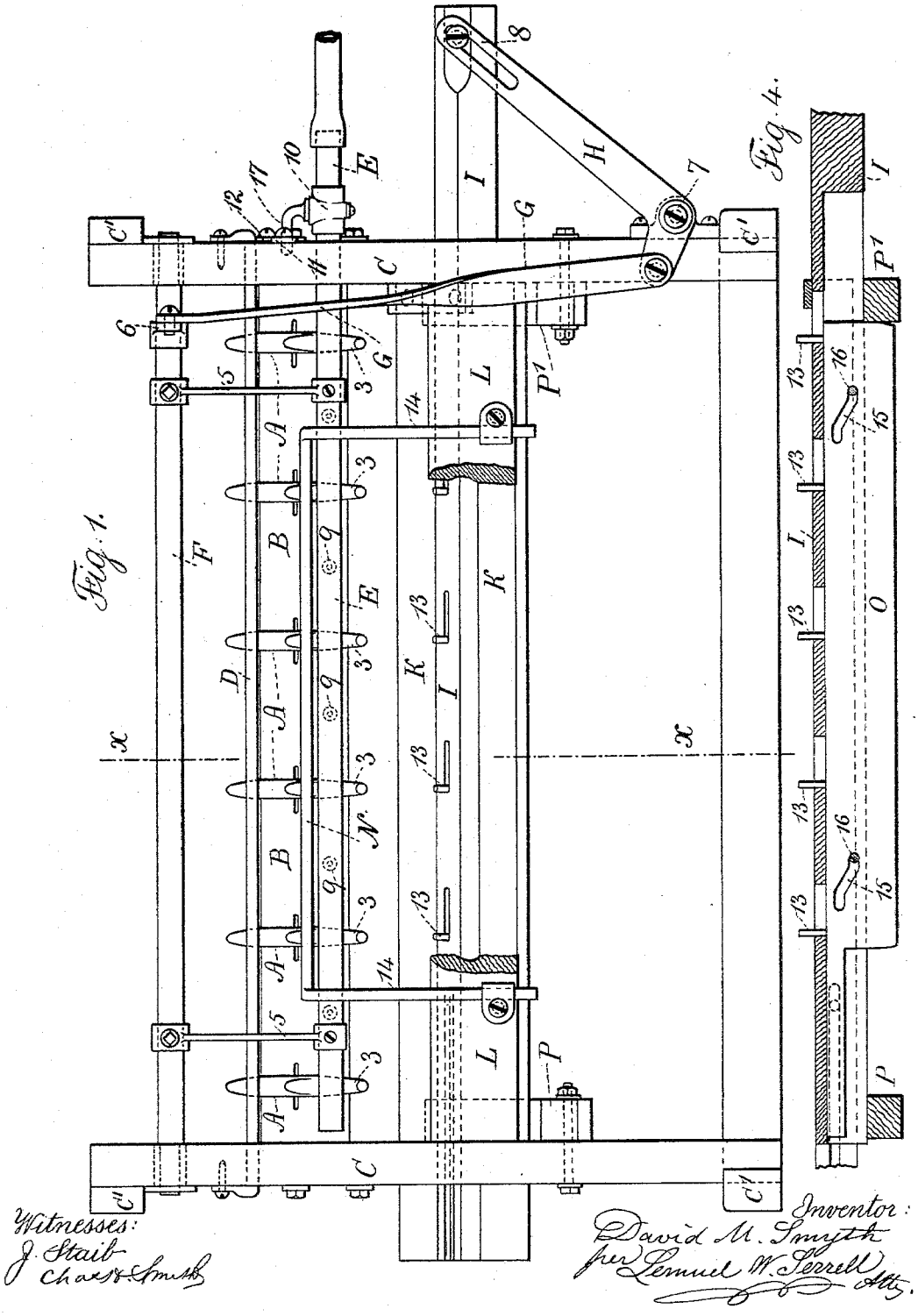
(No Model.) 2 Sheets—Sheet 1.

D. McC. SMYTH.

SIGNATURE GATHERER.

No. 565,145. Patented Aug. 4, 1896.



