

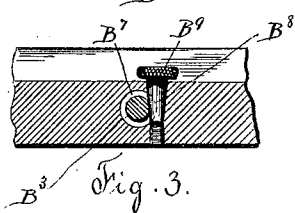
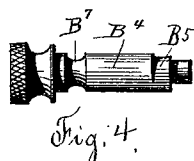
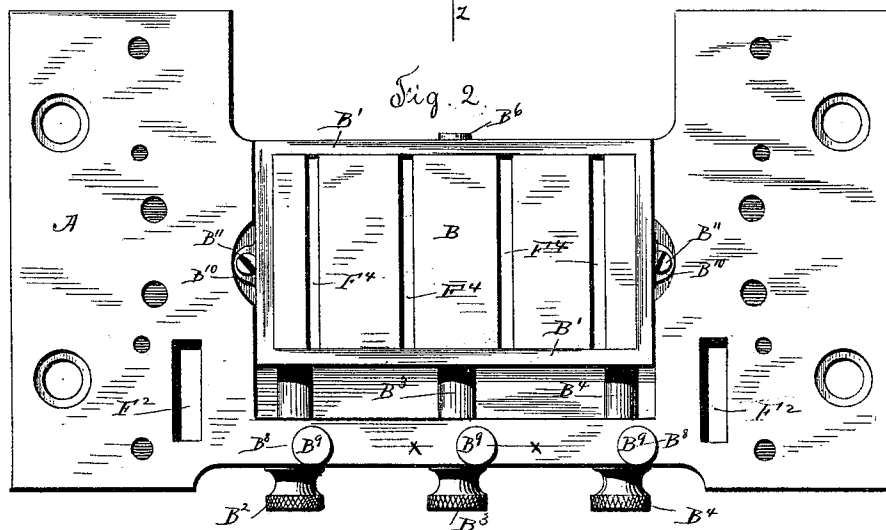
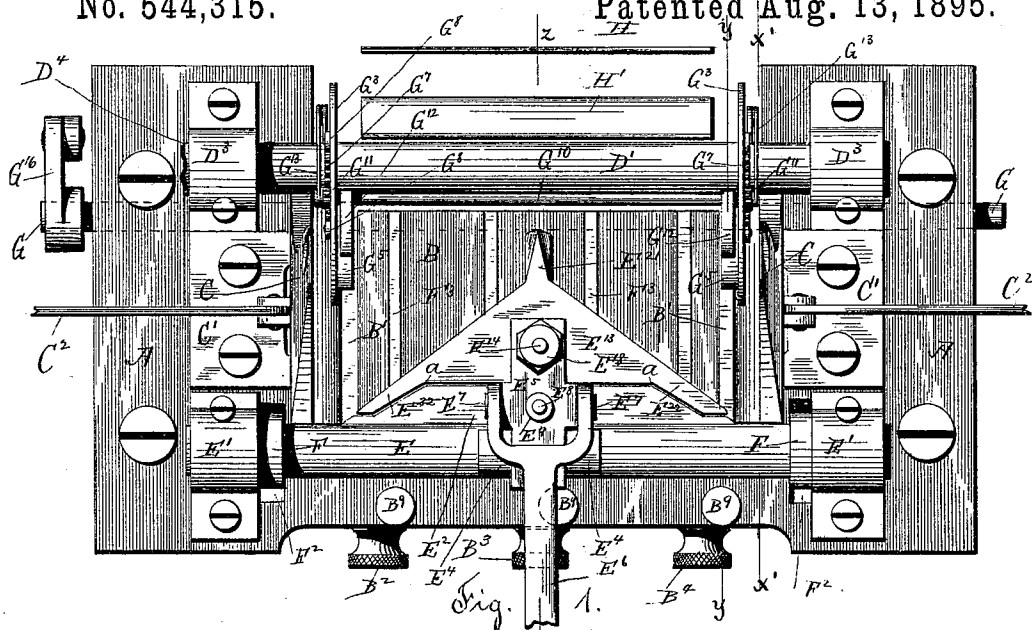
(No Model.)

5 Sheets—Sheet 1.

E. M. LOW.
ENVELOPE MACHINE.

No. 544,315.

Patented Aug. 13, 1895.



Witnesses

Chas. F. Schmelz.

D. Westgate

Inventor

Everett M. Low.

By his Attorney

Rufus B. Fowler.

