

No. 666,568.

Patented Jan. 22, 1901.

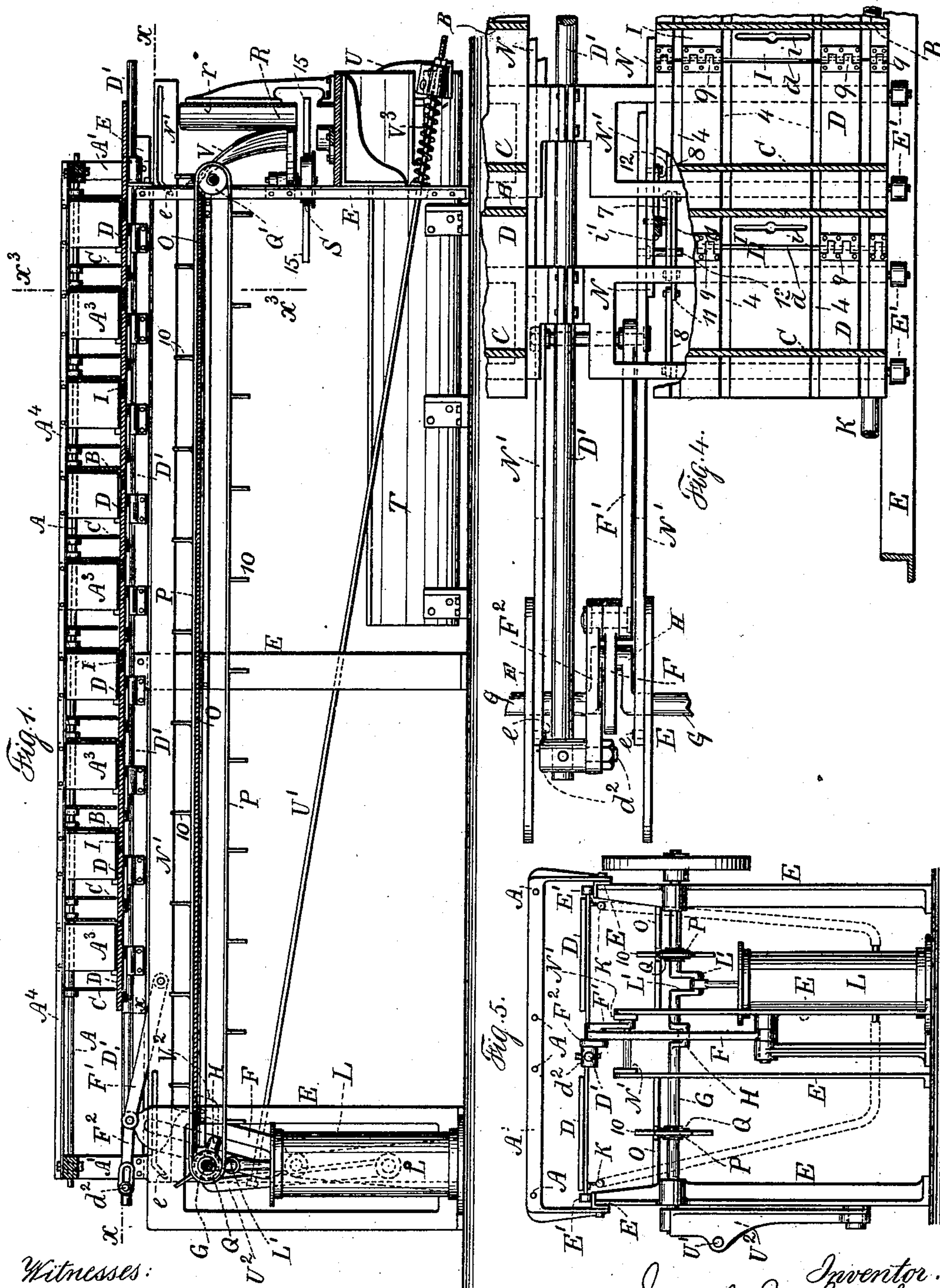
J. E. SMYTH.

SIGNATURE GATHERER.

(Application filed Mar. 21, 1898. Renewed June 29, 1900.)

(No Model.)

