

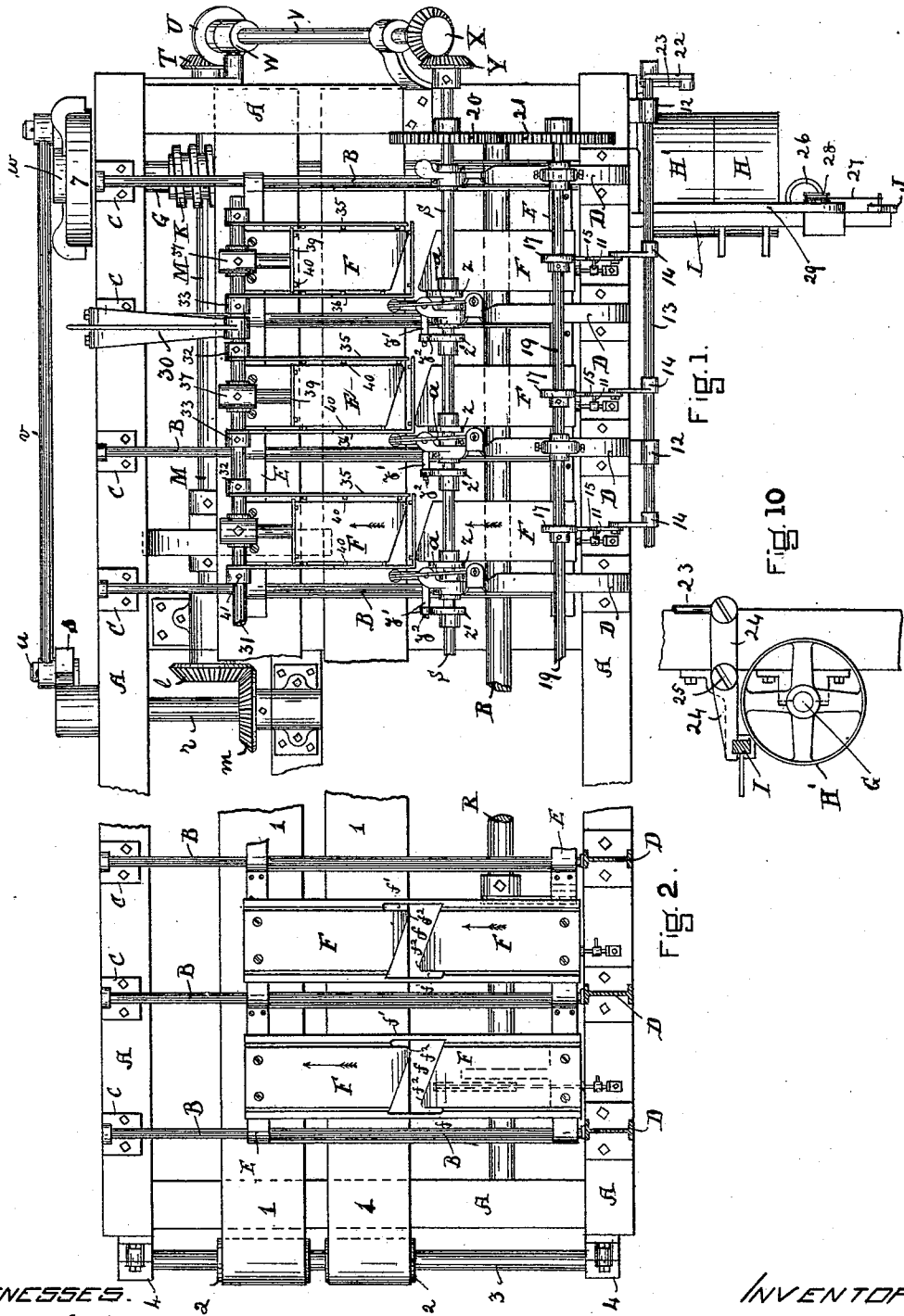
(No Model.)