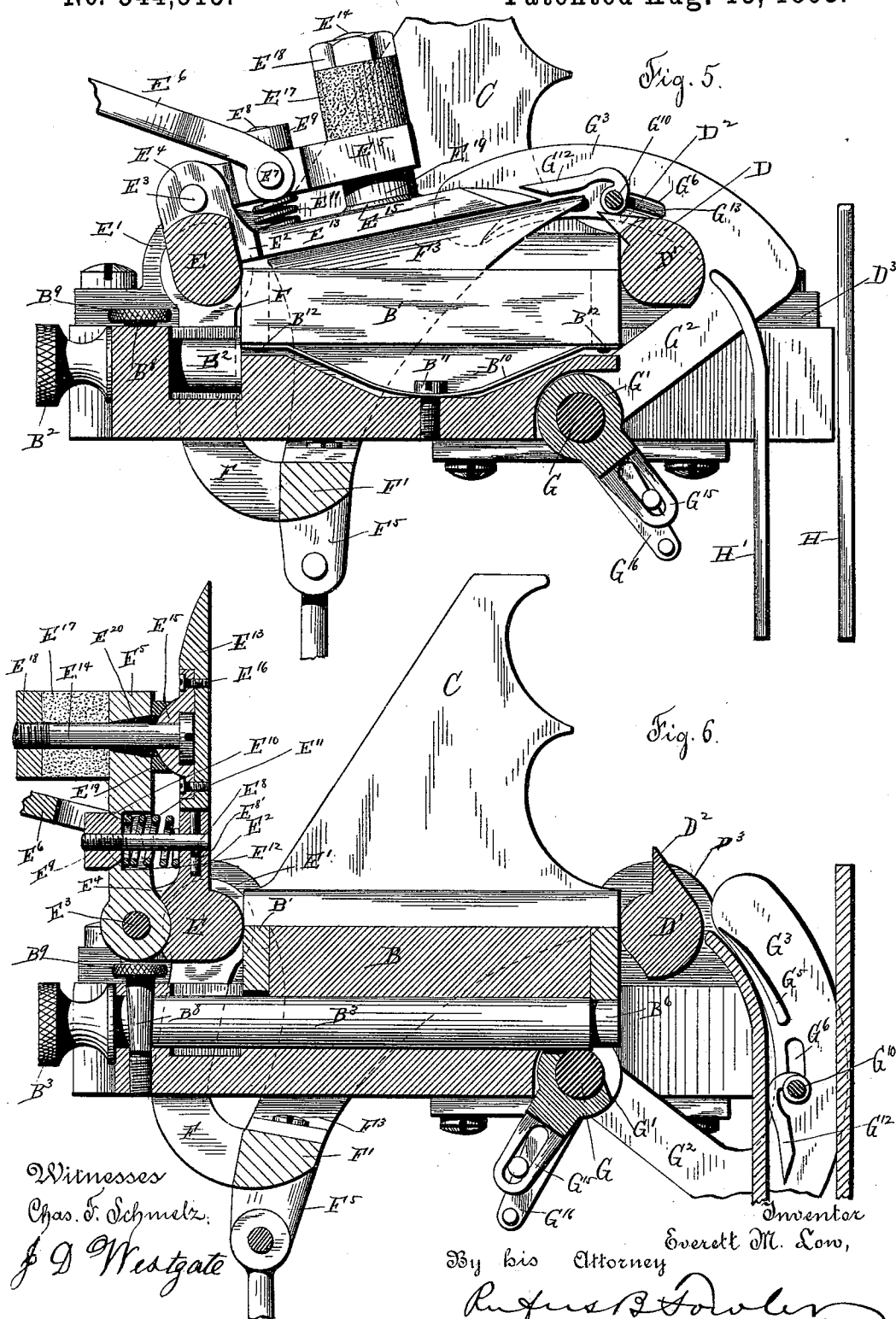
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5 Sheets—Sheet 2.

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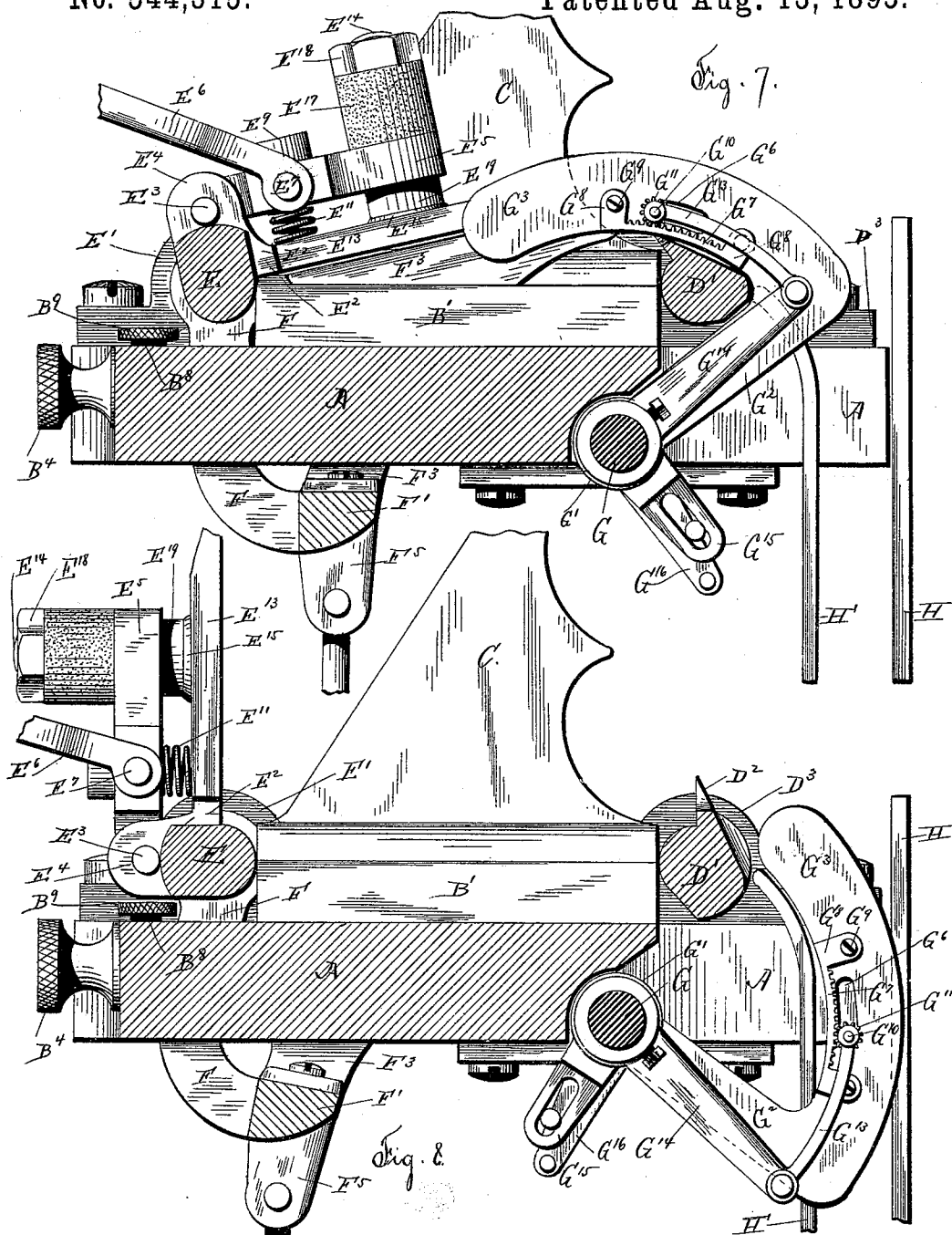
(No Model.)