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

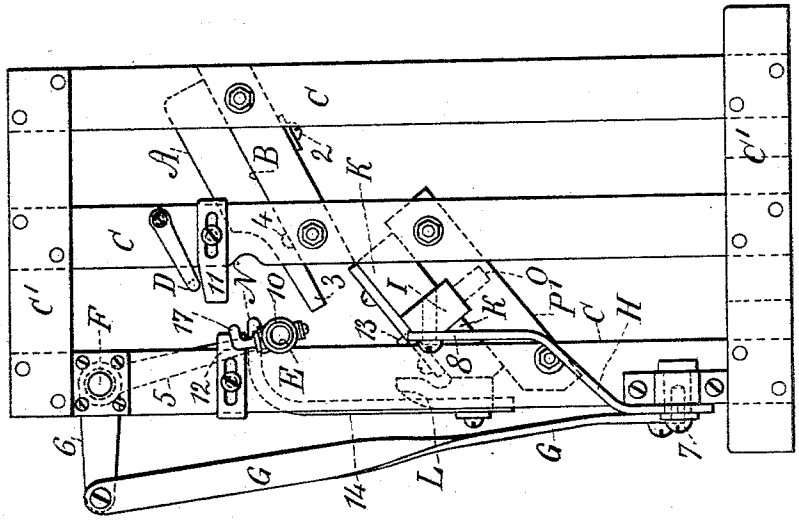


Fig. 2.

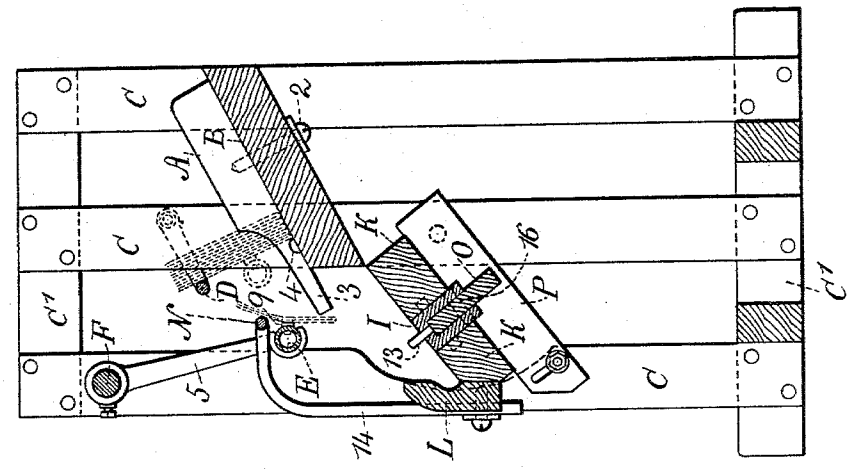
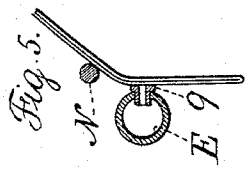


Fig. 5.



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UNITED STATES PATENT OFFICE.

DAVID McCONNELL SMYTH, OF PASADENA, CALIFORNIA.

SIGNATURE-GATHERER.

SPECIFICATION forming part of Letters Patent No. 565,145, dated August 4, 1896.

Application filed April 13, 1894. Renewed December 28, 1895. Serial No. 573,679. (No model.)

To all whom it may concern:

Be it known that I, DAVID MCCONNELL 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.

Difficulty has heretofore been experienced in taking signatures from piles of signatures and delivering the same in piles, so that the signatures will be in the regular order required in putting them together for bookbinding.

In my present improvement the signatures are in piles, and the lower signature of each pile is taken away by a suction action, which suction is automatically operated, so that the tube from which the air is exhausted is used as the conveyer for transferring the signatures from the piles of signatures to a gatherer upon which the signatures are received and by which they are caused to accumulate in regular order.

In the drawings, Figure 1 is an elevation of the machine with the fence partially removed. Fig. 2 is a cross-section at the line *x x* of Fig. 1. Fig. 3 is an end elevation. Fig. 4 is an elevation of the forwarding-bar and section of the signature-slide, and Fig. 5 is a section in larger size of the suction-tube.

The inclined signature-holding table B is supported upon the vertical posts C of the frame, and these posts are united by suitable cross-rails C′ at the top and bottom, and upon the inclined table B are partitions A, which are preferably connected to the table B by screws 2, passing up from below and through slots in the table, so that the partitions can be adjusted to any desired distances apart for accommodating different sizes of signatures, the slots in the inclined table B running longitudinally of the same, as represented, and the lower ends of these partitions are tapered to form guide-rods 3, that extend down and partially over the raceway of the gatherer, and upon the inclined table B and near the lower edge thereof there are stops 4, which are advantageously made hemispherical, and these are at suitable distances apart so as to accommodate the different sizes of signatures.

It is to be understood that the piles of signatures are to be placed with their folded back edges downwardly upon the inclined table B and between the partitions A, with the lowest signatures resting against the stops 4, and there is a steady-bar D, against which the signatures press as they tend to slide downwardly upon the inclined table B, and this steady-bar D is adjustable, so as to be properly placed in relation to the signatures, whether the same may be large or small.

