

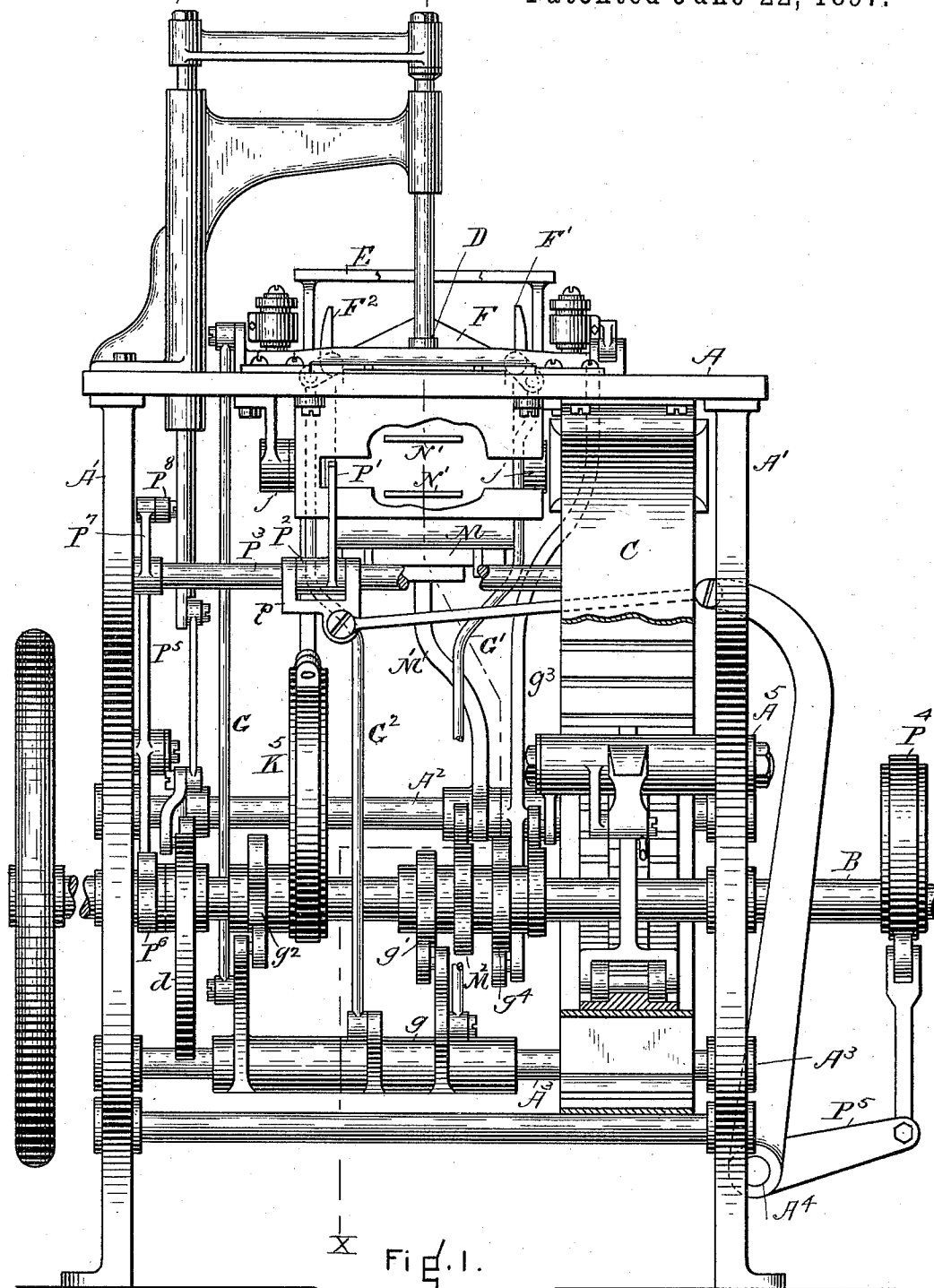
(No Model.)