5 Sheets—Sheet 3.

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No. 544,315.

Patented Aug. 13, 1895.



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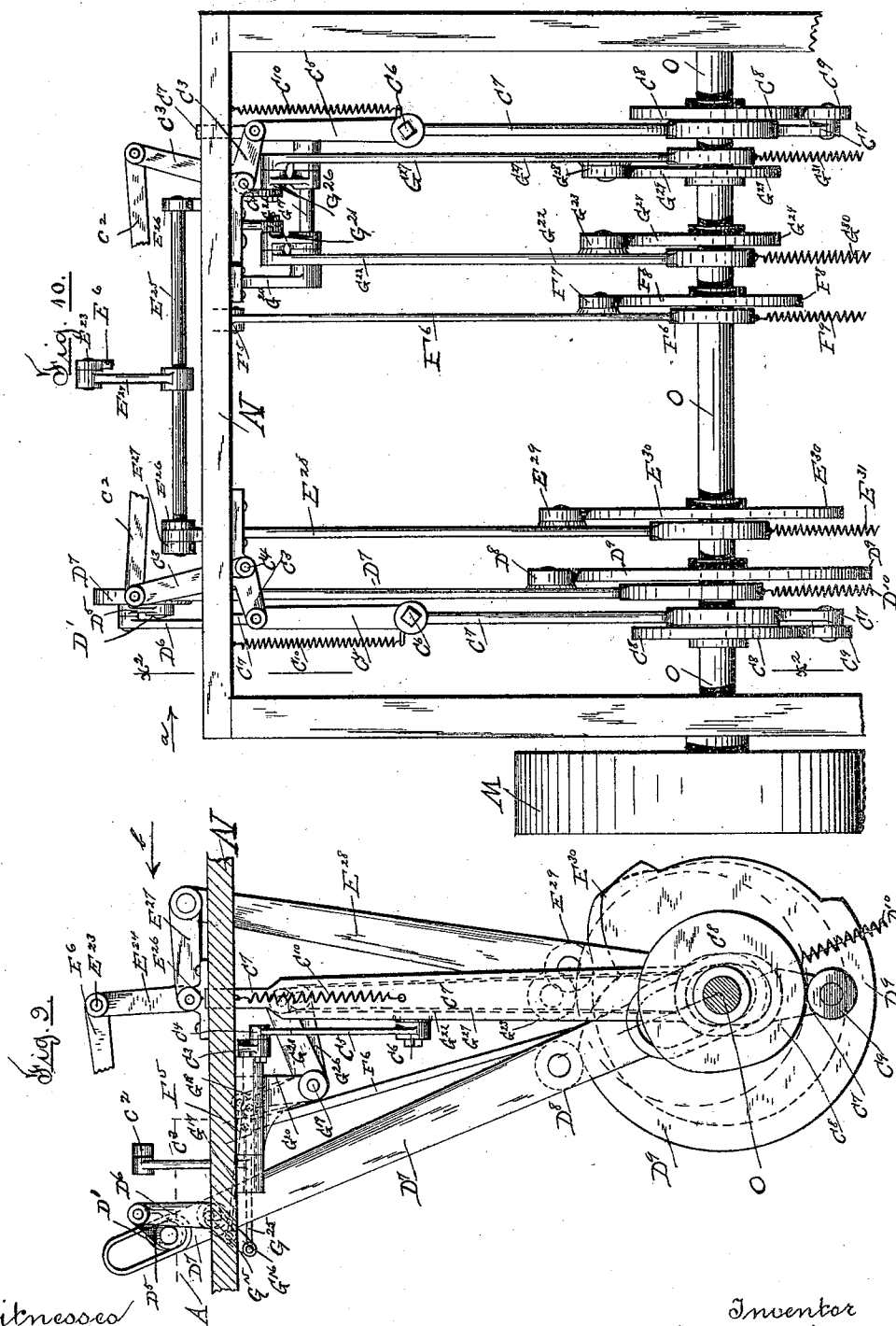
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E. M. LOW.