3 Sheets—Sheet 1.

H. E. PLIMPTON & W. I. LEWIS.
MACHINE FOR GATHERING SIGNATURES.

No. 459,334.

Patented Sept. 8, 1891.



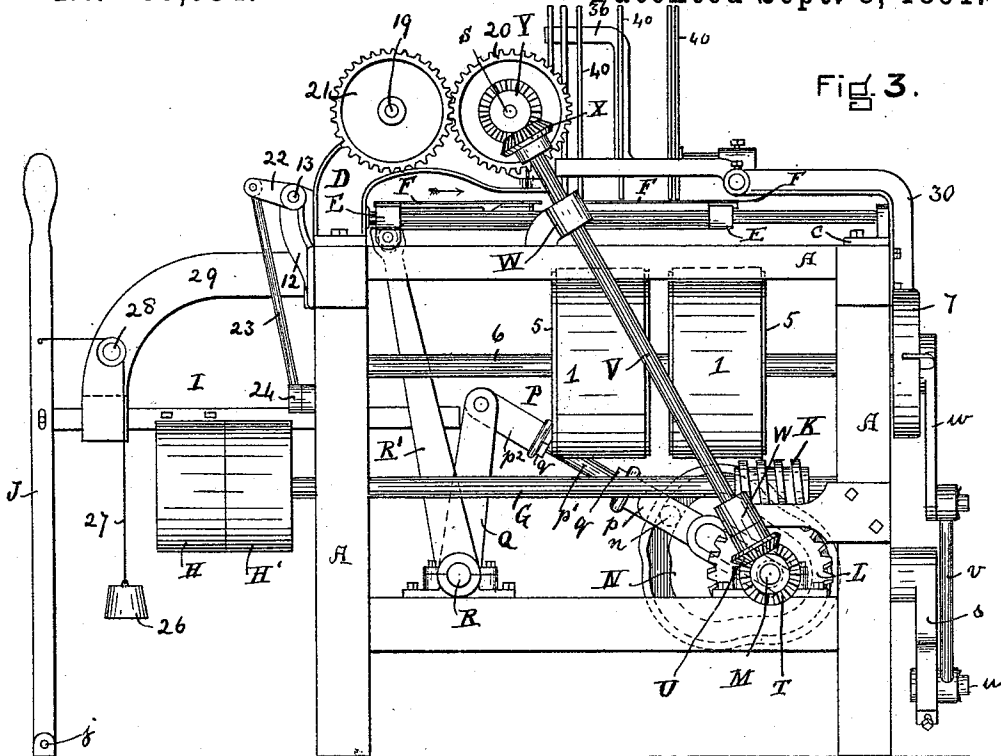
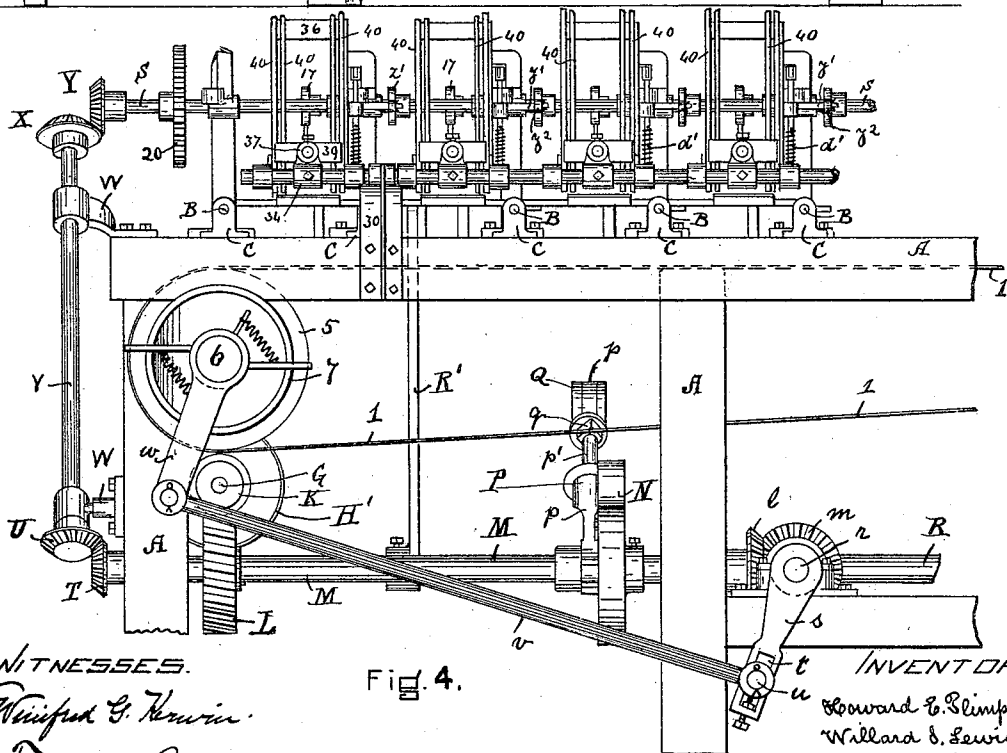
WITNESSES.
Winifred G. Harris
Frank W. Lowe

