

No. 652,300.

Patented June 26, 1900.

D. M. SMYTH.
SIGNATURE GATHERER.

(Application filed July 14, 1896. Renewed Nov. 22, 1899.)

(No Model.)

2 Sheets—Sheet 1.

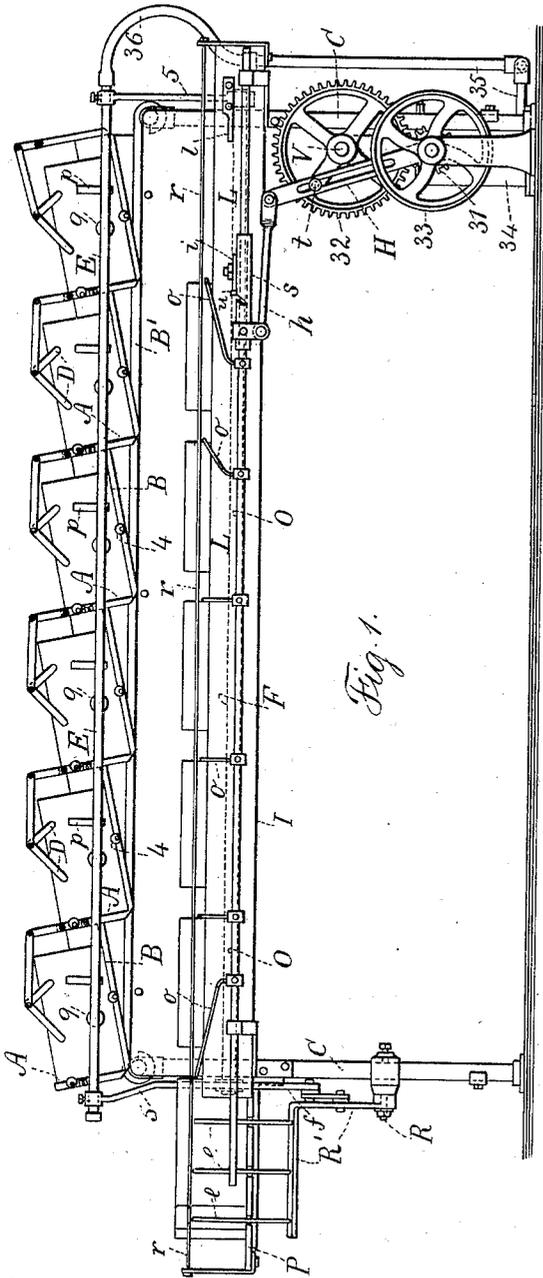


Fig. 1.

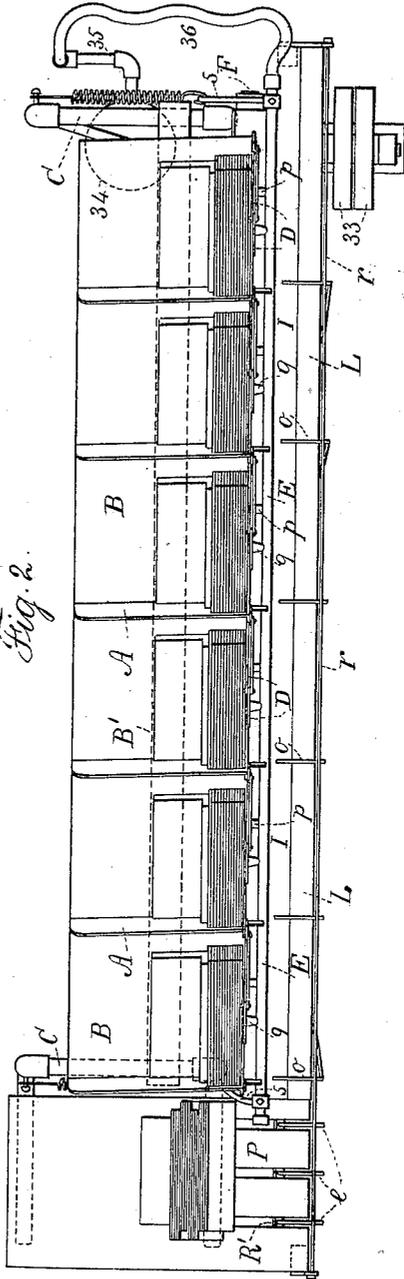


Fig. 2.

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2 Sheets—Sheet 2.