4 Sheets—Sheet 1.

W. S. METCALFE & J. A. SHERMAN.
ENVELOP MACHINE.

No. 584,824.

Patented June 22, 1897.



WITNESSES.

Frank S. Parker.
Eva A. Guild

INVENTORS.

W. S. Metcalfe
John A. Sherman
Per O. L. Smith
H. L. Smith

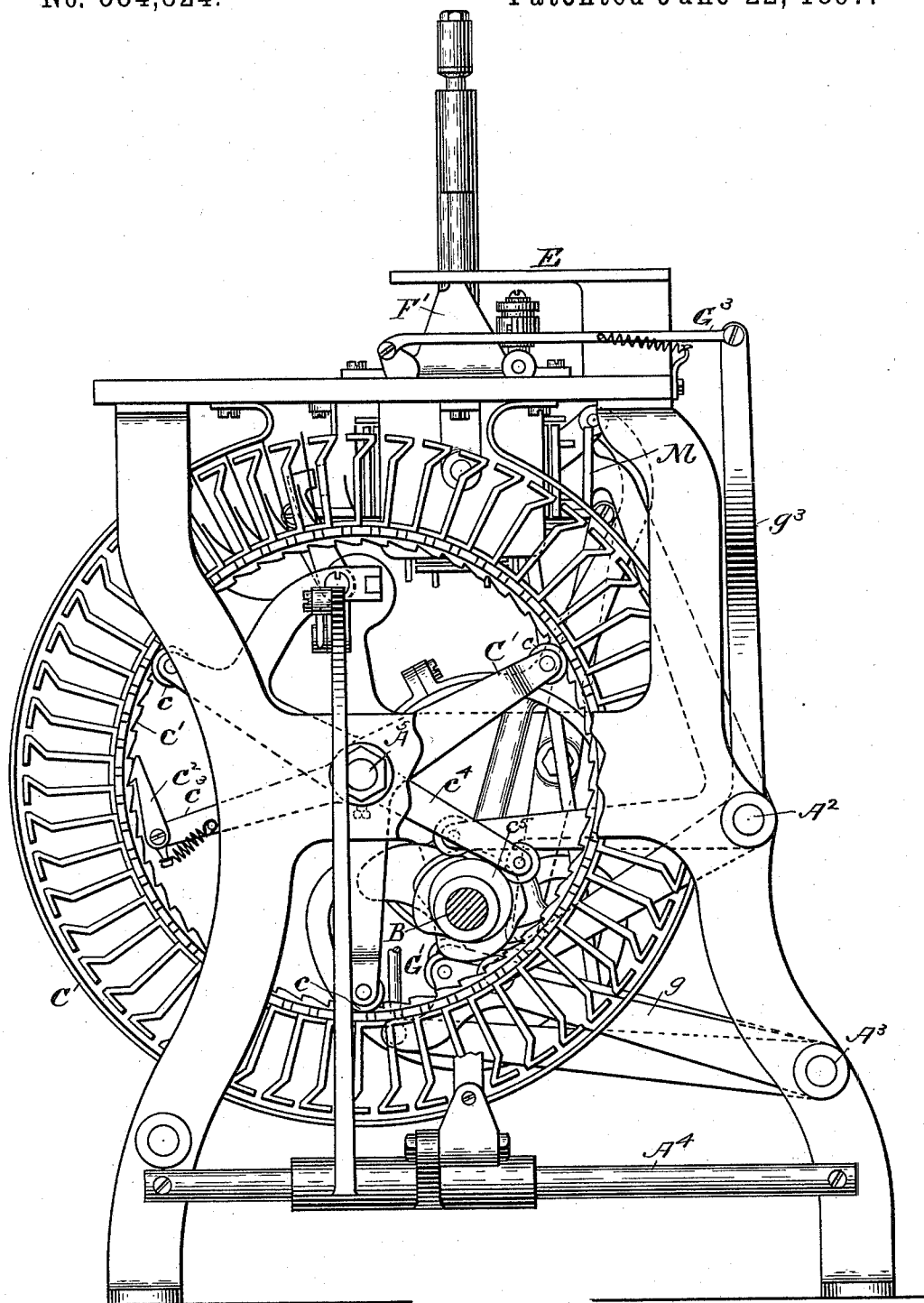
(No Model.)