INVENTORS
Howard E. Plimpton
Willard S. Lewis
by *Edmund Blanta*
attorney.

H. E. PLIMPTON & W. I. LEWIS.
MACHINE FOR GATHERING SIGNATURES.

No. 459,334.

Patented Sept. 8, 1891.



WITNESSES.

Willard G. Newin.
Frank W. Lowe

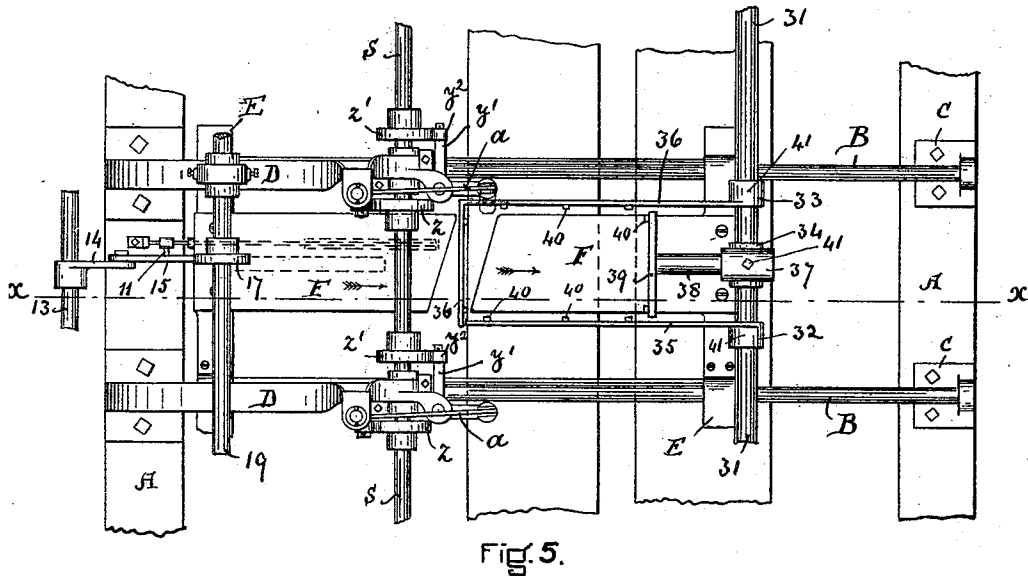
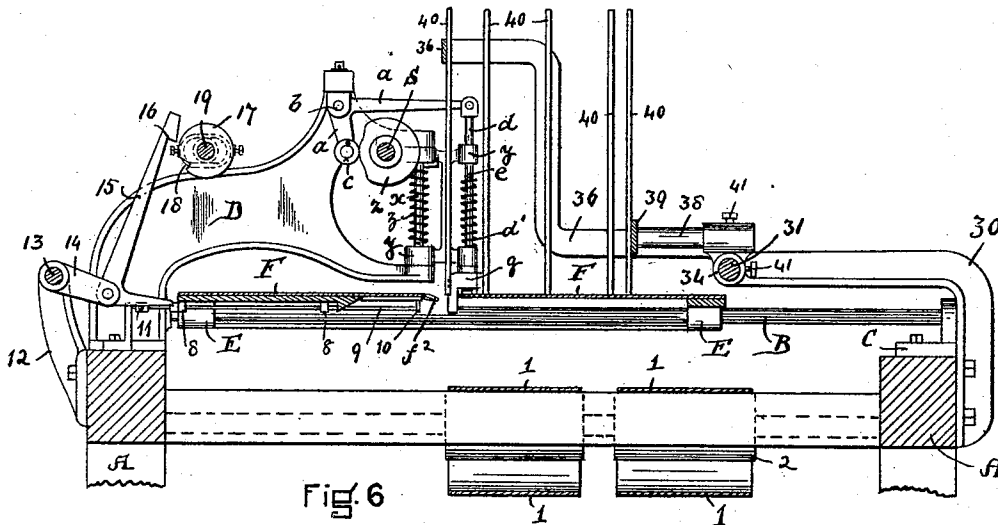
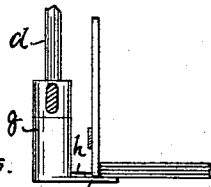
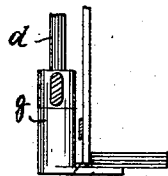
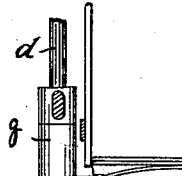
INVENTORS.