3 Sheets—Sheet 1.



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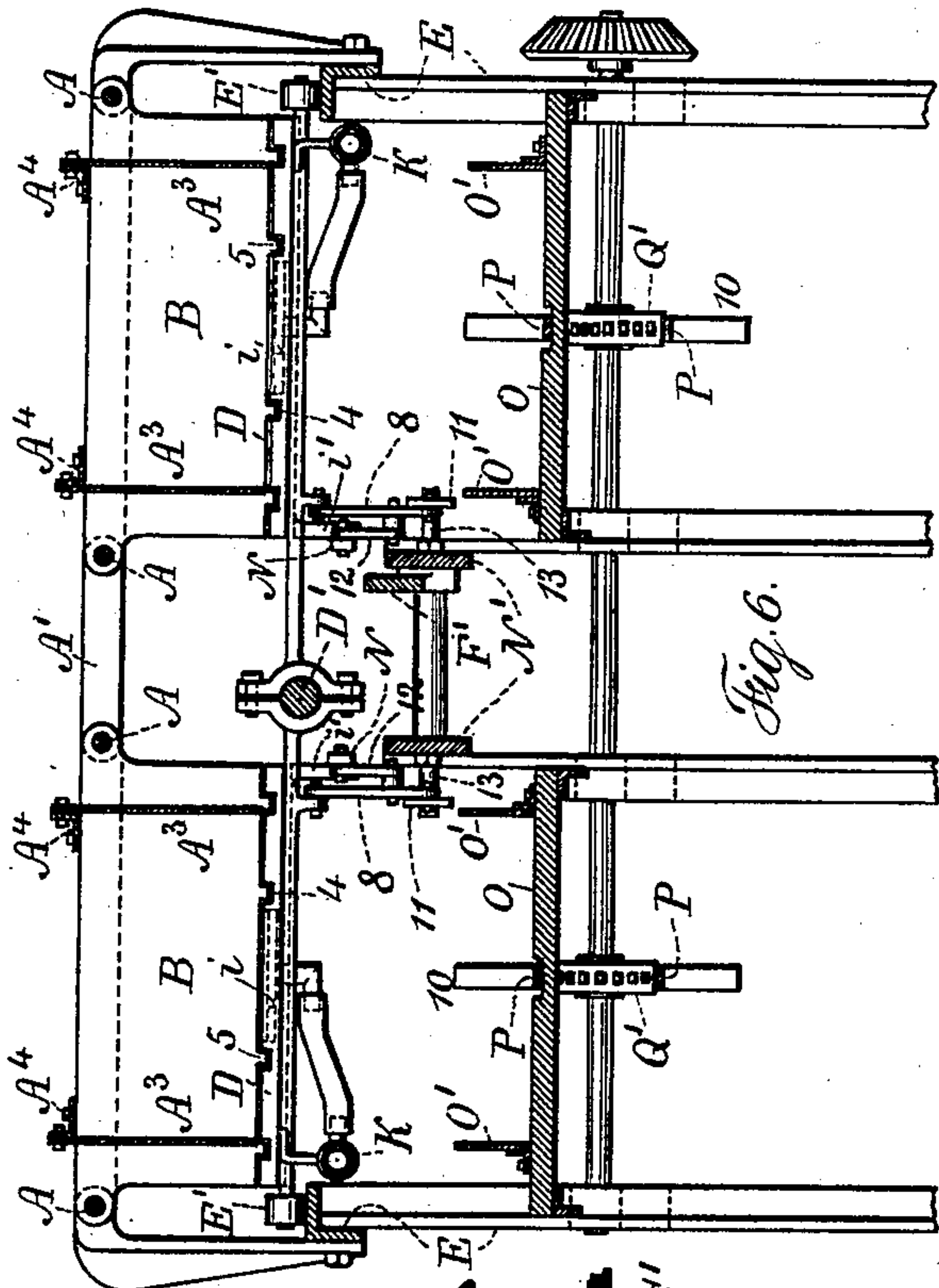


Fig. 6.