4 Sheets—Sheet 2.

W. S. METCALFE & J. A. SHERMAN.
ENVELOP MACHINE.

No. 584,824.

Patented June 22, 1897.



WITNESSES

Frank G. Parker.
Eva A. Guild

Fig. 2.

INVENTORS.

Mr. J. Westcott
J. W. A. Harrison

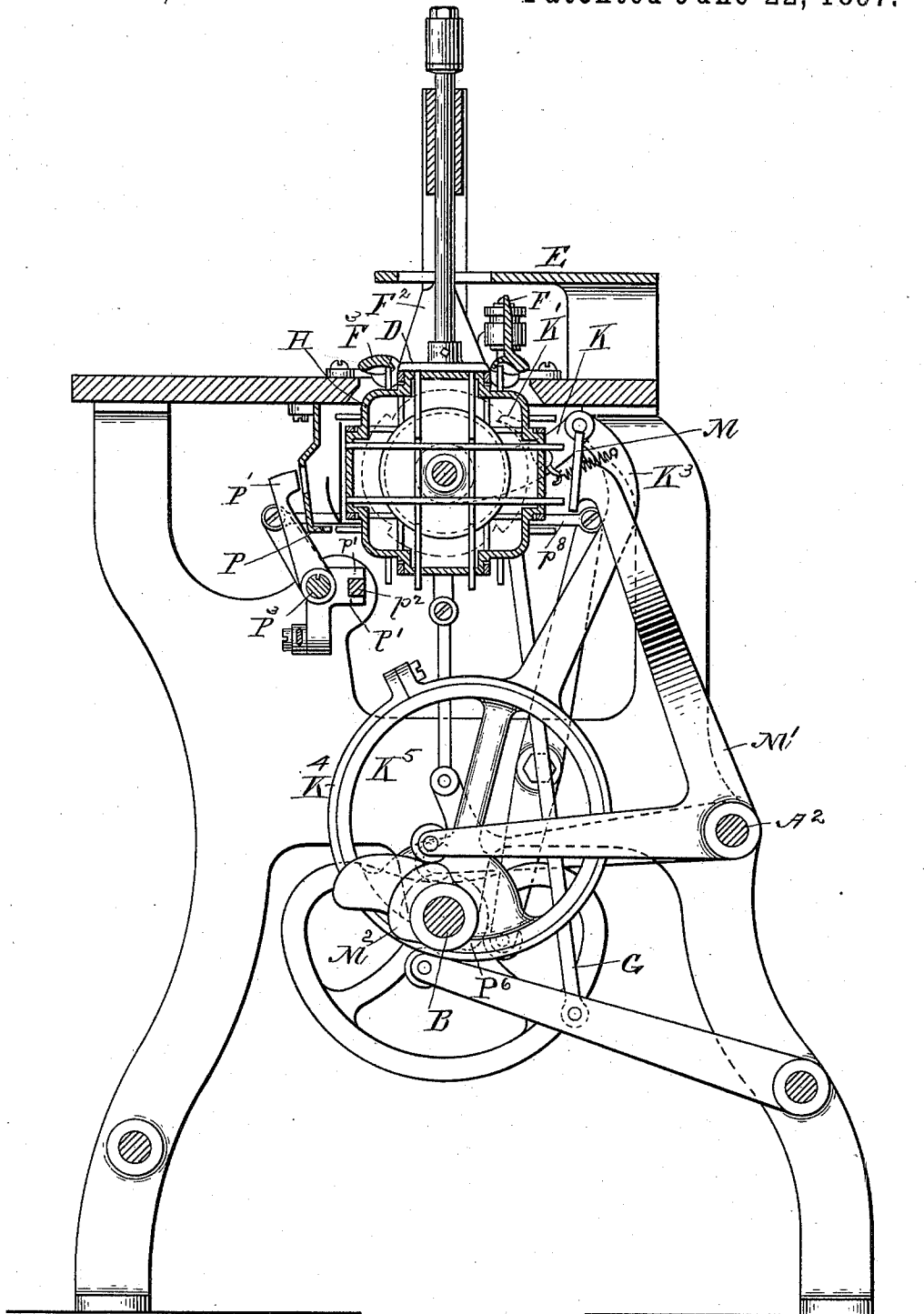
(No Model.)