Howard E. Plimpton
Willard G. Lewis
by Edwin Blanta
Attorneys.

H. E. PLIMPTON & W. I. LEWIS.
MACHINE FOR GATHERING SIGNATURES.

No. 459,334.

Patented Sept. 8, 1891.



WITNESSES.

Winifred G. Harris.
Frank W. Lowe

INVENTORS.

Howard E. Plimpton.
Willard J. Lewis
by Edwin Blanta
Attorneys.

UNITED STATES PATENT OFFICE.

HOWARD E. PLIMPTON, OF NORWOOD, AND WILLARD I. LEWIS, OF WAL-
POLE, ASSIGNORS TO HERBERT M. PLIMPTON & CO., OF BOSTON, MASSA-
CHUSETTS.

MACHINE FOR GATHERING SIGNATURES.

SPECIFICATION forming part of Letters Patent No. 459,334, dated September 8, 1891.

Application filed January 17, 1891. Serial No. 378,083. (No model.)

To all whom it may concern:

Be it known that we, HOWARD E. PLIMPTON, of Norwood, and WILLARD I. LEWIS, of Walpole, in the county of Norfolk and State of Massachusetts, citizens of the United States, have invented certain new and useful Improvements in Machines for Gathering the Signatures of Books, of which the following, taken in connection with the accompanying drawings, is a specification.

Our invention relates to improvements in machines for automatically collecting or gathering the several folded sheets or signatures of a book in regular successive order; and the invention consists in the peculiar construction of the devices for operating and feeding a single signature from a pile, and in a stop-motion whereby the machine is stopped if the signature is not delivered, and in certain details of construction, as hereinafter fully described, and pointed out in the claims.

Referring to the accompanying drawings, Figure 1 represents a plan or top view of one end of a machine embodying our invention. Fig. 2 is a sectional plan view of the other end, taken just above the carrying-plates. Fig. 3 is a view of one end, showing the driving mechanism. Fig. 4 is a side view of the same end of the machine. Fig. 5 is a plan or top view showing the mechanism for carrying and delivering one of the signatures. Fig. 6 is a vertical cross-section taken on line $x x$ of Fig. 5. Figs. 7, 8, and 9 are detail views of the presser-foot. Fig. 10 is a detail view of the trigger for holding the shipper-rod.

A represents a frame of rectangular form, across the top of which is arranged a series of rods or bars B, carried at one end by bearings C and at the other end in bearings formed in forked arms D.