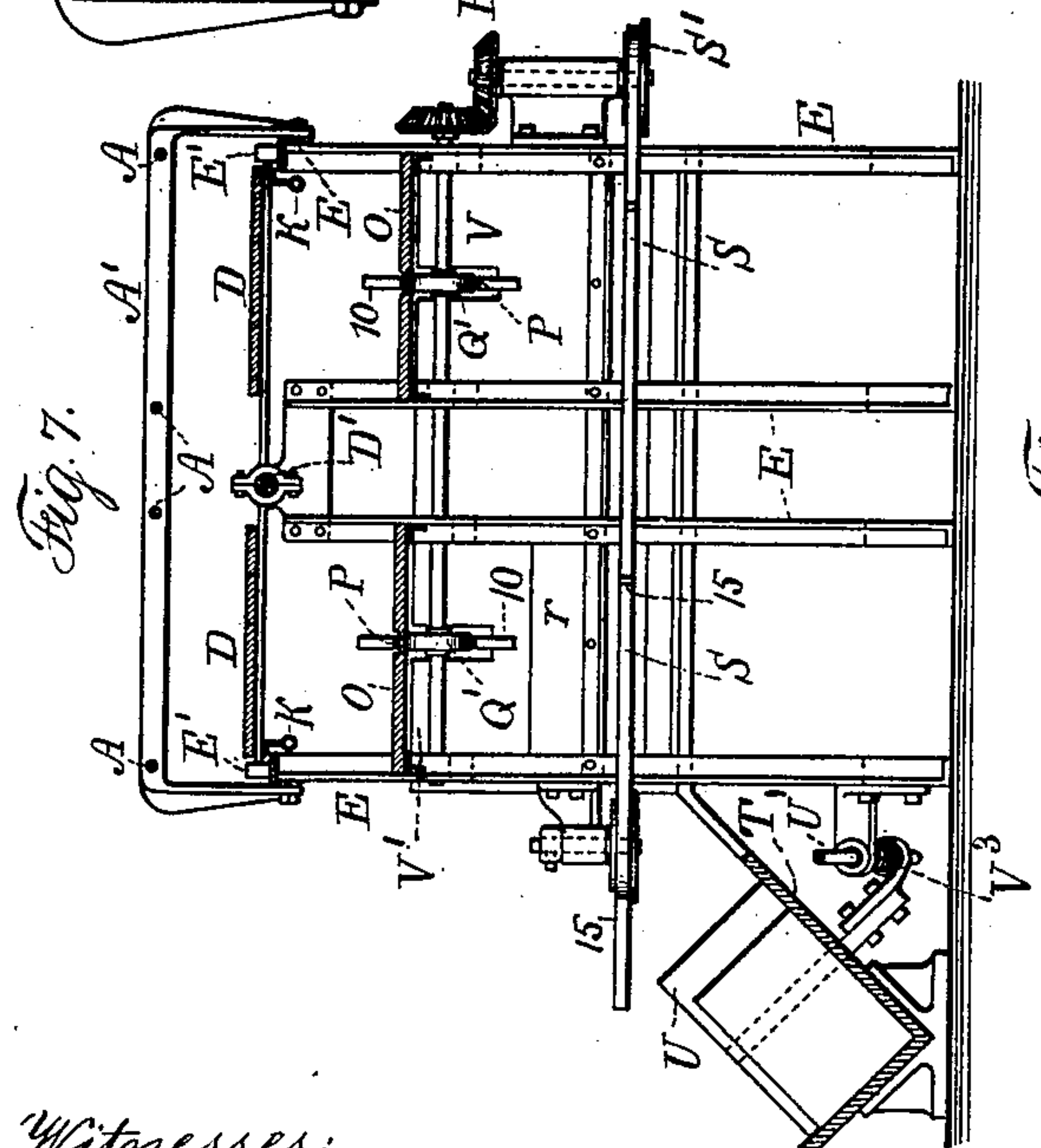


Fig. 7.

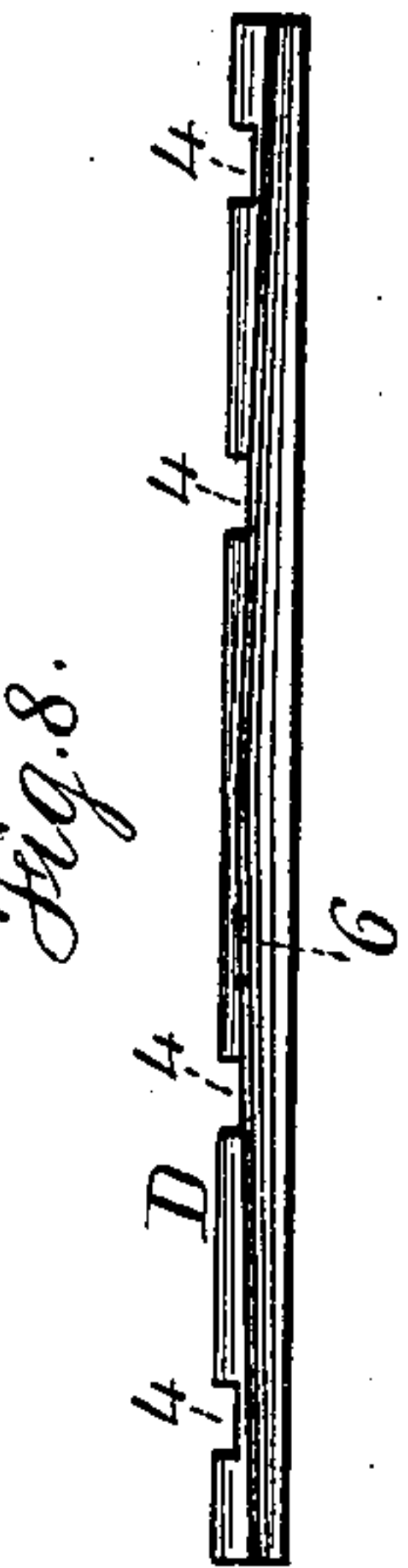


Fig. 8.