4 Sheets—Sheet 3.

W. S. METCALFE & J. A. SHERMAN.
ENVELOP MACHINE.

No. 584,824.

Patented June 22, 1897.



WITNESSES

Frank G. Parker.
Eva A. Guild

Fig. 3.

INVENTORS.

Wm. S. Metcalfe
John A. Sherman
By J. O. & C. Co.
Attorneys

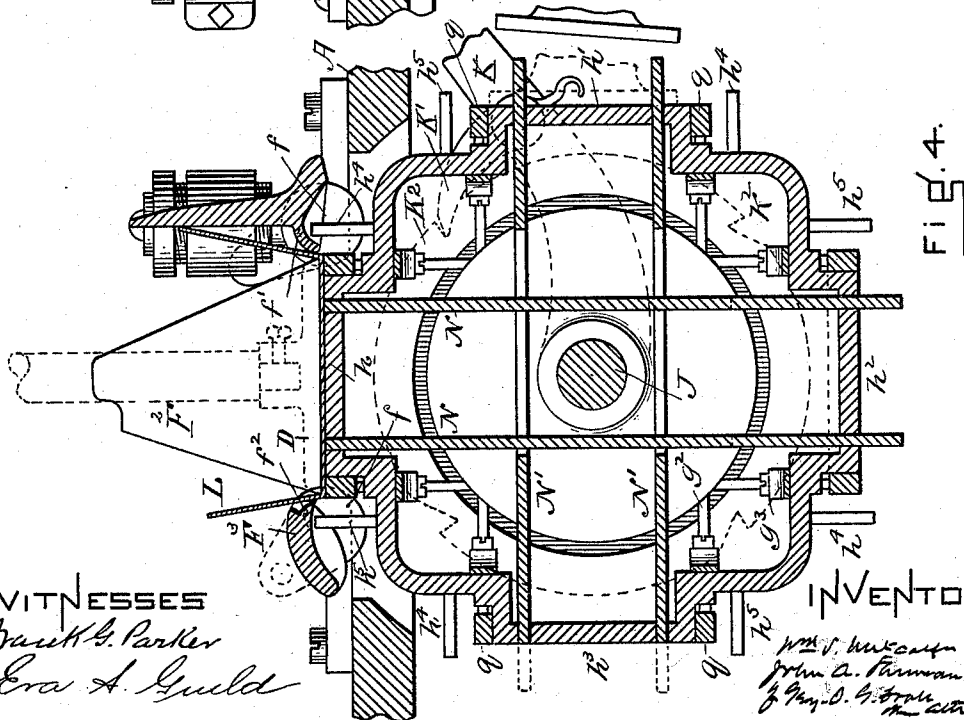
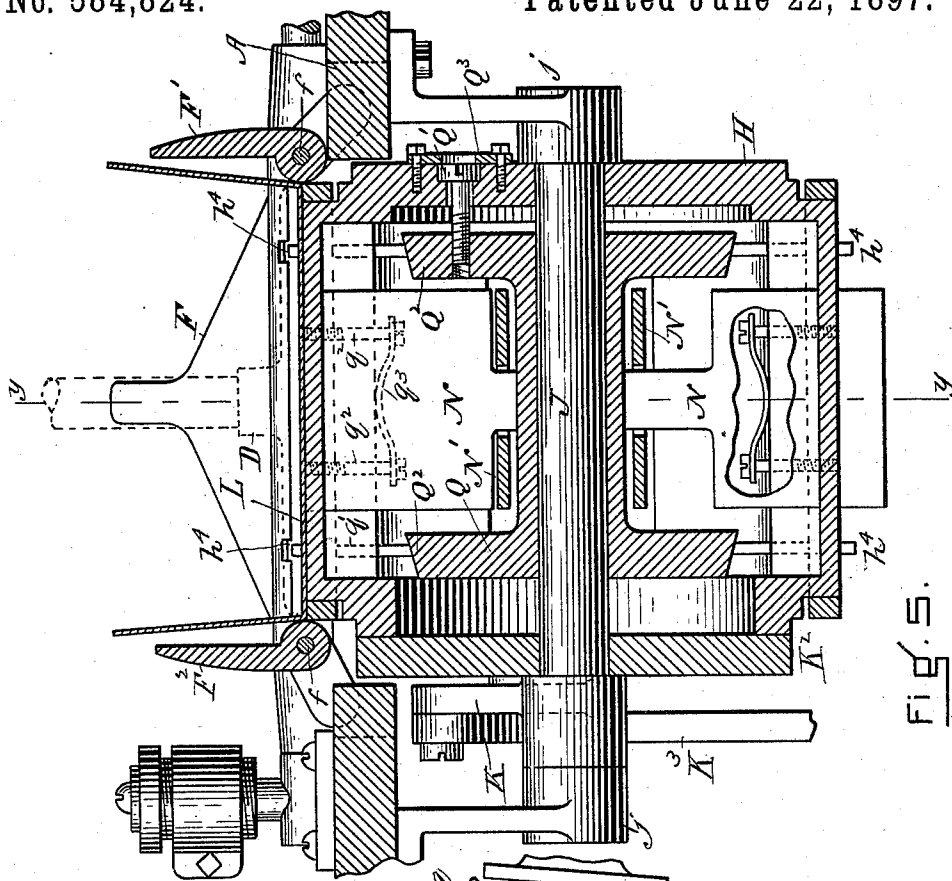
(No Model.)

