

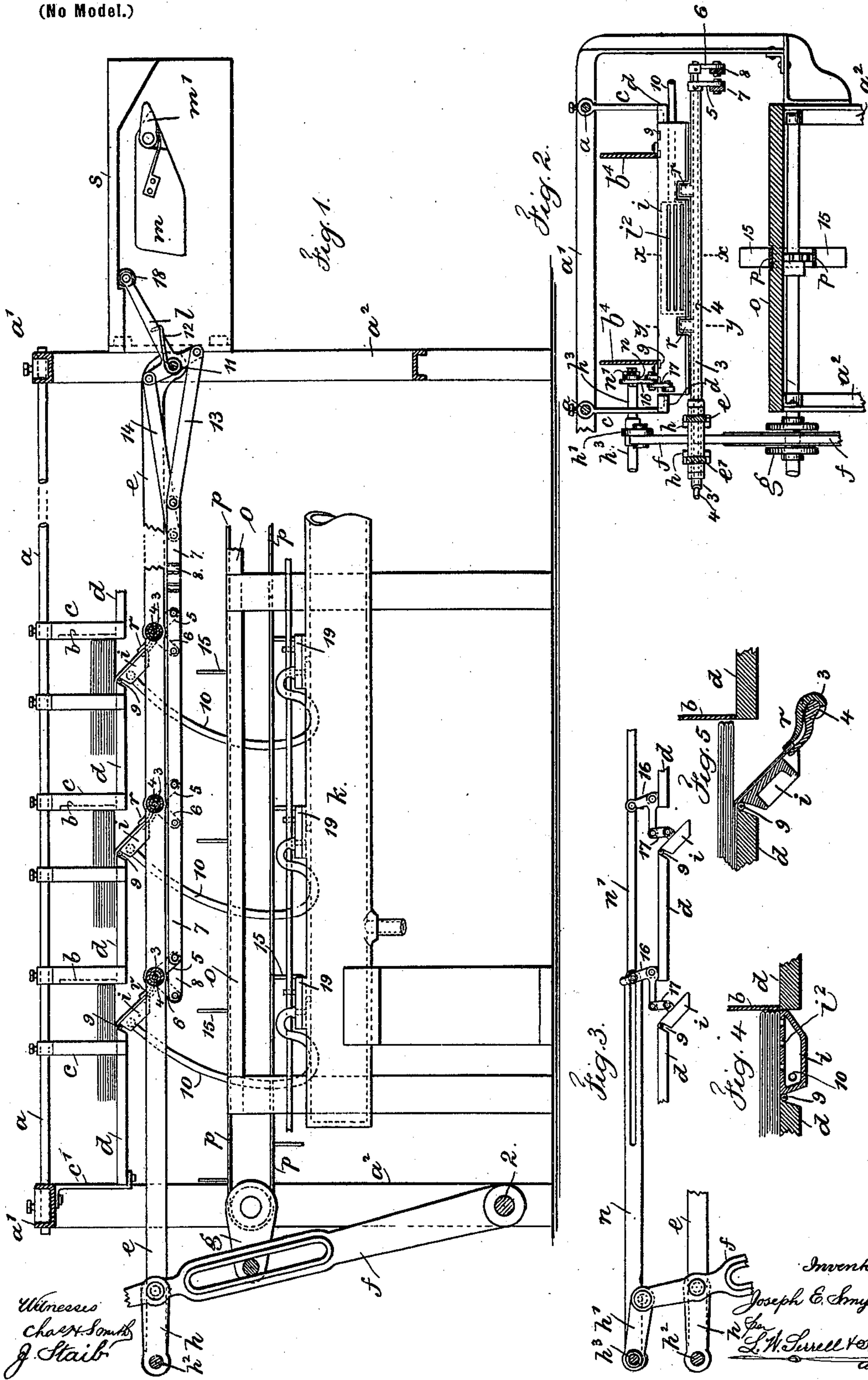
No. 685,535.

Patented Oct. 29, 1901.

J. E. SMYTH.
SIGNATURE GATHERER.

(Application filed Sept. 8, 1899. Renewed May 2, 1901.)

(No Model.)



UNITED STATES PATENT OFFICE.

JOSEPH E. SMYTH, OF PASADENA, CALIFORNIA.

SIGNATURE-GATHERER.

SPECIFICATION forming part of Letters Patent No. 685,535, dated October 29, 1901.

Application filed September 8, 1899. Renewed May 2, 1901. Serial No. 58,555. (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.

My present invention relates to an improvement upon the device shown and described in my application for Letters Patent, Serial No. 674,576, filed March 21, 1898, and duly allowed May 20, 1899. In the device of the said application the signatures contained in the respective boxes of the machine were removed one at a time by a reciprocating motion imparted to the table-sections supporting the signatures, and this movement was imparted after a suction apparatus was brought into operation to draw down the folded-back edge of the signature, so that the moving table intervened between the lowermost signature thus held and the signatures above to support the signatures above and to separate the lowermost signatures from the piles of signatures.