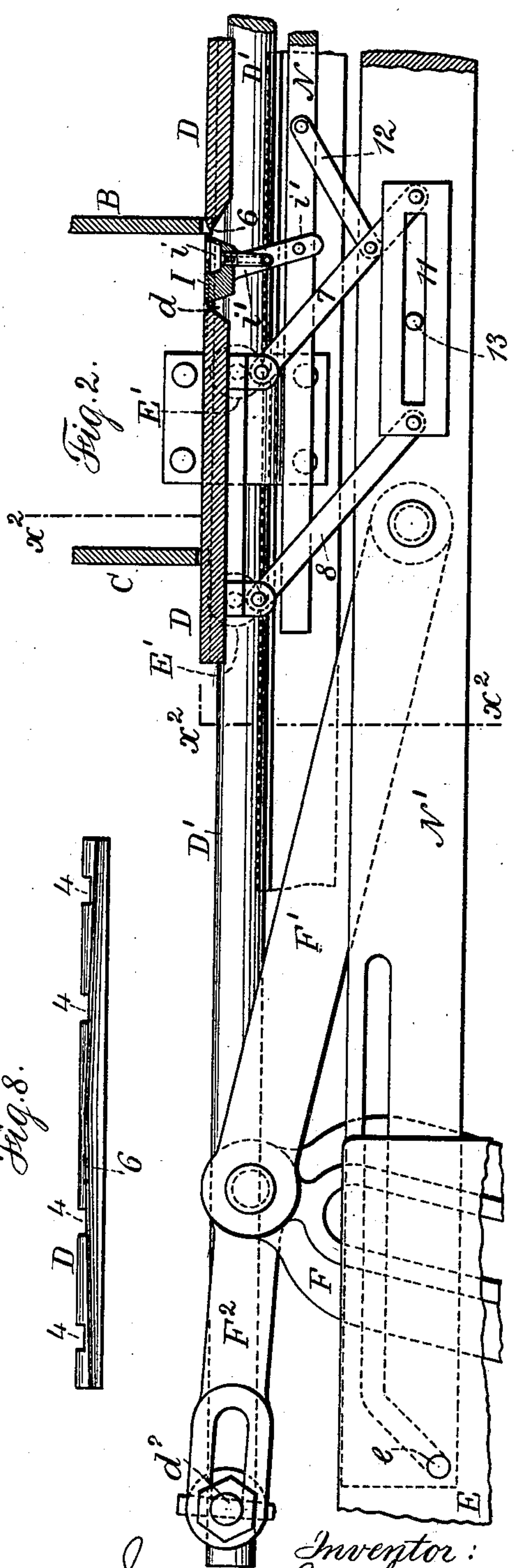


Fig. 9.