Upon the rods B is mounted a sliding carriage E, to the top of which is secured a series of plates F, each having a diagonal slot f cut therein in its center, and at each of the inwardly-projecting corners it is also cut back, as shown at f' , so that the points f^2 may be bent down slightly, as shown, (see Figs. 2 and 6;) or, if preferred, single plates of the required width and having diagonal ends might be secured to the traveling carriage E, as shown in Figs. 1 and 5. These plates are for

sustaining the signatures, as will be described hereinafter.

An intermediate reciprocating motion is given to all the plates at the same time in the following manner: G is the main driven shaft, mounted in suitable bearings secured to the frame A. Upon the outer end of this shaft is mounted a fast and loose pulley H H'. I is the shipper-bar, and J the lever for operating the same, which lever is fulcrumed to a lug j , secured to the floor. Near the other end of the shaft is mounted a worm K in gear with a worm-wheel L, mounted upon the main slow-moving shaft M, to which is secured a cam-plate N for each plate or pair of plates F. P is an adjustable connecting-rod consisting of a forked piece p , an intermediate piece p' , and an outer piece p^2 . Upon the forked piece p is mounted a roller n , that works in the groove in the cam-plate N, the fork passing over the shaft M. The intermediate piece p' is formed with a right and left hand screw at its ends. Both the pieces $p p^2$ are bored out and screw-threaded, one right and the other left hand, so that the ends of the intermediate piece p' can be secured therein, whereby the connecting-rod can be lengthened or shortened, according to the throw required, and when in the desired position the parts are secured by lock-nuts q . The outer end of the connecting-rod P is connected to the end of an arm Q, secured to a rocker-shaft R, that extends the whole length of the machine. To this shaft is also secured a series of levers R', (one only being shown in the drawings,) each of which has at its outer end a fork which embraces a roller secured to the sliding carriage E, so that as the plate N is rotated an intermediate reciprocal motion is imparted to the signature carriers or plates F. The arms D D, secured to the top of the frame, extend over toward the center of the machine and at their inner ends are forked, and the upper prong is provided with a bearing, in which is mounted a shaft S. This shaft is driven from the main slow-moving shaft M by a bevel-wheel T, mounted on the end of said shaft M, which wheel is in gear with a bevel-wheel U, secured on one end of a shaft V, mounted in suitable bearing W, secured to the frame A.

On the upper end of this shaft V is secured a bevel-wheel X in gear with a bevel-wheel Y on the end of shaft S. Upon this shaft is mounted a series of cams Z Z'. *a a* are bell-crank levers, each fulcrumed at *b* to the arm D. The lower arms of said levers are each fitted with a roller *c*, that is in contact with the cam Z on shaft S. The outer end of the bell-crank lever is connected to a presser-foot bar *d*, supported in a swinging frame *y*, carried on a rod *x*, that extends between the two prongs of a fork. A spiral spring *z* holds the frame *y* in its normal position. Around the rod *d* is placed a spiral spring *d'*, one end of which rests upon the lower end of frame and the other end against the pin *e*, passed through the rod *d*, the spring keeping the presser-foot bar raised, so that the roller *c* will always be in contact with the cam Z. To the rear of the frame *y* is an arm *y'*, upon the end of which is mounted a roller *y''*, that rests against a cam Z', so that at the proper moment the presser-foot is thrown forward. At the end of each presser-foot bar *d* is secured a presser-foot *g*, the lower end of which is formed with a lip *g'*, and just the thickness of a signature above said lip is secured a knife or separator *h*, (see Figs. 7, 8, and 9,) which, when the plates are traveling back and forth, separates a signature at each movement. After the signatures have been separated they fall upon endless belts or aprons 1, that pass over rollers 2, mounted on a shaft 3, carried by bearings 4 at one end of the machine, and over pulleys 5, mounted upon a shaft 6 at the other end of the machine. To the shaft 6 is imparted an intermittent rotary motion by means of a friction-clutch pulley 7, operated from the main slow-moving shaft M by means of a bevel-wheel *l*, mounted on the end of said shaft and in gear with a bevel-wheel *m*, mounted upon a counter-shaft *r*, upon the outer end of which is mounted an arm *s*, having at its outer end a slot *t*, through which is passed a pin *u*, connecting a rod *v*, the other end of which is attached to an arm *w*, mounted loosely on the shaft 6. By the movement of this arm the friction-clutch is applied and released alternately by the revolution of the arm *s*.