In my present invention the signatures are removed by pairs of grippers, and the invention relates especially thereto and to a device for actuating the said pairs of grippers and for actuating the hinged separators or suction-boxes. I provide a lever operated by a crank from a suitable source of power, the crank engaging the mortise of the said lever. The lever actuates links, which in turn impart longitudinal movements to bars, one set of which actuates the grippers to remove the lowermost signatures of the piles and another set the hinged grippers or suction-boxes. The grippers are opened and shut by pairs of parallel-moving bars actuated by a rocker and cam, the same being supported by the bars carrying the gripper-shafts and actuated by the reciprocating movement of said bars.

In the drawings, Figure 1 is a partial section and elevation illustrative of the essential features of my invention. Fig. 2 is an elevation and partial section at one side of the machine, representing approximately half of the machine. Fig. 3 is an elevation representing the bars for operating the hinged separators or suction devices. Fig. 4 is a section of the table and one of these boxes in

position at the line $x x$ of Fig. 2; and Fig. 5 is a similar section at the line $y y$ of Fig. 2 through the grippers and showing the grippers as engaging the folded-back edge of a signature.

The mortised lever f , pivoted upon the cross-shaft 2 and actuated by the crank g from a suitable source of power, the table o , and the endless belt p , with plates 15, for moving along the superposed signatures as deposited upon the table o , are devices similar to those described in my aforesaid application. The exhaust-pipe k and the pipes 10, extending therefrom, and the suction-boxes or hinged separators i , connected by hinges 9 to the table-sections d , are also similar to the devices described in my aforesaid application. Said suction-boxes or separators have apertures or openings at i^2 , through which the suction acts.

The bars a , supported upon arms a' from frames a^2 , and from which bars a the cross-partitions b and supporting-bars c are connected and extend to the table-sections to form, with the table-section d and the partitions $b^4 b^4$, secured to said table-sections, the boxes to hold the piles of superposed signatures, are also similar to the devices of the aforesaid application. I have shown a supporting-bar c' from the arm a' at one end of the frame and as connected for supporting the end table-section d .

The links $h h'$ are connected to the upper end of the mortise-lever f . The link h is pivoted to a cross-shaft h^2 at the rear ends of the bars $e e'$, and the link h' is connected to a cross-shaft h^3 at the rear ends of the slotted bars n . The bars $e e'$ have connected to and extending through them the hollow shafts 3 and the shafts 4, extending through said hollow shafts. The grippers are represented at r . They are in pairs, and one gripper of each pair is connected to the hollow shaft 3 and the other gripper of each pair to the internal shaft 4, the hollow shaft 3 having openings at the proper places for the connection of said grippers.

The hollow shafts 3 carry rocker-arms 5 and the shafts 4 carry rocker-arms 6, and bars 7 and 8, that are parallel and in the same plane, are pivoted to the free ends of the said rocker-arms. The respective ends of the bars

7 and 8 are connected to links 13 14, and their free ends are connected to a T-shaped rocker-arm *l*, pivoted to a shaft 11, connected to the forward ends of the bars *e e'*, and around the shaft 11 is a spring 12, with one end of the same connected to the shaft and the other end to the rocker-arm 11, the tendency of the said spring being to elevate the free end of the rocker-arm, upon which free end there is a roller 18.

A guide-frame *s* is connected to and projects from the frame *a*² of the machine, the under surface of the same being a runway for the roller 18, and in this guide-frame is a cam *m* with a spring-actuated nose *m'*, the rocker-arm *l* being swung by the combined action of the guide-frame *s* and the cam *m*, the said roller running on the under side of the guide-frame, passing by the nose *m'*, which yields for the same, then underrunning the said nose and cam, and finally running off the end of the cam *m* and springing upward to the under side of the guide-frame *s*. In this movement the said rocker-arm *l* moves the links 13 and 14 and the bars 7 and 8 to impart to the hollow shaft 3 and shaft 4 through the rocker-arms 5 a partial rotary motion, which will open and shut the grippers at the proper time.

The hinged separators or suction-boxes *i* have links 17 pivoted to their upper surfaces, and upon the table-sections *d* bell-crank levers 16 are pivoted, the arms of the same in turn being pivoted to the links 17 and to the bars *n* and *n'*. The bar *n* is slotted at the end opposite to that connected to the link *h'*, and the bar *n'* is pivoted to the first of the bell-crank levers by a pin passing through the slot of the bar *n* and pivoted directly to all the other bell-crank levers, there being one bell-crank lever for each of the signature-holding boxes and suction-boxes. This device for raising and lowering the suction-boxes is simply illustrative, it being a fact that other and equivalent means may be employed with equal facility. In the movement of these parts the mortise-lever *f* as operated by the crank *g* moves in first one direction and then in the other. In its motion from the position shown in Fig. 3 the slotted bar *n* is moved along until the end of the slot comes against the pivot of the first bell-crank lever. The force of the said movement is then exerted through the said pivot and the bar *n'* to all of the bell-crank levers simultaneously to raise all the suction-boxes, and in the return movement the said bar *n* is operated alone until the outer end of the slot is reached, when all the suction-boxes are simultaneously moved and lowered.