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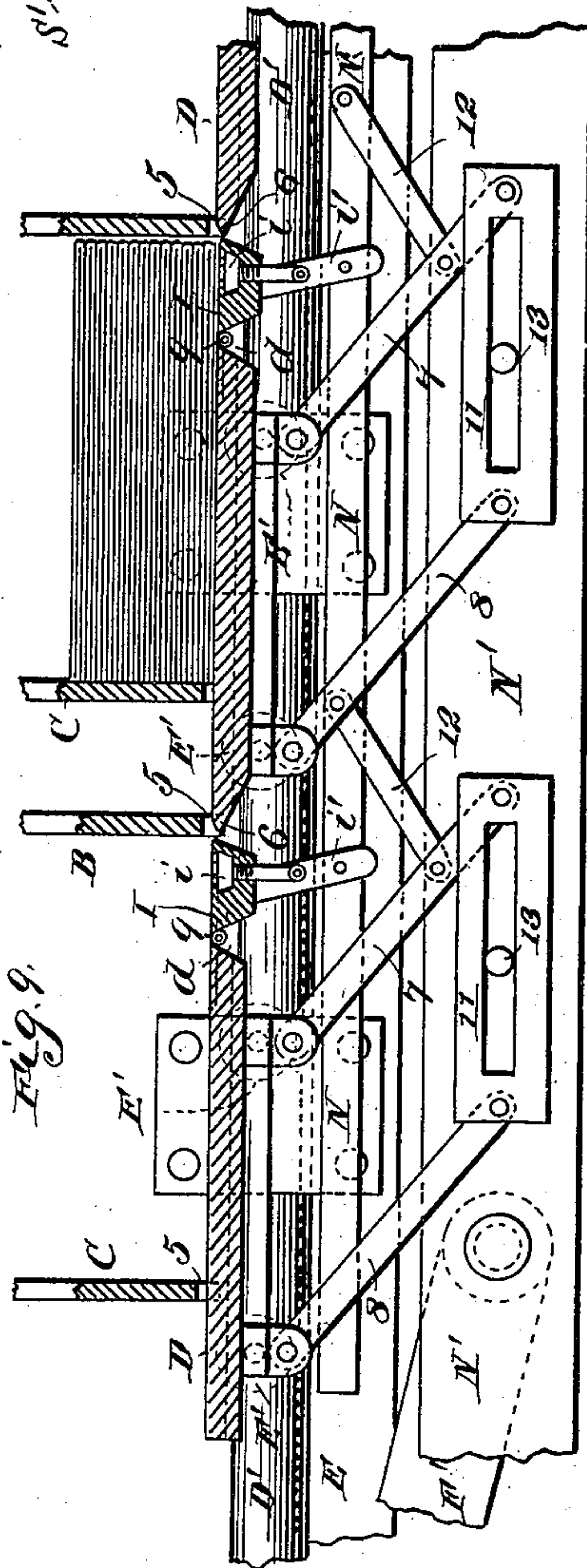
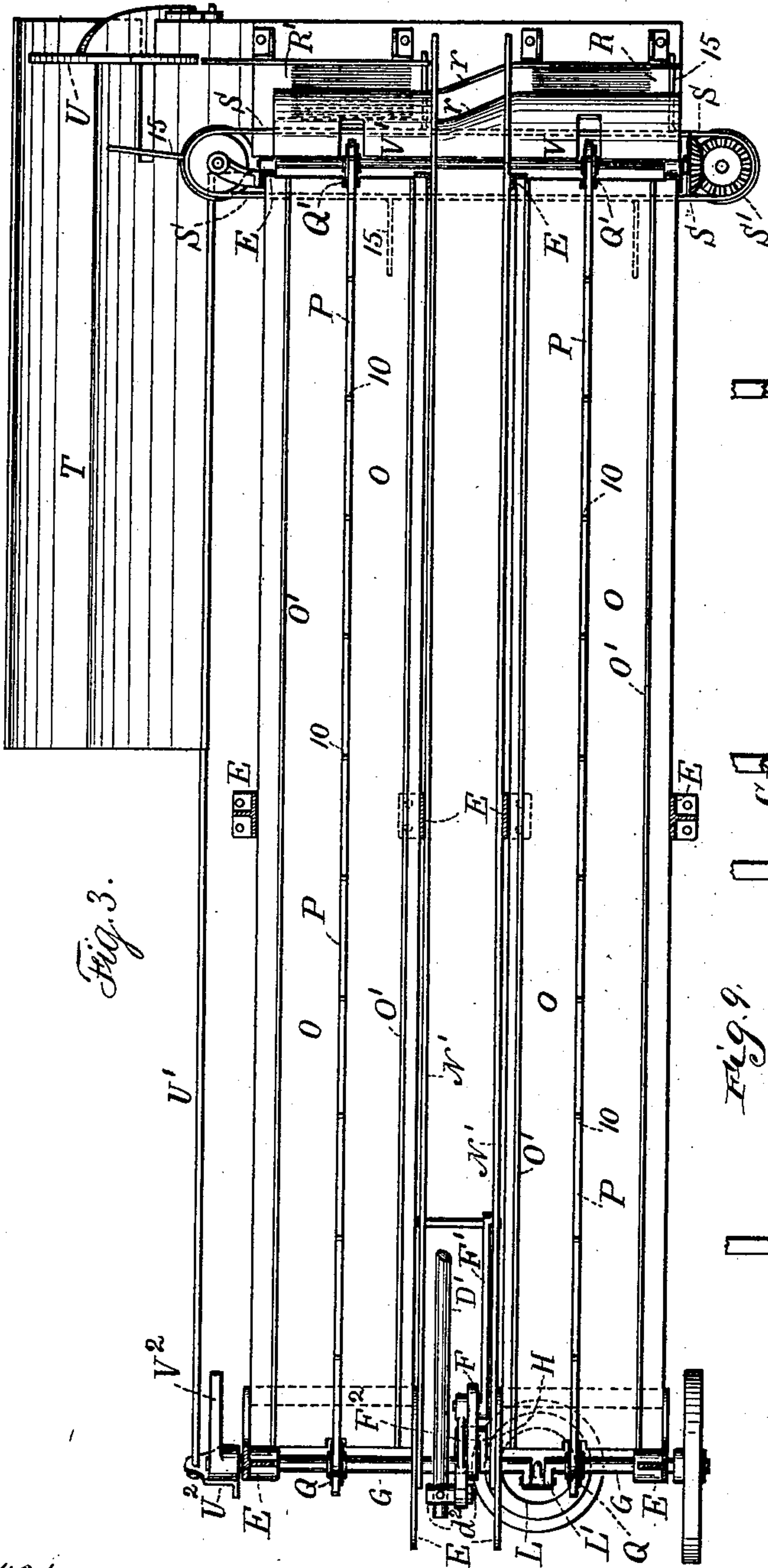
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UNITED STATES PATENT OFFICE.