ENVELOPE MACHINE.

No. 544,315.

Patented Aug. 13, 1895.



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Annie L. Grogan

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(No Model.)

5 Sheets—Sheet 5.

E. M. LOW.
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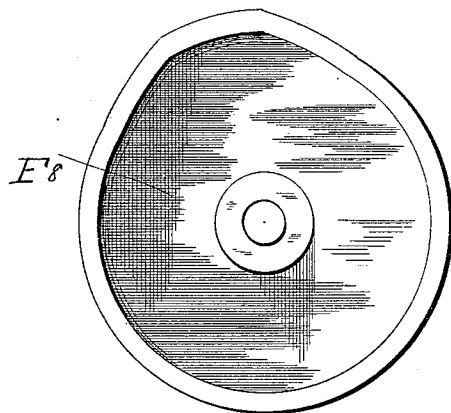


Fig. 11.

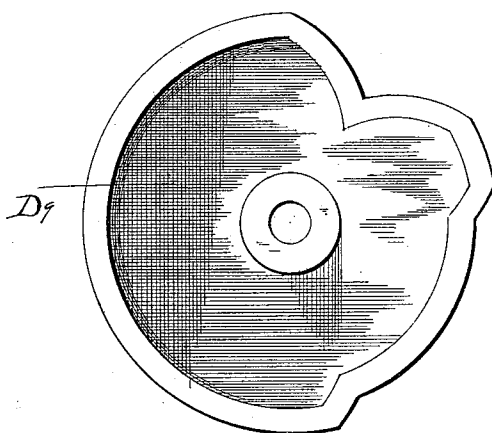


Fig. 12.

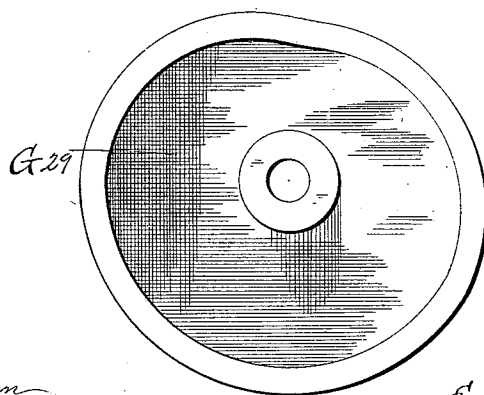


Fig. 13.

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UNITED STATES PATENT OFFICE.

EVERETT M. LOW, OF WORCESTER, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE WORCESTER ENVELOPE COMPANY, OF SAME PLACE.

ENVELOPE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 544,315, dated August 13, 1895.

Application filed August 21, 1888. Serial No. 283,378. (No model.)

To all whom it may concern:

Be it known that I, EVERETT M. LOW, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Envelope-Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, which, in connection with the drawings making a part of this specification, will enable others skilled in the art to which my invention belongs to make and use the same.

My invention relates to envelope-machines, and more particularly to that portion of an envelope-machine known as the "folding-box," and to the mechanism which is employed in taking the folded envelope from the folding-box and delivering the same to the drying or counting mechanism, as the case may be.

The folding-box which forms the subject of my present invention belongs to that class in which the envelope is folded upon a table or folding-bed by means of hinged wings or folding-blades, one pair of which act conjointly at each end of the envelope and in opposite directions to fold the end flaps of the envelope, another serves to fold the back flap of the envelope, and another creases the seal-flap.

The construction and operation of the folding-wings are substantially the same as those now in general use in envelope-machines, except as hereinafter pointed out and described with reference to the construction of the back-flap folder and the movements of the back-flap and seal-flap folders. The mechanism by which the envelope is delivered from the folding-box is, I believe, novel in its construction and operation, as is also the method of taking the envelope from the box in its essential features.

The object of my invention is to improve upon the construction and operation of the folding-box and connecting and operating mechanisms of envelope-machines; and my invention consists in certain novel features of construction and operation of the same, as will be hereinafter fully described.

Referring to the drawings, Figure 1 represents a plan view of a folding-box of an en-

velope-machine of my improved construction, showing the folding-wings in the position they occupy at the time the folded envelope is taken from the folding-box. Fig. 2 shows a top view of the bed or table on which the envelope is folded, the folding-wings having been removed. Fig. 3 is a sectional view of a portion of the supporting-plate on line $x x$, Fig. 2. Fig. 4 is a detached view of one of the spindles employed for raising the folding-ring. Fig. 5 is on an enlarged scale a transverse sectional view of the folding-box on line $y y$, Fig. 1, showing the parts as the envelope is seized. Fig. 6 is on an enlarged scale a transverse sectional view of the folding-box on line $z z$, Fig. 1, showing the mechanism for folding the flaps and for delivering the envelope from the box in the position assumed as the envelope is released from the delivering mechanism. Fig. 7 is on an enlarged scale a transverse sectional view of the folding-box on line $x' x'$, Fig. 1, showing the operative mechanism in the position shown in Fig. 5. Fig. 8 is on an enlarged scale a transverse sectional view of the folding-box on line $x'' x''$, Fig. 1, showing the operative parts in the same position as shown in Fig. 6. Fig. 9 is an end view taken on line x^2 , Fig. 10, looking in the direction of the arrow a , same figure, showing the cams supported below the bed of the machine and the mechanism for connecting them with the parts which they operate; and Fig. 10 is a front view of the cams and connecting mechanism shown in Fig. 9, looking in the direction of arrow b , same figure; and Figs. 11, 12, and 13 represent, respectively, on an enlarged scale, face views of the cams F^8 , D^9 , and G^{20} , detached.