The suction-pipes 10 are respectively connected to the sides of the suction-boxes or hinged separators *i* at their upper ends, and adjacent to their lower ends and above the exhaust-pipe *k* are valves 19, of suitable form and operated by any desired mechanism so as to permit the suction action to be in effect at the right moment. In the operation of the de-

vice, with reference to Fig. 4, the suction-boxes each occupy a normal position against the under surface of the lowermost signatures at the folded or back edge, and when the suction is brought into effect the lowermost signatures are held against the upper surfaces of the said suction-boxes. At this time the bars *n n'*, the bell-crank levers 16, and link 17 are brought into operation to depress or lower the suction-boxes and in so doing bend down the rear edges of the lowermost signatures. After this movement is effected, or practically simultaneously therewith, the grippers *r* are opened, by means of the bars 7 8, rocker-arms 5 6, the links 13 and 14, the T-shaped rocker-arm *l*, and the cam *m*, to engage the folded-back edges of the signatures and hold the same securely. In Fig. 1 the suction-boxes are shown as depressed and the grippers as in engagement with the folded-back edges of the signatures.

The forward movement of the bars *e* and *e'* will in this position draw the lowermost signatures out of the boxes and from beneath the superposed piles of signatures until the signatures are clear and their free ends have fallen down between the plates 15 on the endless belt *p* over the table *o*. In the meantime the rocker-arm *l*, with its roller 18, has advanced and the roller has passed down the incline of the guide-frame *s* and beneath the nose *m'* and the grippers have been opened sufficient to drop the signatures entirely upon the table *o*. The grippers are kept open while the roller 18 travels along the under side of the cam *m*.

As soon as the signatures are free from the suction-boxes and before the forward movement is entirely completed the bar *n* actuates the bar *n'* and the bell-crank levers and links to raise the suction-boxes and simultaneously the suction is applied. This position of the suction-boxes is maintained while the roller 18 is traveling on the under side of the cam *m* and before the same leaves the cam. In the reverse movement the bar *n* actuates the bar *n'*, the bell-crank levers, and links to depress the suction-boxes with other signatures held to the surfaces thereof. The grippers in the meantime are open, and as open advance over the folded rear edges of the various signatures in their depressed position, and when the roller 18 runs off the rear end of the cam *m* and the spring 12 elevates the same the grippers are closed upon the signatures to repeat the operations.

It is to be understood that some of the minor details of mechanism, and which are not necessary for the operation or for the understanding of this invention, are not illustrated in the drawings nor described in the specification.

I claim as my invention—

1. The combination in a signature-gathering machine with a range of boxes for holding superposed signatures, suction-boxes and means for raising and lowering the same to

carry down the folded-back edges of the lowermost signatures, of a gripping device for each box composed of a slotted hollow shaft, a gripping-finger attached thereto, a shaft
5 passing through said hollow shaft, a gripping-finger attached to said shaft and passing through the slot in said hollow shaft and adjacent to the finger thereon, means for operating said shafts to open and close said fingers, and means for moving the gripping device bodily, substantially as set forth.

2. The combination in a signature-gathering machine with a range of boxes for holding piles of superposed signatures and suction-boxes pivoted thereto and means for moving the suction-boxes to carry down the rear edges of the lowermost signatures, of grippers in pairs, devices upon which the grippers are mounted, longitudinally-movable
15 bars to which the said devices are pivoted whereby the pairs of grippers are connected and moved lengthwise of the machine, rocker-arms connected to the carriers of the grippers, bars pivoted to the said rocker-arms, links pivoted to the forward free ends of the said bars, and means for imparting to the said links and the said bars movements to open and shut the grippers, substantially as set forth.

3. The combination in a signature-gathering machine with a range of boxes for holding piles of superposed signatures and suction-boxes pivoted thereto and means for moving the suction-boxes to carry down the rear edges of the lowermost signatures, of grippers in pairs, devices upon which the grippers are mounted, longitudinally-movable bars to which the said devices are pivoted whereby the pairs of grippers are connected and moved lengthwise of the machine, rocker-arms connected to the carriers of the grippers, bars pivoted to the said rocker-arms, links pivoted to the forward free ends of the said bars and a T-shaped rocker-arm pivoted to the bars carrying the gripper-holding devices
30 35 40 45 50
and pivoted to the forward ends of the aforesaid links and carrying a roller at its free end, a guide-frame on the under side of which the said roller travels and a cam and spring-nose within the guide-frame for actuating the rocker-arm and the devices connected therewith for periodically opening and shutting the grippers, substantially as set forth.

Signed by me this 25th day of August, 1899.

JOSEPH E. SMYTH.

Witnesses:

M. J. O'KELLY,

WILLIAM B. WARD.