JOSEPH E. SMYTH, OF PASADENA, CALIFORNIA.

SIGNATURE-GATHERER.

SPECIFICATION forming part of Letters Patent No. 666,568, dated January 22, 1901.

Application filed March 21, 1898. Renewed June 29, 1900. Serial No. 22,066. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH E. SMYTH, a citizen of the United States, residing at Pasadena, in the county of Los Angeles and State of California, have invented an Improvement in Signature-Gatherers, of which the following is a specification.

Difficulty has heretofore been experienced in arranging mechanism for gathering signatures in a sufficiently compact space, so that the machine may occupy but little more room than the boxes for holding the signatures, and in instances where the boxes have been comparatively close together and the signatures have been removed from the bottoms of the piles the separating devices have not been reliable in their action upon the signatures or else the signatures have been liable to become wedged, and hence not easily separable from the piles of signatures in the boxes.

In the present invention I make use of signature-holding boxes that are stationary and variable in size, so as to be adapted to different sizes of signatures and a reciprocating table beneath the range of boxes, such table being slotted transversely for the signatures to be passed off, and atmospheric separators are applied at the slots, so as to act upon the signatures near their folded back edges to bend such signatures downward for the back edges of such signatures to pass through the slots as the reciprocating table moves in one direction beneath the signatures to separate the bottom signature in each pile and cause it to drop, and the atmospheric separators are raised so as to partially close the transverse slots and cause the table to move freely beneath the signatures upon the return reciprocation, and the suction action is applied to the separators immediately before the table commences its movement to bend down the folded back edges of the signatures and cause them to pass through the slots in the table. The signatures drop upon a stationary signature-slide over which the signatures are moved progressively and are accumulated in piles at the delivery end, and they are drawn along by the action of an endless chain and cross bars or fingers between one pile and the next, and the piles of signatures drop into a trough

near the sprocket-wheels of the chains, and they are moved along in this trough to the place of delivery. Where the machine is made with two or more ranges of boxes adjacent to each other, the troughs at the delivery ends are made with reference to bringing the pile of signatures from one range of boxes in the proper relation to the pile of signatures from the other range of boxes, so as to deliver the signatures in the proper order to form volumes, and these are passed off upon a suitable table or support.

In the drawings, Figure 1 is a vertical section longitudinally of a range of boxes. Fig. 2 is a section in larger size of one of the boxes and connections for reciprocating the table. Fig. 3 is a partial plan view below the boxes and near the line xx , Fig. 1. Fig. 4 is a plan view, partially in section and broken open, illustrating the reciprocating table and connections for moving the same. Fig. 5 is an elevation at the pump end of the machine. Fig. 6 is a cross-section at the line $x^2 x^2$ of Fig. 2, and Fig. 7 is a cross-section at the line $x^3 x^3$, Fig. 1, near the delivery end. Fig. 8 shows the edge of one table-section; and Fig. 9 is a section of two of the boxes and of the table-sections and means for actuating the same, showing also a pile of signatures in one of the boxes.

The boxes are in one or more rows. I have shown two rows, and there are partitions of any suitable character for keeping the signatures in position. I prefer and use the longitudinal bars A, that are supported by arms A' from the frame E, and on these bars are the cross-partitions B, that have eyes around the bars A and are held by screws after being set in the proper position, and the partitions C are similarly supported and can be moved from time to time so as to adapt the gatherer to different sizes of signatures. The longitudinal partitions A³ are preferably in sections hanging from longitudinal bars A⁴, that are above the cross-partitions B and are advantageously connected to them by angle-pieces, as shown. The partitions B are stationary, so as to occupy the proper fixed positions to the reciprocating table and delivering devices.

By the foregoing it will be observed that

the boxes can be adapted to different sizes of signatures and are open at the bottom, so that the signatures can be delivered downward, and beneath the range of boxes is a reciprocating table formed of a series of sections D, suitably supported at their ends, preferably by rollers E', upon the frame E of the machine and connected by the longitudinal slide-rod D', so that this and the table-sections can be reciprocated by suitable power, and I have represented a lever F, actuating-shaft G, and crank H, acting upon the lever F, the crank H passing through a slot in the lever F and a link F² to the slide-rod D', and the necessary movements are given to the table-sections as hereinafter described, and I remark that it is advantageous to give to the table a movement that is as great as the width of the largest signatures to which the machine is adapted—that is to say, the movement should be as great as the distance between one cross-partition B and the next. In Figs. 1, 2, 4, and 9 the parts F and D' and associated parts are shown in the positions they assume at the extremity of the stroke to the right.