In the accompanying drawings, A is a supporting-plate attached to the table N of the envelope-machine, the central section being raised at B and forming the folding-bed or table on which the envelope-blank is folded. The raised portion B is surrounded by a rectangular ring B' , capable of a vertical movement, so that the upper surface of the ring may be raised flush with the surface of the folding-bed B, or lowered slightly below it. The ring B' , in this instance, rests upon the three eccentric spindles B^2 , B^3 , and B^4 , which

are journaled in the plate A, the spindles B² and B⁴ being alike, as shown in Fig. 4. The ends of each of the spindles B² B⁴ are made eccentric to the axis of the spindle for a short distance, and the side of the ring B' next the back-flap folder is supported upon the eccentric section B⁵ of the spindle. Between spindles B² and B⁴ is a longer spindle B³, (shown in its entire length in Fig. 6,) and extending across the folding-table or bed supporting the side of the ring B' next the seal-flap upon a similar eccentric section B⁶. The spindles B², B³, and B⁴ are provided with a groove B⁷ (see Fig. 4) to receive a tapered pin B⁸, having a milled head B⁹ and a screw-threaded top entering a screw-threaded hole in the plate A. (See Fig. 3.)

As the pin B⁸ is screwed into the plate A, the tapered section of the pin is made to press against the side of the spindle, preventing the spindle from turning, and at the same time holding the spindle from being drawn out. The ring B' is thus raised or lowered through a space equal to the throw of the eccentric sections of the spindles, and the spindles are held from turning by means of the tapering pins B⁸.

The raised bed B and ring B' are the size of the folded envelope, and they together form the bed upon which the envelope-blank is folded, the ring B' being raised or lowered below the surface of the portion B, in order to vary the pressure of the folders upon the edge of the envelopes in the same manner as is now common in envelope-machines.

B¹⁰, Figs. 2 and 5, denote springs attached by screws B¹¹ to the plate A, with the ends of the springs attached by screws B¹² to the under side of the ring B', so that the tension of the springs B¹⁰ will serve to draw the ring B' down upon the eccentric sections of the spindles B², B³, and B⁴.

The end-flap folders C are hinged to the plates C', attached to the plate A, (see Fig. 1,) and they are operated in the usual manner through the connecting-rod C², pivoted at its outer end to the angle-lever C³, pivoted at C⁴, below the table N, and the lower arm of said angle-lever C³, connected with the rod C⁵, pivoted at C⁶ to the lever C⁷, having a slot in its lower part, through which the shaft O extends, and carrying at its lower end the roll C⁹, which engages with and is operated by the cam C⁸ on the driving-shaft O, carrying pulley M. (See Figs. 9 and 10.) A spring C¹⁰ serves to keep the cam-roll C⁹ in contact with its cam C⁸, and similar springs serve to keep the other cam-rolls, hereinafter to be described, in contact with their cams.

The seal-flap folder D consists of the spindle D', having a wing D² and journaled in bearings D³. (See Fig. 1.) The spindle D' and the seal-flap folder D are given a rocking motion, as hereinafter described, and are moved, as is usual in envelope-machines, by means of a radial arm D⁵ on the spindle D', which is extended from the broken end D⁴,

(see Fig. 1,) and said radial arm is connected by a link D⁶ with the lever D⁷, carrying a roll D⁸, which is engaged and operated by a cam D⁹ on the driving-shaft O and a spring D¹⁰, (see Figs. 9 and 10,) causing said seal-flap folder D to have a rocking motion up and down at the proper time to fold the seal-flap of the envelope.

The back-flap folder has a peculiar construction, as shown in central sectional view in Fig. 6, by which a yielding pressure is given to the folding-blade and an independent pressure given to the edge of the blank and to the gummed surface. Referring to said figure, E is the spindle of the back-flap folder, journaled in bearings E', (see Fig. 1,) attached to the plate A and having a wing E², formed integral with the spindle E and shown in outline in Fig. 1. Pivoted upon a pin E³, held in lugs E⁴, projecting from the rear side of the spindle E, (see Fig. 1,) is an arm E⁵, to which a forked connecting-rod E⁶ is attached by the pins E⁷. (See Fig. 1.) A bolt E⁸ is attached to the wing E² by a pin E^{8'}, and extending through the arm E⁵ receives upon its screw-threaded end the nut E⁹, which rests in the tapering seat E¹⁰ in the arm E⁵. (See Fig. 6.) Between arm E⁵ and the wing E² is a coil-spring E¹¹, with one end resting on the wing E² and the other end entering a recess E¹² in the arm E⁵.