The suction-tube E is supported on arms 5 from the rock-shaft F, which shaft is pivoted between the frames C, and to this rock-shaft a movement is given to swing the suction-tube E toward and from the piles of signatures, and the mechanism for moving the rock-shaft and suction-tube may be of any desired character. I have, however, represented a connecting-rod G extending from the arm 6 of the rock-shaft to a bent lever H, pivoted at 7 and connected at its upper end 8 to the signature-slide I, which is below and parallel to the inclined table B.

In the suction-tube E there are openings at the proper distances apart, and each opening is advantageously provided with a nipple 9, which may be of rubber or other suitable material, and in the suction-tube there is a stop-cock 10, having a lever 17 adjacent to the respective stops 11 and 12, which are adjustable, and the end of the suction-tube is connected to any suitable exhaust apparatus, preferably by a flexible tube, so that the suction-tube can be carried backward and forward by the rock-shaft and arms, and when the suction-tube is closely adjacent to the piles of signatures the stop-cock 10 is opened by the stop 11, so that the exhaust action within the tube E causes the atmospheric pressure to hold the lowest signature of each pile of signatures firmly, and by the swinging of the suction-tube when the rock-shaft is moved the signatures are carried bodily from the respective piles of signatures and the lower edges of such signatures slide over the stops 4, and the signatures are drawn away from beneath the steady-bar D, so that the signatures are held by the suction-tube and then are dropped as soon as the stop 12, coming in contact with the lever-handle of the

stop-cock, shuts off the exhaust and prevents the suction holding the signatures to the tube.

As the signatures fall they rest upon the signature-slide I and also upon the supporting-bars K at the opposite sides of the signature-slide, and the fence L holds the signatures in place, as they tend to slide down the surfaces of the slide I and supporting-bars K, and this signature-slide I receives a longitudinal movement by a crank and connecting-rod or other suitable power, so that the same is moved endwise between the supporting-bars K. Such signature-slide I is mortised longitudinally, and there are forwarding-pins 13 passing through such mortises into the forwarding-bar O, which is provided with diagonal slots 15, so that when the signature-slide I is moved in one direction, say toward the left, Fig. 1, the forwarding-pins act against the respective signatures to move them bodily along the space occupied by one signature, and when the end of the forwarding-bar reaches the end bearer P it is stopped and forced downward and the forwarding-pins are drawn down beneath the surface of the signature-slide by the cross-pins 16 on the signature-slide acting in the diagonal slots, and the signature-slide returns without moving the signatures, and the end of the bar O is arrested by the beam P′ and the forwarding-bar and its pins are raised by the pins 16 of the signature-bar acting in the diagonal slots, and when the signature-bar is moved again toward the delivery end of the machine the pins 13 act to forward the piles of signatures the proper distance for the next signatures to be dropped on the piles.

It is now to be understood that any desired number of partitions may be provided for the piles of signatures and that the table B may be of any desired length. I, however, prefer to make the table B of a length adapted to about ten piles of signatures and to provide in one machine three, four, or more inclined tables and their partitions and the devices connected therewith, as before mentioned, for removing the signatures and dropping them successively; and the piles of signatures are to be arranged in the proper regular order, so that the first signature is withdrawn from the first pile and dropped, and this is moved along to the second pile and the second signature dropped thereon, and the first and second signatures are moved along to the third pile and the third signature dropped thereon, and so on throughout the whole range of piles of signatures, so that by the time the first signature reaches the last pile there is one signature from each pile in regular order one upon the other and ready to be lifted off from the machine in any suitable manner, and this operation continues so long as the signatures are supplied in piles in the proper receptacles provided for them between the partitions A.

In starting the machine the piles of signatures are to be placed into the receptacles and one discharged from each receptacle, and all the signatures are progressed and a signature from the second receptacle is dropped upon the signature from the first receptacle, and so on throughout the whole range of receptacles, and the pile of signatures will hence be made up complete and in their regular order when the signature from the first receptacle has reached the last receptacle and a signature has been dropped on the pile, which pile is ready to be removed by hand or otherwise for binding.

I remark that the incomplete piles of signatures that reach the delivery end of the machine in first starting the same should be assorted and the signatures returned to their respective boxes, and after the pile of signatures has been completed, as aforesaid, at the delivery end of the signature-slide the operations are continuous and a complete pile is discharged at the delivery end each movement of the forwarding-bar.

If the signatures are exhausted in any pile, the delivery of the signatures will be stopped automatically, because there will not be sufficient suction to seize and hold the various signatures if one of the suction-holes is open in consequence of there not being any signature in the receptacle for the suction-tube nipple to come into contact with. Hence the accumulation of piles with missing signatures is effectually prevented.

The suction-nipples that are not required are to be closed with suitable plugs, so as only to leave those open that come opposite to the middle portions of the signatures.