Each of the plates F is fitted with a stop-motion, which is constructed as follows: Under the plate F are secured bearings 8, in which is mounted a small sliding rod 9, formed at its end with a button 10, and at the rear end is a pin 11. On the side of the frame are secured brackets 12, in which is mounted a rock-shaft 13, to which are secured arms 14, (one for each rod 9,) and to each arm is fulcrumed a bell-crank lever 15, the lower or short arm of which projects over the pin 11, and the long arm is at its end formed with a hook 16. 17 is a disk or cam formed with a single notch or recess 18. These cams are secured to a shaft 19, to which motion is transmitted from shaft S by cog-wheels 20 21. On the end of the shaft 13 is secured an arm

22, which is by a rod 23 secured to the end of a trigger 24, fulcrumed to the frame at 25. The outer end of this trigger rests in a notch in the shipper-bar I and keeps the belt on the tight pulley H. 26 is a weight attached to one end of a cord or chain 27, that passes over a pulley 28 on an arm 29, secured to the frame A, and the other end of the cord or chain 27 is secured to the shipper-lever J, so that if the trigger 24 is raised the weight 26, by the cord 27, will draw upon the shipper-lever and force the belt onto the loose pulley H'. To one side of the frame (the side opposite to that of which the arms D are secured) are secured arms 30, that support a rod or bar 31 longitudinally of the frame A. Upon this bar are mounted sleeves 32 33 34, the sleeve 32 carrying a flat bar 35 of swan-neck form, (see Fig. 5,) and the sleeve 33 carries a similar bar 36, but which at its outer end is bent at right angles, so that its end meets the end of the bar 35. The sleeve 34 is formed with another sleeve 37 on its upper side. In this sleeve is mounted so as to slide freely a rod or bar 38, that carries a flat bar 39. These bars 35 36 39 form a rectangular frame, to each side of which are secured upright rods 40, that hold the pile of signatures in place. All the sleeves are adjustable upon the shaft, and the bar 38 is adjustable in the sleeve 37, so that the size of the rectangular frame to hold the signatures can be adjusted as required, and when in position are secured by set-screws 41.

The operation is as follows: Supposing the signatures have been arranged in order on the respective plates—that is to say, the signature forming the first part of the book being nearest the delivery end and the signature forming the end of the book being farthest from the same, the signatures in each pile being of the same character—and the machine in the position shown when it is started, the plates F will be caused to travel in the direction of the arrows, but the signatures will be held by the rectangular frame and the presser-foot will be in its normal position, as shown in Fig. 7. As the shaft S is rotated it, through cam Z', forces the presser-foot forward, the foot *g'* passing just under the signatures and the knife or separators *h* just over the top of the bottom signature, as shown in Fig. 8. Then the presser-foot is forced down a short distance, so that it assumes the position shown in Fig. 9, by means of the bell-crank lever *a* being operated by the cam Z on shaft S, carrying the corner of the lower signature down a short distance, so that as the plate F advances it will pass onto the top of the bottom signature, (the presser-foot then returns to its normal position,) which is thus separated from the pile and falls upon the apron or belt 1. The pile of signatures will now be on the other end of the plate. The apron is then caused to advance by means of the friction-pulley 7 just the distance of the space between the piles of signatures, so that