Between the sections of the reciprocating table D there are openings containing hinged sections I, which I term "separators." It is advantageous to make the top surfaces of the reciprocating-table sections and separators with longitudinal grooves or channels, as represented at 4, and to provide upon the bottom edges of the cross-partitions B and C downward projections 5, passing into these channels, so that the signatures cannot pass beneath either of the cross-partitions by the reciprocations of the table-sections D, and these downward projections, which are represented at 5, may be leather, bristles, or any other suitable material, and the edges 6 of the table-sections at the cross-openings d are beveled upon the under side, so as to pass in between one signature and the next, and the upper edges of the table should be beveled, as shown, so as to avoid the risk of passing above the second signature in the pile.

Each hinged separator I connected with the table-sections acts against the signature near the folded back edge to bend such back edge downward. Any suitable mechanism may be employed for this purpose. I prefer and use atmospheric pressure by making the separator at the edge opposite the hinges 9 with a chamber i. There is a slot or one or more openings from the chamber i through the surface of the separator, and there is an exhaust-pipe K connected with an air-pump L, that is driven by suitable mechanism, such as the crank L' on the driving-shaft G, and the parts are so constructed and timed that a minus pressure is produced in the exhaust-pipe K at the time the reciprocating-table sections are in the position shown in Figs. 1 and 2, with the edge 6 at the cross-slot beneath the stationary cross-partition B and with the atmospheric separator up against the bottom signature in the pile, so that the minus pressure

causes the atmospheric separator to seize the signature near the fold thereof. At this time the atmospheric separator is swung upon its hinges, so as to bend the signature downward, and the table is moved and the separator slides upon the surface of the signature as the folded edge thereof passes beneath the edge 6, and the continuation of the motion causes the signature to pass below the reciprocating table, and the atmospheric suction may be either lessened or the atmosphere admitted into the separator, so that it no longer acts upon the signature, allowing the signature to pass down and fall upon the signature-slide, to be taken away, as hereinafter described.

The means for giving to the atmospheric separator I an up-and-down swinging movement may be of any desired character. I have shown upon each separator a projecting lever i', connected with the longitudinal bar N, and said bar N may be swung up and down at the proper times, or any other suitable means may be used for raising and lowering the atmospheric separators, as they are moved by and with the table-sections. I have represented the link F' from the upper end of the lever F as connected to a longitudinal bar N', having a slot near each end with an inclined end portion, there being pins e on the frame E entering such slots and by which the bar N' is raised at the extreme movement in one direction, and as soon as it commences to move in the other direction it drops. Links 7 and 8 are pivoted to the under side of each table-section and suspend a slotted plate 11, and a link 12 connects the link 7 to the longitudinal bar N, and a pin 13 on the bar N' enters the slot in the plate 11, the slots in the plate 11 being longer than the endwise movement given to the bar N', so that the pin 13 does not come in contact with the plate 11 at the ends of the slot. The operation of this part is that as soon as the lever F commences to move back from the position shown in Figs. 1 and 2 and moves the bar N' endwise said bar descends and the pins 13 swing the links 7, 8, and 12, and the bar N is moved endwise and swings all the atmospheric separators downward to bend the folded edges of the signatures, and by this time the link F² has engaged the cross-pin d² on the slide-rod D' (see Figs. 2 and 4) and moved the same and the table-sections along beneath the signatures, causing such signatures to pass down between one table-section and the next, as aforesaid, and the advancing edge of one table-section passes beneath the next pile of signatures, holding them up. As the lever F' is swung the other way it carries with it the bar N' and the table-sections, and as the motion is completed the bar N' is raised by the pins in the inclined portions of the slots and the hinged separators are swung up against the under surfaces of the signatures, ready for the operations to be repeated.

The connections between the exhaust-pipe K and the atmospheric separators I may be

of any desired character. I have shown the exhaust-pipe K with branch connections and flexible tubes to the atmospheric separators.

The signature-slide O is, in the form of a longitudinal table, beneath the boxes and the reciprocating-table sections, and the endless chains P, passing around sprocket-wheels Q Q', are provided with fingers or plates at distances apart corresponding to the distances between the stationary cross-partitions B, and these are so connected to the chains that they stand upright, or nearly so, and the chains are below the surfaces of the signature-slides O, and the sprocket-wheels and chains are moved progressively or intermittently in unison with the movements of the reciprocating table, so that the spaces between the plates or fingers of the chain are in the proper position for receiving the signatures as they fall from the reciprocating table. It will be apparent that the signatures accumulate in piles between the respective plates or fingers as such signatures are moved toward the place of delivery. I have represented the sprocket-wheels Q upon the driving-shaft G, the size of such sprocket-wheels being such as to move the chains and cross-plates the proper distances each revolution.

Where the signature-gatherer is composed of only one range of boxes, one volume or group of signatures will be associated and delivered over the sprocket-wheel Q' each complete movement, and the pile of signatures may fall upon any suitable table or receiver. I, however, prefer to employ a trough R, into which the pile of signatures drops as it is pushed off the end of the signature-slide O by the action of the plate or finger behind the pile, and it will be observed that the signatures drop into this trough with the folded back edges downward, and hence such signatures are in a convenient position for handling, and they are not liable to become misplaced by the atmosphere or injured as they drop into the trough.