4 Sheets—Sheet 4.

W. S. METCALFE & J. A. SHERMAN.
ENVELOP MACHINE.

No. 584,824.

Patented June 22, 1897.



WITNESSES

Frank G. Parker

Era A. Guild

INVENTORS

*Wm. J. McCaffrey
John A. Furman
J. G. O. G. Hall*

UNITED STATES PATENT OFFICE.

WILLIAM S. METCALFE AND JOHN A. SHERMAN, OF WORCESTER,
MASSACHUSETTS.

ENVELOP-MACHINE.

SPECIFICATION forming part of Letters Patent No. 584,824, dated June 22, 1897.

Application filed September 12, 1895. Serial No. 562,255. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM S. METCALFE and JOHN A. SHERMAN, of Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Envelop-Machines, of which the following is a specification.

Our invention relates mainly to the use of a series of plates, on each of which in turn the creased blank is placed by the plunger after passing through the creaser, and then having been folded by the folding mechanism is conveyed away to be pushed directly into the drier; and it consists of certain combinations of parts, hereinafter described, for accomplishing this result.

The best form of our invention now known to us is shown in the drawings, but it will be evident to those skilled in the art that the details of construction of our invention may be easily modified so as to be used with any of the well-known forms of gumming, feeding, and counting mechanism.

In the drawings, Figure 1 shows a front elevation, partly in section, of a mechanism embodying our invention. Fig. 2 is a side elevation of the same, also partly in section. Fig. 3 is a vertical section on line *x x* of Fig. 1. Fig. 4 is an enlarged vertical section of the carrier and folding mechanism on line *y y* of Fig. 5; and Fig. 5 is a transverse vertical section of the mechanism shown in Fig. 4, the mechanisms shown in Figs. 4 and 5 being on an enlarged scale.

A is the table of the machine, supported on legs *A'* in the usual manner and carrying a main shaft *B*, on which are mounted the cams for operating various parts. The frame is strengthened by cross-bars *A²*, *A³*, and *A⁴*, each of which supports certain lever mechanisms. A stud *A⁵*, also carried by the frame, supports the drier *C*.