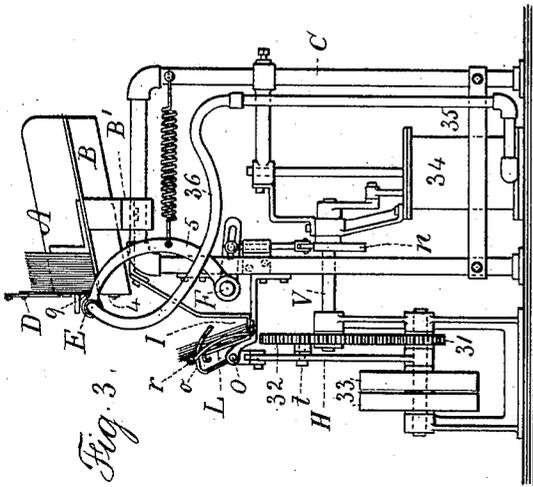


Fig. 3.

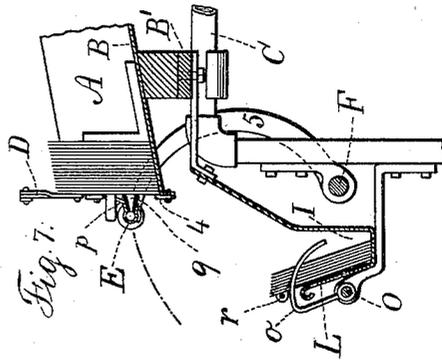


Fig. 7.

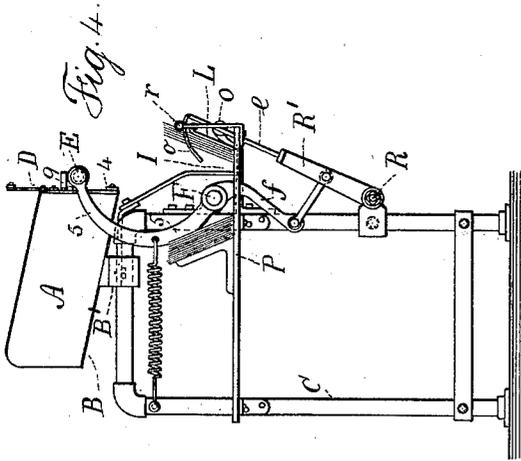


Fig. 4.

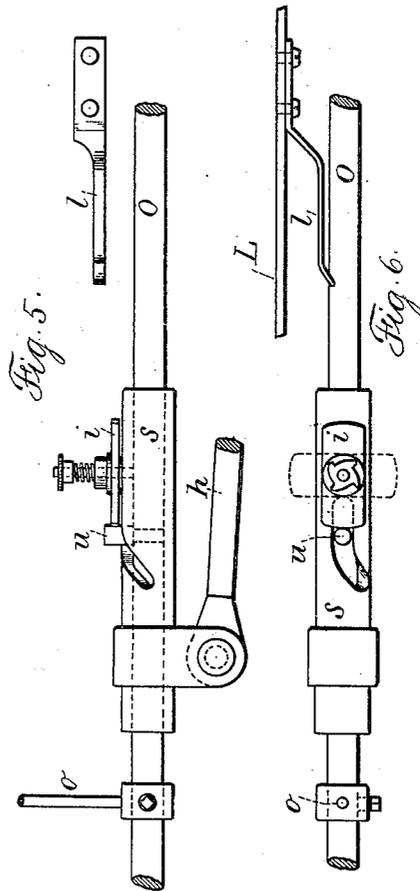


Fig. 5.

Fig. 6.

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UNITED STATES PATENT OFFICE.

DAVID M. SMYTH, OF PASADENA, CALIFORNIA.

SIGNATURE-GATHERER.

SPECIFICATION forming part of Letters Patent No. 652,300, dated June 26, 1900.

Application filed July 14, 1896. Renewed November 22, 1899. Serial No. 737,963. (No model.)

To all whom it may concern:

Be it known that I, DAVID M. 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 Machines for Gathering Signatures, of which the following is a specification.

This invention is a modification of and an improvement upon the device set forth in my Patent No. 565,145, of August 4, 1896, filed April 13, 1894, and is for the purpose of simplifying the apparatus and rendering the same more efficient in operation. In the present instance the signatures are placed in boxes and drawn out in succession by a vibrating sucker, and they fall into a trough and stand up edgewise, preferably on the back or folded edges, and they are moved along progressively by a rod that is reciprocated and provided with fingers that pass in between one pile of signatures and the next, and the rod is turned in its bearings, so that the fingers are swung back outside of the trough upon the return movement and swung in between one pile of signatures and the next on the forward movement, so as to carry the signatures along progressively to the delivery end, where they are received upon a table and pushed back by swinging fingers.

In the drawings, Figure 1 is an elevation of the machine, and Fig. 2 is a plan view. Fig. 3 is an elevation at the right-hand end of the machine, and Fig. 4 is an elevation at the left-hand end, and Fig. 5 is an elevation, in larger size, of the reciprocating forwarding-slide, and Fig. 6 is a plan view of the same, with the thumb-screw and spring removed, and Fig. 7 is a section through the trough in larger size.