It is only necessary to provide one partition A for each pile of signatures, as the head of the pile only is to be brought into contact with such partition or gage, and hence the machine is adapted to several different sizes of signatures.

It is advantageous to employ a delivery-bar or stripper N, connected to adjustable arms 14, that rise from the fence L, the delivery-bar or stripper N coming slightly above the suction-tube E when the same has been drawn back, so that the signatures may come into contact with such delivery-bar or stripper N as the air-suction is stopped by closing the cock 10 by contact from the stop 12, and the further movement of the suction-tube beneath the delivery-bar or stripper N insures the proper discharge of all the signatures, so that they drop upon the signatures that have preceded them. This delivery-bar or stripper is represented as adjustable to vary its place in relation to the suction-tube, and it may receive a movement to aid in causing the sheet to fall into the proper position.

I do not limit myself to any particular mechanism for giving motion to the respective parts herein described, as these may be varied according to circumstances, and this machine is capable of indefinite extension, according to the number of signatures that may be re-

quired in the volume, or each machine may be made with a single row of signature-holders and the signatures may be gathered from more than one machine in making up the complete volume.

I claim as my invention—

1. The combination in a signature-gathering machine, of a range of receptacles for receiving and holding the signatures, a pipe and suction-nipples upon the same adjacent to each receptacle, means for moving the pipe nearly horizontally and toward and from the range of receptacles for drawing the end signature in each receptacle bodily and laterally from the pile of signatures, and means for separating the signatures from the nipples closely adjacent to the range of receptacles, so that such signatures fall by gravity, and a signature-slide upon which such signatures fall and means for gathering such signatures into piles, substantially as set forth.

2. The combination with an inclined table and partitions forming boxes for receiving piles of signatures, of a suction-tube having nipples, means for sustaining and moving such suction-tube nearly horizontally toward and from the piles of signatures and for exhausting the air, a delivery-bar or stripper near the piles of signatures and against which the signatures are moved as they are separated laterally from the boxes and a signature-slide below the delivery-bar upon which the signatures fall by gravity and means for moving the signatures along upon the slide between the dropping of one set of sheets and the next, substantially as specified.

3. The combination with a range of receptacles for holding the piles of signatures, of a suction-tube having a nipple opposite each pile of signatures, a rock-shaft and arms for carrying the suction-tube, and means for moving such suction-tube nearly horizontally and toward and from the piles of signatures and withdrawing the end signature laterally in each pile simultaneously by the suction action, and means for relieving the suction and dropping the signatures, substantially as specified.

4. The combination with a range of receptacles for holding the piles of signatures, of a suction-tube having a nipple opposite each pile of signatures, a rock-shaft and arms for carrying the suction-tube, and means for moving such suction-tube nearly horizontally toward and from the piles of signatures and withdrawing the end signature laterally in each pile, simultaneously by the suction action, and means for relieving the suction and dropping the signatures and a delivery-bar or stripper with which such sheets are brought into contact, substantially as specified.

5. The combination with a range of receptacles for holding the piles of signatures, of a suction-tube having a nipple opposite each pile of signatures, a rock-shaft and arms for carrying the suction-tube, and means for moving such suction-tube nearly horizontally toward and from the piles of signatures and withdrawing the end signature laterally in each pile, simultaneously by the suction action, and means for relieving the suction and dropping the signatures, a delivery-bar or stripper with which such sheets are brought into contact and a signature-slide upon which the signatures are dropped, substantially as specified.

6. The combination in a signature-gatherer, of receptacles in which the piles of signatures are held, a delivery-bar or stripper near the end signatures in the piles, a suction-tube and means for moving the same nearly horizontally so as to withdraw the end signatures from the piles laterally and drop the same between the delivery-bar and the piles of signatures, substantially as specified.

7. The combination in a signature-gatherer, of receptacles for the piles of signatures, mechanism for withdrawing the end signature laterally from each pile and dropping them edgewise, an inclined signature-slide and fence upon which the signatures fall, and mechanism acting upon each group of signatures between the fall of one lot and the next, to move the groups of signatures along on the slide, substantially as specified.

8. The combination in a signature-gatherer, of receptacles for the piles of signatures, a vibrating exhausting device for detaching the end signatures laterally in the piles and dropping them edgewise, a stationary delivery-bar or stripper near the piles of signatures, a signature-slide below the same for receiving the signatures, and forwarding-pins and means for moving them up and down and also longitudinally of the signature-slide for moving the sets of signatures along the slide progressively, substantially as specified.

Signed by me this 27th day of March, 1894.

DAVID McCONNELL SMYTH.

Witnesses:

JOHN McDONALD,

ANN E. DEAN.