D is a plunger of ordinary construction which reciprocates as is customary in envelop-machines, being moved by the cam *d*, to which it is connected and by which it is operated in the customary manner.

E is the "creaser," so called, (shown in Figs. 2 and 3,) which is also of the usual construction and serves to bend the flaps of the

blank as the plunger forces the blank through it to the folding mechanism.

The folding mechanism proper consists of four folders *F*, *F'*, *F²*, and *F³*, which operate in the usual manner, but the construction of the pressure-folder and seal-flap folder differ somewhat from that of the corresponding folders now in general use. Each of the folders is mounted at each end in suitable journals, but the pressure-folder *F* and the seal-flap folder *F³* are each of them cut away for practically their entire folding length between the two journal-boxes to allow the rotary carrier-frame *H* to rotate freely underneath them. This will be understood by reference especially to Figs. 3, 4, and 5, in which the journals of these folders are indicated at *f*. There is left, however, of the folder *F* a shell or rim *f'* and of the folder *F³* a shell or rim *f²*, which are so constructed that while the operation of folding is taking place these rims form the two long opposite edges of the folding-box, and hence keep the blank from spreading while the folding operation is being performed. Thus what is ordinarily known as a "folding-box" is dispensed with, the folders themselves serving to protect the edges of the envelop and the carrier its face, as will be explained below.

As has been intimated above, the folders operate from the cam-shaft *B* in the usual manner. The side folders *F'* *F³* are connected by suitable connecting-rods *G'* *G²* to levers mounted on a sleeve *g* on the brace *A³*, this sleeve being operated from the cam *g'* by a suitable arm. The pressure-folder is operated in the same manner, through the connecting-rod *G*, by the cam *g²*. The seal-flap folder *F³* is operated by the horizontal connecting-rod *G³*, lever *g³*, mounted on the brace *A²*, and cam *g⁴*. It has an intermittent motion, for the purpose to be described below.

The carrier above referred to consists of a four-sided casting *H*, suitably mounted upon a shaft *J*, hung from the frame in bearings *j*. This casting is rotated intermittently by means of a pawl-and-ratchet mechanism. (Shown especially in Figs. 3 and 4.) *K* is an arm mounted on the shaft *J* and carrying the pawl *K'*. To one side of the carrier is at-

2
tached a ratchet K^2 , with which the pawl K' engages, and a sufficient throw is given to the arm K to turn the carrier through an arc of ninety degrees by means of a connecting-rod K^3 , mounted on the eccentric-strap K^4 , operated by an eccentric K^5 on the cam-shaft B .

The four sides of the carrier (marked h , h' , h^2 , and h^3) consist of plates upon which the folding operation takes place, and pins h^4 h^5 are provided to insure the removal of the envelop which has been folded with the carrier as the carrier rotates. These pins are located on the casting in pairs opposite each other near the long sides of each plate, (see Figs. 4 and 5,) so that while the carrier is rotating the envelop will be pushed by pins h^4 out from under the folders, and when the carrier has turned, say, forty-five degrees, the envelop in sliding down the plate will be arrested by pins h^5 and held in proper relation to the plate until ejected therefrom.

The operation of the parts of our invention which have been referred to above to fold the envelop will now be described.