E¹³ is a plate of the proper form to press upon the blank on that part which has received the gum, the base-line of the plate forming angles, as *aa*, (see Fig. 1,) corresponding with outlines of the wing E². The plate E¹³ is connected with the arm E⁵ by means of the bolt E¹⁴, whose head is inclosed between the plate E¹³ and the convex plate E¹⁵, attached to the plate E¹³ by the screws E¹⁶. The bolt E¹⁴ passes through arm E⁵ and the elastic washer E¹⁷ and carries a nut E¹⁸. The convex side of the plate E¹⁵ is seated in the concave face of a washer E¹⁹, attached to the arm E⁵, so the plate E¹³ is capable of a slight rocking motion upon washer E¹⁹ allowing the face of the plate E¹³ to conform to any irregularities or inequalities in the envelope-blank. The face of the plate E¹³ is on the same plane as the surface of the wing E², forming a continuous surface which is brought upon the envelope-blank by the rocking motion of the spindle E through the connecting-rod E⁶, pivoted at E²³, Figs. 9 and 10, to a radial arm E²⁴ fast on the spindle E²⁵, supported in bearings E²⁶ on the table N and having a radial arm E²⁷ fast thereon and connected at its outer end with the lever E²⁸, carrying a roll E²⁹, engaging with and operated by the cam E³⁰ on the shaft O and a spring E³¹. The power is applied through the connecting-rod E⁶, operated as above described, to the arm E⁵, and through the spring E¹¹ to the wing E² and spindle E, rocking the spindle E and bringing the wing E² down upon the edge of the envelope-blank with a yielding pressure. The movement of the arm E⁵ at the same time

carries the plate E¹³ with its wings E²² down upon the surface of the blank corresponding to the gummed portion with a pressure sufficient to firmly unite the gummed portion of the back flap to the edges of the end flaps, the pressure being applied directly from the arm E⁵ to the plate E¹³ through the washer E¹⁹, resting on the convex plate E¹⁶, the plate E¹³ being raised from the blank by means of the bolt E¹⁴ and nut E¹⁸. (See Fig. 6.)

In case the plate E¹³ is prevented from being pressed down parallel with the surface of the folding-bed by reason of any inequalities in the blank, the plate E¹³ is rocked slightly by the convex plate E¹⁵, turning in its seat in the washer E¹⁹, thereby causing an equal pressure to be exerted upon the entire gummed surface of the back-flap.

The hole E²⁰ through the arm E⁵ to receive the bolt E¹⁴ is made slightly tapering to permit the rocking motion of the plate E¹³, as just described, the elastic washer E¹⁷ yielding as the plate E¹³ is rocked.

Journaled upon the spindle E of the back flap are two arms F F, having their lower ends curved and either attached to or formed as a part of the bar F⁴. (Shown in sectional view in Fig. 5, 6, 7, and 8.)

The curved arms F F pass through slots F² in the plate A, (see Fig. 1,) and the bar F' extends from one arm to the other and lengthwise of and beneath the folding-bed B. To the bar F' are attached the envelope-lifting blades F³, entering the slots F⁴ in the folding-bed B, with the upper edges of the blades, when in their normal position, flush with the upper surface of the folding-bed.

Lugs F⁵ project from the central section of the bar F', to which a connecting-rod F⁶ is attached, (see Figs. 5, 6, 7, and 8,) carrying at its lower end a roll F⁷, which engages with and is operated by a cam F⁸ on the shaft O and a spring F⁹. (See Fig. 10.) By means of said connecting-rod F⁶, operated by the cam F⁸, the lifting-blades F³ are raised at the proper time into the position shown in Figs. 5 and 7 from the position shown in Fig. 6.

Journaled in bearings beneath the plate A and parallel with the spindle D' of the seal-flap folders is a shaft G, carrying between its bearings a sleeve G' to which the radial arms G² are attached or made integral therewith, the outer ends of the arms G² having curved plates G³, curved concentrically with the shaft G. Upon the inner sides of each of the curved plates G³, or next to the folding-bed, are the fixed jaws G⁵. (See Fig. 6.) Each of the curved plates G³ is also provided with a slot G⁶, curved concentrically with the shaft G, and a curved rack G⁷, (see Fig. 7,) which is attached to the outer side of the plate G³ by means of the ears G⁸ and screws G⁹. A spindle G¹⁰ extends across from one of the plates G³ to the other, passing through the slots G⁶ and having pinions G¹¹ on the outer ends of the spindle and upon the outer sides of the plates G³ the pinions engaging the

racks G⁷. To the spindle G¹⁰ are attached, just inside the curved plates G³, the jaws G¹² in position to cause said jaws G¹² to present opposing surfaces to the jaws G⁵ for the purpose of seizing the folded envelope between the jaws G⁶ and G¹², as hereinafter described.

The outer ends of the spindle G¹⁰ are connected by the links G¹³ with the ends of the radial arms G¹⁴, which are attached to the shaft G. (See Fig. 7.) A rocking motion is given to the shaft G by means of an arm G¹⁵, attached to said shaft and connected by rod G¹⁷ with an arm G¹⁸, pivoted on a shaft G¹⁹, supported in hangers G²⁰ under the table N. (See Figs. 9 and 10.) The shaft G¹⁹ carries a radial arm G²¹, at the outer end of which is connected the lever G²², carrying a roll G²³, engaging with and operated by the cam G²⁴ on the shaft O and a spring G³⁰. (See Fig. 10.) Through said cam and intervening mechanism a rocking motion is given to the shaft G and parts connected therewith. The sleeve G', supported on the shaft G, is also given a rocking motion, independent of the shaft G, through the radial arm G¹⁶ and the connecting-rod G²⁵, arm G²⁶, fast on the shaft G¹⁹ and connected with lever G²⁷, carrying roll G²⁸, engaging with and operated by G²⁹ on the shaft O and a spring G³¹. (See Fig. 10.)

