thereof, and means for vibrating the other end of the trough transversely to the travel of the boxes through the trough, substantially as and for the purpose described. 75

5. In a machine for filling boxes, in combination with a source of supply of the material to be boxed, a swinging trough having one end pivoted to a suitable support, means for feeding boxes into such end of the trough, a reciprocating piece connected with the other end of the trough, and means for reciprocating such piece, substantially as and for the purpose described. 80

6. In a machine for filling boxes, in combination with a source of supply of the material to be boxed, a swinging support for the boxes, while being filled, having one of its ends pivoted to a suitable support, means for feeding the boxes to and over the swinging support at such end, a to-and-fro-moving piece connected with the other end of the support, and means for actuating such piece, substantially as and for the purpose described. 85

7. In a machine for filling boxes, in combination with a source of supply of the material to be boxed, a swinging support for the boxes, while being filled, having one of its ends pivoted to a suitable support, means for feeding boxes upon the swinging support at its pivoted end, a to-and-fro-moving piece connected with the other end of the pivoted box-support, a second swinging box-support, having one end also connected with the to-and-fro-moving piece, and its other end pivoted to a suitable stationary support, and means for actuating such piece, substantially as and for the purpose described. 100

8. In a machine for filling boxes, in combination with a source of supply of the material to be boxed, the two troughs having their outer ends pivoted to suitable supports, a reciprocating piece to which the other adjoining ends of the troughs are pivotally connected, means for reciprocating such piece, and means for feeding boxes to and through the troughs, substantially as and for the purpose described. 115

9. In a machine for filling boxes, in combination with a source of supply of the material to be boxed, the two swinging troughs having their outer ends pivoted to suitable supports, and their inner adjoining ends pivotally connected with a reciprocating piece, means for reciprocating the latter, comprising a spring whose stress acts to move the piece in one direction, an abutment against which the piece strikes when moved by the stress of 120 125 130

the spring, and means for feeding boxes to and through the troughs, substantially as and for the purpose described.

10. In a machine for filling boxes with matches and the like, in combination with a source of supply of the material to be boxed, supplying such material in a stream of a width greater than the length of a box, means for feeding and moving a series of boxes across such stream, without vibration where they begin to pass across the stream, and means for subsequently giving the boxes a series of jars or vibrations, beginning at a point beyond that where the boxes enter or begin to pass across the stream of material, and acting upon the boxes while they are still passing across such stream, substantially as and for the purpose described.

11. In a machine for filling boxes with matches and the like, in combination with a source of supply of the material to be boxed, supplying such material in a stream of a width greater than the length of a box, means for feeding and moving a series of boxes across such stream, and means for giving the boxes a series of sidewise or transverse vibrations acting to give substantial vibrations to the boxes only at and beyond a point in the travel of the boxes which is beyond the point where the boxes first begin to pass across the stream of material, substantially as and for the purpose described.

12. In a machine for filling boxes with matches and the like, in combination with a source of supply of the material to be boxed, supplying such material in a stream of a width greater than the length of a box, a swinging support for the boxes, while passing across such stream, having one end pivoted to a suitable support at or near one side of the stream of material, means for vibrating the box-support, and means for feeding boxes upon such support at its pivoted end, substantially as and for the purpose described.

13. In a machine for filling boxes with matches and the like, in combination with a source of supply of the material to be boxed, supplying such material in a stream of a width

greater than the length of a box, a swinging trough extending across such stream and having one end pivoted to a suitable support, at or near one side of the stream, means for feeding boxes into such end of the trough, and means for vibrating the trough, to give a series of sidewise jars to the boxes, substantially as and for the purpose described.

14. In a machine for filling boxes with matches and the like, in combination with a source of supply of the material to be boxed, supplying such material in a stream of a width greater than the length of a box, a swinging trough extending across such stream, and having one end pivoted to a suitable support at or near one side of the stream of material, means for feeding boxes into such end of the trough, means for giving the trough a series of short sharp swings, comprising spring mechanism for swinging the trough in one direction, and a stop device to check the movement of the trough under stress of such spring mechanism, substantially as and for the purpose described.

15. In a machine for filling boxes with matches and the like, in combination with a source of supply of the material to be boxed, supplying such material in a stream of a width greater than the length of a box, a swinging trough extending across such stream and having one end pivotally supported at or near one side of the stream of material, means for feeding boxes into the trough at its pivoted end, a second swinging trough having one end connected with the outer swinging end of the first trough, so as to move therewith and its other end pivoted to a suitable fixed support, and means for giving the trough a series of short sidewise vibrations, substantially as and for the purpose described.

In testimony that I claim the foregoing I have hereunto set my hand this 24th day of December, 1897.

JACOB PULVER WRIGHT.

Witnesses:

H. DAYTON STANNARD,
F. WHEELER BEECHER.