25 A blank having been fed under the plunger D in any of the customary ways, the plunger descends and carries the blank down through the creaser E and deposits it between the four folders on one of the plates h h' h^2 h^3 —say h —in the position shown in Figs. 4 and 5, where L indicates the blank. The four folders are now moved to fold and close the envelop in the usual manner, the seal-flap folder operating last. The envelop being folded, the flaps begin to rise, the seal-flap holder F^3 turning, say, a quarter of a revolution, and the pressure-folder moving sufficiently far out of the way—say back into nearly the position shown in Fig. 4—to allow the carrier to pass underneath it, these folders being notched, as shown in Fig. 5, to allow the pins h^4 and the pins h^5 of the next plate h' to pass beneath them. At this instant the carrier-moving mechanism begins to rotate the carrier and carries it around in the direction indicated by the arrow and into the next position, so as to bring the next plate h' into the position under the folding mechanism so that the folding of the next blank may take place. When the carrier starts on this movement, however, the plate h , carrying the envelop which has just been folded, in passing under the seal-flap folder F^3 causes a slight friction between the under side of the folder and the top surface of the envelop, which pushes the envelop over against the pins h^4 and consequently insures the carrying of the freshly-folded envelop positively out from under the folders. Soon it begins to slide and brings up against the pins h^5 . When the carrier completes its quarter-rotation, the envelop is ejected therefrom by means of ejectors N N' , operated by a spanker-plate M , which is mounted on the lever M' , carried on the brace A^2 and operated by the cam M^2 .

The ejectors consist of four plates, two of

which are marked N and two N' . These plates pass through the carrier at right angles to each other, as will be seen from Figs. 4 and 5, the plates h , h' , h^2 , and h^3 being slotted for the purpose, one pair of plates N being of the shape shown in Fig. 5, the other pair of plates N' being of substantially the same width throughout, but slotted to allow the neck of each plate N to pass through it, so that these four plates, both being of substantially the same width and moving in pairs at right angles to each other, do not interfere at all with each other's movements.

When the carrier has brought an envelop down into a vertical position, as described above, the cam M^2 throws the spanker M forward, so that it pushes the projecting ends of the ejectors N into the carrier, so that their further ends project through the plate h , thus forcing the envelop out from between the pins h^4 h^5 . When the carrier has moved again through an arc of one hundred and eighty degrees, these projecting ends are stuck in turn and the plates are pushed so that they project through the plate h^2 and eject the envelop which it holds. The plates N' operate in precisely the same way.

The envelop is received from the carrier upon a shelf P , (shown especially in Fig. 3,) and from this it is pushed into the drier C by means of the pusher P' , which is mounted on a sleeve P^2 , keyed to the rock-shaft P^3 , but free to slide thereon. Its sliding movement is given it from the eccentric P^4 , to which it is connected by suitable connecting-rods and the lever P^5 , which is connected to the shoe p . It is given a slightly-oscillating movement by means of the cam P^6 , acting through the rocker-arm P^7 and connecting-rod P^8 , so that the pusher P' will drive the envelop into the drier and will then oscillate back out of the way, as is indicated in Fig. 3, and the shoe p will carry it back to its original position. The shoe p is provided with fingers p' , which slide on the square rod p^2 , so that the oscillation of the sleeve will not turn the shoe. The envelop may be withdrawn from the drier in any convenient way.

The drier C is mounted on a spider C' , fast on the stud A^5 , having a friction-roll c at the end of each of its arms. On the interior of this drier is a set of ratchet-teeth c' . c^2 is a pawl operated by the arm c^3 and lever c^4 from the cam c^5 , its movement being intermittent, as is usual in this class of driers.

In order to adjust the thickness of the envelop, we provide the following mechanism: Each plate is provided with a rectangular rim, which may be called a "ring" q , from the lower side of which project pins q' , the inner ends of which engage with a beveled surface on a spool Q , mounted on the shaft J . From the lower side of each ring also project screws q^2 , the heads of which pass through a heavy leaf-spring q^3 , as indicated in Fig. 5. The spool Q has an end play on the shaft J , and its position on the shaft is controlled by

the screw Q', the head of which is prevented from end movement, for example, by a washer Q³, which is attached to the carrier. The hole in this washer allows the insertion of a screw-driver to alter the adjustment of the spool. The projecting edges of the spool Q² are beveled, as shown, and it is evident that by moving the spool in either direction on the shaft, so as to alter the position of the pins q', the rings may be either pushed out against the force of the springs q³ or those springs may be allowed to draw it in, and, moreover, that these movements will be the same with each ring, so that one turn of the screw Q' will control the adjustment of all four plates, so that the envelops will be folded flat or thin.