At the side of the folding-bed B are placed the plates H H', between which the envelopes, as they are taken from the folding-bed, are delivered to either a drying or counting mechanism, as desired.

The method of folding the envelope-blank and the operation of the several folding-wings in the operation of folding the blank is the same as that in common use in other machines of this class, and will therefore be readily understood without further detail description. The method of delivering the folded envelope from the folding-box or from the folding-bed B by means of the conjoint action of the folding-wings, lifting-blades, and mechanism for seizing the folded envelope is as follows: As soon as the envelope has been folded by the action of the folding-wings in the usual manner, the end-flap folders C C are raised to a vertical position, the seal-flap folder D is also raised to a vertical position to allow the folded envelope to pass and be raised out of the folding-box, and the back-flap folder is raised to the position shown in Figs. 1, 5, and 7, the lifting-blades F³ being at the same time raised simultaneously with the raising of the back-flap folder, as shown in Figs. 1, 5, and 7, thereby raising the envelope, which is inclosed between the upper edges of the lifting-blades and the under surfaces of the back-flap folder. The motion of the seal-flap folder is reversed a short distance and brought into the position shown in Figs. 1, 5, and 7, and the sleeve G' is at the same time rocked upon the shaft G, bringing the radial arms G² and curved plate G³ into the position shown in Figs. 1, 5, and 7 with the fixed jaws

G⁵ beneath the under surfaces of the envelope as it rests upon the lifting-blades F³. During the movement of the curved plate G³ to the position as described, the shaft G is also rocked 5 through a short angular movement, causing the spindle G¹⁰ to be moved along the slots G⁶ through the radial arms G¹⁴ and links G¹³ rolling the pinions G¹¹ along the fixed racks G⁷, and thereby rotating the spindle G¹⁰ and 10 attached jaws G¹² and causing the envelope to be seized between the opposing faces of the fixed jaws G⁵ and movable jaws G¹², as shown in Fig. 5, in which figure the position of the several parts is shown in the position of seizing the envelope. As soon as the 15 envelope is seized by the jaws G¹² and G⁵, the sleeve G' is rocked in the opposite direction, carrying the radial arms G² and curved plates G³ to the position shown in Figs. 6 and 8, 20 the shaft G and radial arms G¹⁴ being simultaneously reversed in their rocking position and with equal speed, so the racks G⁷ and pinions G¹¹ will be carried down without causing a rotation of the spindle G¹⁰ until near the 25 end of the rocking motion of the sleeve and shaft, when the motion of the shaft G is accelerated, causing spindle G' to be moved in the opposite direction in the slots G⁶ and rolling the pinions along the racks G⁷, rotating 30 the spindle G¹⁰ and attached jaws G¹², bringing them into the position shown in Figs. 6 and 8 and allowing the envelope to fall by its own weight down into the chute formed by the plates H and H'. As the mechanism for 35 delivering the envelope from the folding-box is engaged in carrying the envelope down to the position shown in Fig. 8, the back-flap folder and the seal-flap folder are carried to an upright position ready for the next suc- 40 ceeding envelope to be brought down upon the folding-bed B and folded by the folding-wings.

During the process of delivering the envelope from the folding-box, as above described, the back-flap folder has a motion 45 from a position in contact with the envelope upon the folding-bed to the position shown in Figs. 1, 5, and 7, where it has a short period of rest, while the jaws G⁵ and G¹² are seizing the envelope; then it moves to an upright position to receive an envelope-blank.

The seal-flap folder, while the envelope is being delivered, is raised first to a vertical position to allow the envelope to pass. It is 55 then reversed a short distance to the position shown in Figs. 1, 5, and 7, in order to allow the envelope to be drawn over the top of the seal-flap folder without raising the envelope, by means of the lifting-blades, so far. The 60 seal-flap folder is then raised to a vertical position to receive the next envelope-blank.

By the operation of folding the envelope-blank by means of the hinged folding-wings, the folded envelope is held upon the folding- 65 bed B and inclosed between the folding-wings, from which it is delivered in some machines by dropping the bed itself and deliv-

ering the envelope through the bottom or downwardly. In other machines the envelope is raised above the folding-wings and carried away by suitable devices. 70

In the above-described mechanism for delivering the envelope from the folding-box, I raise the seal-flap side of the envelope only high enough to allow it to be carried over the 75 seal-flap folder in the position shown in Fig. 5, the back-flap side of the envelope being raised but a short distance above the folding-bed, and the envelope being held upon the lifting-blades in an inclined position, tangen- 80 tially to a circle which is concentric with the shaft G, about which the envelope-seizing jaws are carried.

A large part of the angular motion of the envelope-seizing apparatus, as herein de- 85 scribed, is performed during the movement of the folding apparatus, as it is performed outside of and independently of the folding mechanism, allowing the movements of the 90 folding and delivering mechanisms to overlap each other during a part of their movements, thereby saving time and increasing the speed at which the envelope-machine may be operated.

It will be understood that the details of 95 construction of the several parts of my improved machine may be varied somewhat from what is shown and described without departing from my invention.

Having thus described my invention, what 100 I claim as new, and desire to secure by Letters Patent, is—

1. In an envelope machine, the combination with the folding bed, and a ring surrounding said bed, of spindles having eccentric sections 105 supporting said ring, and similar grooves around the spindles, and tapering pins screwed into the frame work, and entering said grooves, whereby the spindles are held from turning, substantially as described. 110

2. In an envelope machine, the combination with a folding bed, and a ring surrounding said bed, of eccentrics supporting said ring, and springs attached to said ring and to the 115 frame work of the machine, with their tension applied to hold said ring in contact with said eccentrics, substantially as described.