The piles of signatures are carried off in succession in any suitable manner. I prefer to make use of a pusher for moving the signatures along progressively in the trough, such pusher 15 being in the form of a finger extending out from an endless chain or belt S, and the trough can terminate at any suitable place for the reception of the piles of signatures as pushed along. Where two or more ranges of boxes are combined in one machine, the troughs are to be made and the signatures moved in such a way that one pile of signatures is brought in line, or nearly so, with another pile of signatures, the second pile of signatures being dropped into the trough so as to occupy the proper position as delivered in relation to the first pile of signatures, and with this object in view it is advantageous to construct the troughs as shown in Fig. 3, in which the trough R from the first line of boxes is curved or diagonal to bring the first pile of signatures to the proper po-

sition in relation to the second pile of signatures to be received between the diverging sides of the trough R', and the side r of the first trough may terminate at a little distance beyond the place where the second group of signatures is dropped into the trough R', so that the second pile of signatures may come directly into contact with the first pile and be carried along forward through the trough, and a similar arrangement may be employed with three or more ranges of boxes. If desired, the signature-slide may have sides O', one or both of which may be adjustable in their position, so as to form a trough within which the piles of signatures can be moved along and the signatures will be kept in line and upon one another, and it is advantageous to employ inclined guides V V' at the sides of the sprocket-wheels Q', so that the signatures will pass over the same as they descend into the trough.

In some instances it is advisable to make the edges 6 of the reciprocating-table sections at the cross-slots d slightly pointed near the middle of the reciprocating table, as seen in Fig. 8, so that the projecting point at the edge 6 may more easily pass in between the signature that is bent down into the slot and the next signature above it in the pile of signatures.

The trough T is advantageously at the end of the troughs R R', so that the piles of signatures slide down the incline seen in Fig. 7 as they pass into such trough, and there is a pusher U in such trough, that is connected by a rod U' with the lever U², (see Fig. 5,) that is pivoted at its lower end upon the frame E and acted upon by a cam V² upon the shaft G, and the volumes of signatures are moved along in the trough by these devices, and the spring V³ carries the pusher back out of the way to give space for the next volume of signatures to slide down from the troughs R R' into the trough T.

I remark that any desired means may be used for driving the chain S and fingers 15. In Fig. 7 bevel-gears are shown for connecting the shaft of the sprocket-wheels Q' with the wheel S' for the belt or chain S.

I claim as my invention—

1. The combination in a signature-gatherer with the range of boxes for holding the piles of signatures, of a table beneath the boxes composed of sections, and mechanism for reciprocating the sections, hollow atmospheric separators between one table-section and the next, hinges at one side for connecting the sections and atmospheric separators, tubular connections for exhausting the air from the separators and means for swinging the moving edges of the separators downward after the folded edges of the signatures have been drawn to the separators by atmospheric action, and means for moving the table-sections and causing the downward delivery of the signatures, substantially as set forth.

2. The combination in a signature-gatherer

of two ranges of boxes, table-sections beneath the boxes and means for reciprocating the same, separators connected with the sections and acting upon the folded edges of the signatures to draw the same down and deliver the signatures downward, signature-slides upon which the signatures are received, means for moving the signatures progressively to the places of delivery, so that the signatures accumulate in piles, two inclined guides for receiving the piles of signatures, a cross-trough into which the piles of signatures are received, an endless belt and fingers for moving the piles of signatures along progressively in the cross-trough, and a diagonal trough to bring the first pile of signatures in the proper position in relation to the second pile of signatures, substantially as set forth.

3. The combination with the signature-boxes and the table-sections and the separators hinged to the table-sections, of a rod N, connections to the separators and means for moving the rod endwise to swing the separators, substantially as specified.

4. The combination with the signature-

boxes and the table-sections and the separators hinged to the table-sections, of a longitudinal slide-rod and connections to the table-sections, a crank and lever and a slotted link to the slide-rod and a rod and arms for moving the separators and links and a longitudinal bar for giving a downward swinging motion to the separators and for allowing said sections to be moved with the table-sections, substantially as specified.

5. The combination with the signature-boxes and a table composed of sections and separators between one table-section and the next, there being grooves in the upper surfaces of the table-sections and the separators and means for connecting the table-sections and the separators and for reciprocating the same, of downward projections at the lower edges of the partitions of the boxes entering the said grooves, substantially as and for the purposes set forth.

Signed by me this 8th day of January, 1898.
JOSEPH E. SMYTH.

Witnesses:
JOHN McDONALD,
ANN E. DEAN.