The boxes are formed with bottoms B and side partitions A, and the range of boxes is supported upon the end frames C and longitudinal bearer B', and any desired number of boxes may be provided in the range. I have represented six of such boxes in the drawings, and the stops 4 are provided at the lower edges of the boxes to arrest the lower edges of the signatures, and it is advantageous to apply similar stops near the upper portions of the boxes and upon the inner faces of the partitions A, and there are steady-bars D with projecting spring-fingers that hold the upper

portions of the folded signatures in position, and the inclinations of the boxes may be such that the signatures slide down toward the delivery ends, or springs may be employed, acting against followers for moving the piles of signatures along. Each stop 4 is preferably made of a round piece of sheet metal with an eccentric hole and attaching-screw, so that it can be moved around and adjusted to project more or less in steadying the end signature in the pile of signatures. The steady-bars D are pivotally attached to the supporting-arms, so that they can be swung into any desired positions, according to the sizes of the folded signatures.

The suction-tube E passes along in front of the range of boxes, and the arms 5 are at the ends of the shaft F, so that the suction-tube E can be swung toward and from the signatures, and the rubber nipples 9 project from the suction-tube and are brought up against the end signature in each pile of signatures in the boxes by the swinging of the arms 5 as the rock-shaft F is moved by the action of a cam *n* upon the driving-shaft V. This driving-shaft V may be driven by a pinion 31 to the gear-wheel 32, such pinion 31 being rotated by suitable power to the pulleys 33, and upon the shaft V a crank is provided with a connecting-rod to the piston of the pump-cylinder 34, there being a pipe 35 from such pump-cylinder and a flexible connection 36 to the suction-tube E, and the parts are so timed that the piston will rise and apply suction as the tube E and nipples come up to the signatures, and then the suction-tube will be swung back, and the signatures will be relieved by the downward movement of the piston in the pump-cylinder.

The signature-slide I is in the form of a trough, the fence L being at the outer side of this trough, so that the signatures as they are relieved will drop into the trough and rest against the fence, and along in front of the fence is the forwarding-bar O, having upon it fingers *o*, there being as many fingers *o* as there are boxes. This forwarding-bar O has upon it a slider *s*, that receives motion from the link *h*, lever H, and a crank-pin *t*, and this slider *s* is moved freely backward and forward upon the forwarding-bar O; but there is upon this forwarding-bar O a pin *u*

in a cam-slot in the slider, so that as the slider is drawn back the pin *u* and bar *O* remain stationary until the slider as it draws back acts by the incline of the cam-slot to partially rotate the forwarding-bar *O* and swing the fingers *o* outward and away from the signatures, and in this position the bar and fingers are drawn back. When the crank-pin *t* and lever *H* commence to move in the opposite direction, the slider slips along upon the rod and the cam-slot thereof turns the rod or bar *O*, swinging the fingers *o* in between one pile of signatures and the next, and then the fingers carry the piles of signatures toward the delivery end a distance as great as the width of one of the boxes, and at the delivery end of the machine the table *P*, which is on line with the bottom of the signature-slide *I*, receives the piles of signatures that have been gathered progressively from the boxes. This table *P* is slotted transversely, and the pushers *e* upon the shaft *R* act against the pile of signatures and carry the same back and laterally upon the table. The shaft *R* is represented as having on it a crank-arm *R'*, that carries the pushers *e*, and this crank-arm may be moved in any desired manner. I have represented an arm *f* and link extending from the rock-shaft *F*, so that the pushers *e* swing back out of the way as the suction-tube is moved toward the range of signatures, and the reverse.

From the foregoing it will be apparent that the signatures are accumulated from one end to the other of the machine, and the pile as delivered from the signature-slide contains as many signatures as there are piles of signatures in the boxes, and where the number of boxes is sufficient to hold a volume the piles of signatures may be pressed backward in succession and subsequently separated for binding in piles corresponding to the number of signatures in the volume; but it is often advantageous to keep one pile of signatures easily separable from the next pile of signatures whether the pile composes a complete volume or only a portion of a volume, and with this object in view I provide for giving to the forwarding-bar *O* a greater movement at one reciprocation than at the next, and for this purpose the revolving block *i* is pivoted upon the slider *s*, and it is provided with a four-toothed ratchet, and there is a stationary spring *l* on the fence *L*, which engages this ratchet, and the position of this revolving block upon the slider *s* is such that when it is turned into line with the slider the stud *u* comes against the end of the revolving block, and hence the forwarding-bar *O* is moved forward a greater distance and carries one pile of signatures so much farther, and when turned crosswise to the slider at the next movement the stud *u* is not engaged until the slider at the bottom of the slot contacts with such stud *u*, and the next pile of signatures is not carried so far. Hence these piles of signatures will occupy staggered po-

sitions upon the table *P*, with the ends projecting alternately, as illustrated in the plan Fig. 2, and hence they can be lifted off or separated with great convenience, and a book can be made up by placing these piles together in those cases where it is necessary to make use of two machines in consequence of the number of signatures in the book being greater than the number of boxes in the machine.