3. In an envelope machine, the combination with a folding bed upon which the envelope blank is folded, of a back flap folder consist- 120 ing of two wings, each of which has a yielding pressure, and one of said wings folding the edge of the back flap, and the other of said wings pressing the gummed surface of the back flap, said wings having a simultane- 125 ous movement through connected actuating mechanism, substantially as described.

4. In an envelope machine, the combination with the folding bed upon which the envelope blank is folded, of a spindle journaled at the 130 side of and parallel with said folding bed, and having a rocking motion, a wing on said spindle which is brought to bear upon the folding bed by the rocking motion of the spindle, a

plate with its face in the same plane as said wing, and an actuating arm having a vibratory motion and being operatively connected with said wing, and said plate, whereby the said wing and said plate are brought simultaneously upon the folding bed, substantially as described.

5. The combination in the folder for folding the back flap of an envelope, of a spindle having a rocking motion, lugs projecting from said spindle and carrying a pin, a vibrating arm pivoted on said pin, and two wings, one of said wings being carried by said spindle and the other of said wings being carried by said vibrating arm, said wings having their corresponding surfaces in the same plane, and having a simultaneous movement upon the folding bed of the machine, substantially as described.

6. In the back flap folder of an envelope machine, the combination with a spindle having a rocking motion, and a wing adapted for folding the edge of the envelope, of an arm pivoted upon said spindle, a spring interposed between said arm and said wing, whereby a yielding pressure is applied to said wing, substantially as described.

7. In the back flap folder of an envelope machine, the combination with a rocking spindle having a wing forming a folding plate or blade for folding the edge of the envelope, of an arm pivoted in lugs on said rocking spindle, and operatively connected with said wing, whereby the vibratory movement of said arm is communicated to said wing, substantially as described, a pressure plate adapted to press upon the gummed surface of the back flap and having a convex plate seated in a concave washer carried by said arm, a bolt connecting said arm and said pressure plate and having a nut, and an elastic washer between said arm and the nut, substantially as described.

8. In the back flap folder of an envelope machine, the combination of a spindle E, lugs E⁴ carrying pin E³, arm E⁵, wing E² integral with the spindle E, bolt E⁸ attached to said wing, and extending through the arm E⁵, nut E⁹, and spring E¹¹, as and for the purpose set forth.

9. In an envelope machine, the combination with a folding bed on which the blank is folded, and a back flap folder moved about an axis at the side of and parallel with said folding bed, of lifting blades, passing through slots in the folding bed, and having a motion concentric with the movement of the back flap folder, whereby the folded envelope is raised from the folding bed, simultaneously with the raising of the back flap folder, substantially as described.

10. In an envelope machine, the combination with a spindle carrying the back flap folding wings, of curved arms journaled on said

spindle and carrying a bar placed beneath and lengthwise of the bed upon which the envelope blank is folded, and a series of lifting plates or blades attached to said bar, and passing through slots in the bed upon which the envelope blanks are folded, substantially as described.

11. In an envelope machine, the combination with the folding bed on which the envelope blanks are folded, of lifting blades passing through slots in the folding bed, and having a motion by which the seal flap side of the folded envelope is raised above the seal flap folder, a seal flap folder having a motion away from the folding bed to release the seal flap inside of the envelope and a reverse motion to reduce the distance from the bed to the top of the seal flap folder, and mechanism, substantially as described, for removing the envelope from the lifting blades over the seal flap folder, as and for the purpose set forth.

12. In an envelope machine, the combination with a folding bed, and lifting blades by which the folded envelope is raised from said bed, of the radial arms G², plates G³, fixed jaws G⁵, spindle G¹⁰ passing through slots in the plates G³, pinions G¹¹, racks G⁷ attached to the plates G³ and engaging said pinions, and movable jaws G¹² attached to the spindle G¹⁰, and mechanism substantially as described by which said pinions are rolled along said fixed racks, and the jaws G¹² rotated toward or away from said fixed jaws, substantially as and for the purpose set forth.

13. In an envelope machine, the combination with a folding bed upon which the envelope blanks are folded, and lifting blades by which the folded envelope is raised from off said bed, of the envelope delivering mechanism, comprising the arms G², plates G³ having slots G⁶, racks G⁷, spindle G¹⁰, attached jaws G¹², fixed jaws G⁵, pinions G¹¹, radial arms G¹⁴, links G¹³, said arms G¹⁴ having a movement relatively to the movement of the arms G² so the pinions G¹¹ are rolled along the racks G⁷ for the purpose of opening and closing the envelope seizing jaws, as and for the purpose set forth.

14. In an envelope machine, the combination with a folding bed upon which the envelope blanks are folded, and lifting blades by which the folded envelope is raised from said folding bed, of the shaft G having the radial arms G¹⁴, sleeve G' journaled on the shaft G, radial arms G², plates G³ having slots G⁶, racks G⁷, attached to the plates G³, spindle G¹⁰, jaws G¹² attached to the spindle G¹⁰, fixed jaws G⁵, and links G¹³ connecting the arms G¹⁴ with the spindle G¹⁰, substantially as described.

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Witnesses:

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RUFUS B. FOWLER.