It is exceedingly important that the carrier and folders should form a nearly-tight fit at the instant the folding operation is taking place in order that the envelops may be uniformly constructed. For this reason we have constructed our folders, as described, so that they will center the blank and will also hold it on all sides during its folding and yet will allow the carrier to rotate at the proper time.

The pusher for carrying the envelop into the drier has an oscillating as well as a reciprocating motion, in order to allow it to get out of the way on its return stroke of the fresh envelop which is deposited on the shelf.

The machine above described has an increased capacity over other machines now known to us because of its increased capacity for delivering from the folder to the drier, the parts being very compactly arranged.

What we claim as our invention is—

1. In an envelop-machine of the class in which the envelop is folded upon a movable carrier which carries the folded envelop with it from under the folders, in combination with such a carrier and means whereby it is operated, a series of folders adapted to fold a creased blank, those folders, the axes of which are at right angles to the line of motion of the carrier, being provided with a rim adapted to engage with the edge of the envelop during the folding operation and prevent it from spreading, said rim being notched as described, and pins h⁴ mounted upon said carrier in line with the notches in said folders and adapted to engage with and move the folded envelop, all as set forth.

2. In an envelop-machine, a rotary carrier and means whereby it is rotated intermittently said carrier being provided with a series of plates, each in turn adapted to receive the creased blank, in combination with pins h⁴, h⁵ located to control the position of the envelop while the carrier is in motion, all as set forth.

3. In an envelop-machine, in combination with a vertically-moving plunger and a folding mechanism, a rotary carrier having four slotted plates or faces each face of which in turn forms a portion of said folding mechanism, and two pairs of ejectors extending through said carrier at right angles to each

other, each pair being adapted to be projected in turn through one of said opposite plates in line at right angles to the movement of said plunger and means whereby said ejectors are operated, as set forth.

4. In an envelop-machine, in combination with a folding mechanism consisting of a plunger and folding wings and a bottom forming part of a rotary carrier, an ejecting mechanism consisting of ejectors located within said carrier and a spanker-plate having a movement at an angle to said plunger and adapted to strike one or more of said ejectors, whereby the envelop is ejected from said carrier, as set forth.

5. In an envelop-machine having a rotary carrier provided with a series of plates, a set of rings each forming the border of one of said faces and means whereby the positions of all of said rings are adjusted simultaneously, all as set forth.

6. In an envelop-machine, having a rotary carrier provided with plates each surrounded by an adjustable ring, means whereby said rings are simultaneously adjusted, said means consisting of the spool Q adapted to slide on its shaft and provided with beveled edges Q² adapted to engage with projections from said rings, as and for the purposes set forth.

7. In an envelop-machine, mechanism for feeding the envelop into the drier, consisting of a shelf adapted to receive the envelop, and an oscillating reciprocating pusher located to overhang said shelf and adapted to travel the length of said shelf to push said envelop into the drier, then to be oscillated from the line of said shelf and returned to its original position, and mechanism whereby it is reciprocated and oscillated, as set forth.

8. In combination, a folding, a delivery and drier feeding mechanism and drier arranged together as described, said delivery mechanism consisting of a carrier and mechanism for ejecting the folded envelop from said carrier said drier-feeding mechanism being located at one side of the delivery mechanism adapted to move across the line of motion of said ejecting mechanism toward and from said drier whereby the envelop, being received from the ejecting mechanism is immediately delivered into said drier, all as set forth.

9. In an envelop-machine in combination with a rotary carrier provided with ejectors, a receiving-shelf projecting from a vertical support, said ejectors being adapted to force the envelop from said carrier and forming with said shelf and said vertical support a pocket in which the envelop is supported and from which it may be automatically removed, as set forth.

In testimony whereof we have hereunto set our hands this 28th day of August, 1895.

WILLIAM S. METCALFE.

JOHN A. SHERMAN.

Witnesses:

CHAS. H. COLBURN,

BENJAMIN F. SOUTHWICK.