Where the signatures are large, the upper portion of such signatures might fall over the suction-tube *E* and then not drop quickly into the signature-slide. To prevent this difficulty, the fingers *p* are connected to the suction-tube and extend upward and opposite the signatures in each pile of signatures, and I remark that the rear portion of the signature-slide extending up as an incline and terminating beneath the boxes *A* acts as a guide in directing the signatures as they drop, so that the descending signatures pass in behind the other signatures in the signature-slide as they are accumulated progressively. One or more guide-wires *r* may be used to steady the signatures above the outer edge of the signature-trough.

I claim as my invention—

1. The combination with a range of boxes for holding signatures and a suction-tube and means for moving the same to detach the signatures, of a signature-slide in the form of a trough into which the signatures are received, a forwarding-bar having fingers upon the same adapted to engage the piles of signatures, a slider upon the forwarding-bar having a cam-slot engaging a stud upon the forwarding-bar and means for reciprocating the slider and giving to the forwarding-bar a reciprocating and also a turning movement to swing the fingers in between the piles of signatures or away from the same, substantially as set forth.

2. The combination with a range of boxes for holding signatures and a suction-tube and means for moving the same to detach the signatures, of a signature-slide in the form of a trough into which the signatures are received, a forwarding-bar having fingers upon the same adapted to engage the piles of signatures, a slider upon the forwarding-bar having a cam-slot engaging a stud upon the forwarding-bar and means for reciprocating the slider and giving to the forwarding-bar a reciprocating and also a turning movement to swing the fingers in between the piles of signatures or away from the same, and means for varying the reciprocating movement given to the forwarding-bar so as to leave the piles of signatures in different positions, substantially as set forth.

3. The combination with a range of boxes for holding signatures and a suction-tube and means for moving the same to detach the signatures, of a signature-slide in the form of a trough into which the signatures are received, a forwarding-bar having fingers upon the same

adapted to engage the piles of signatures, a slider upon the forwarding-bar having a cam-slot engaging a stud upon the forwarding-bar and means for reciprocating the slider and giving to the forwarding-bar a reciprocating and also a turning movement to swing the fingers in between the piles of signatures or away from the same, a block and means for turning the same to vary the reciprocation of the forwarding-bar for leaving the piles of signatures in different positions, substantially as set forth.

4. The combination with a range of boxes for holding signatures, a suction-tube, nipples and means for moving the same to detach the signatures and to drop them edgewise, of a signature-slide having a bottom, an inclined side extending up below the boxes and an outwardly-inclined side for the signatures to rest against as they stand up on their edges within the slide, a forwarding-bar having fingers and mechanism for moving the fingers in between the piles of signatures and for reciprocating the bar to carry the signatures toward the delivery end and for moving the fingers out from between the signatures upon the return movement, substantially as set forth.

5. The combination in a machine for gathering signatures, of a range of receptacles for the piles of signatures, a signature-slide having a bottom and an inclined outer side and with the inner side inclined upward and beneath the range of receptacles, a suction-tube and nipples and mechanism for moving the same and separating the end signatures from the piles of signatures, and guide-fingers connected to and moving with the suction-tube and extending upward for guiding the detached signatures as they drop edgewise into the signature-slide and adjacent to the inner side of the same, substantially as set forth.

6. In a machine for gathering signatures, the combination with the boxes or receptacles for holding the piles of signatures, and mechanism for separating the signatures from the piles and for dropping them edgewise, of a signature-slide having a bottom and an outer inclined side against which the signatures rest while standing up edgewise in such signature-slide, and an inner side to the signature-slide, the lower portion of which is vertical, or nearly so, and the upper portion is inclined toward the receptacles so that the signatures as they are dropped successively will pass into the slide and between the groups of signatures in such slide and the inner side of the slide, substantially as set forth.

7. In a signature-gathering machine, the combination with the receptacles for holding the separate piles of signatures, of a signature-slide below such receptacles having a bottom and sides for retaining the signatures in a nearly-upright position with their edges resting upon the bottom of the signature-slide, means for detaching one signature at a time from each pile of signatures and dropping the same edgewise between the signatures in the slide and the inner side of such slide, means for moving the groups of signatures along progressively in such signature-slide, a table at the end of such slide and means for moving the groups of signatures successively laterally and piling such groups of signatures one against the other and pushing them back upon the table while such signatures are resting with their edges upon the table, substantially as set forth.

Signed by me this 29th day of June, 1896.
D. M. SMYTH.

Witnesses:

C. C. BROWN,
S. R. SMITH.