they will fall one upon the other until the full number has been successively piled upon each other and the book is ready for sewing, when it is delivered at the end of the belt or apron and taken up by the operator. As soon as the cut-off signature commences to pass under the plate E, it comes into contact with the button 10 and prevents the rod 9 from being carried along with the plate, and as the end of the bell-crank lever 15 thus rests upon the pin 11 on the end of said rod 9 it is held so that as the cam 17 rotates the notch 18 in same is free to pass the hook 16 on the bell-crank lever, which hook will not come into contact with said notch; but as soon as the notch has passed the hook the rod 9 is carried forward and the hook rests upon the cam 17; but should it happen that a signature is not taken from the pile the rod 9 is carried forward with the plates F by frictional contact with its bearings, and when the notch in the cam 17 comes opposite the hook 16 the latter will fall into said notch, and as the shaft 19 rotates the lever 15 will be carried up, thus raising the arm 14 and lowering arm 22, which by rod 23 depresses the outer end of the trigger 24, raising its other end out of the notch in the shipper-bar I, so that the weight 26 will draw the shipper-lever J over and shift the belt from the fast pulley H to the loose pulley H', thereby stopping the machine.

What we claim as our invention is—

1. In a signature-feeding machine, the combination of a presser-foot depressing a portion of the lower signature in the pile and a separating-plate so arranged as to enter between the depressed portion of the lower signature and the rest of the pile, as set forth.
2. In a signature-feeding machine, the combination of a frame for holding a pile of signatures, a presser-foot having a lip or point on its upper side, mechanism for causing said lip or point to engage the bottom signature, a separating-plate, and mechanism for introducing said plate between the signature so separated and the rest of the pile, substantially as set forth.
3. In a signature-gathering machine, the combination of a frame for holding a pile of signatures, a reciprocating plate or plates having a transverse aperture or slot, and means for depressing a portion of the lower signature, substantially as set forth.
4. In a signature-gathering machine, the combination, with a reciprocating plate having a transverse aperture or slot, of a rod mounted in bearings under said plate and having a button on its forward end, said rod being held back by the signature as it is separated by said plate, but being carried forward when a signature is not separated, and mechanism connected with said rod for

stopping the machine, substantially as set forth.

5. The signature-supporting plates, each having a diagonal opening, said plates being secured to a frame having an intermittent reciprocating motion, in combination with stationary frames supported above said plates for holding the signatures, substantially as and for the purposes set forth.

6. In a machine for gathering book-signatures, a frame for holding the signatures, consisting of a side bar 35, secured to sleeve 32, a side end bar 36, secured to a sleeve 33, an end bar 39, carried by a rod 38, and sleeve 37, formed in one with sleeve 34, all of which are mounted and are adjustable upon a longitudinal rod supported in bearings 30, secured to the frame A, as set forth.

7. The combination of the main shaft G, worm K, worm-wheel L, shaft M, cam N, adjustable connecting-rod P, arm Q, shaft R, and arm R', having a fork at its upper end for transmitting an intermittent reciprocating motion to the plates F, as set forth.

8. In combination with the intermittent reciprocating plates F, the stop-motion consisting of the bar 9, pin 11, bell-crank lever 15, arm 14, shaft 13, cam 17, shaft 19; to which a continuous rotary motion is imparted, arm 22, shaft 12, connecting-rod 23, trigger 24, shipper-bar I, lever J, arm 29, pulley 28, cord or chain 27, and weight 26, all arranged and operated substantially as set forth.

9. In combination with the intermittent reciprocating plates F, the presser-bar d, and foot g, to which a slight circular movement is imparted to take hold of the corner of the bottom signature of the pile, then a slight downward movement to carry said corner below the corner of the plate, after which it is returned to its normal position, substantially as and for the purpose set forth.

10. A signature-gathering machine consisting of the following elements: a frame for holding the pile of signatures, a reciprocating plate having a transverse aperture or slot, means for automatically taking hold of and depressing a portion of the lower signature of the pile, a rod under said plate connected with a mechanism for stopping the machine, and means whereby said signatures will be collected in successive order, substantially as set forth.

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses, on this 10th day of January, A. D. 1891.

HOWARD E. PLIMPTON.
WILLARD I. LEWIS.

Witnesses:

CHAS. STEERE,
EDWIN PLANTA.