

(No Model.)

4 Sheets—Sheet 1.

J. DENNIS, W. S. METCALFE & J. A. SHERMAN.
ENVELOPE MACHINE.

No. 458,691.

Patented Sept. 1, 1891.

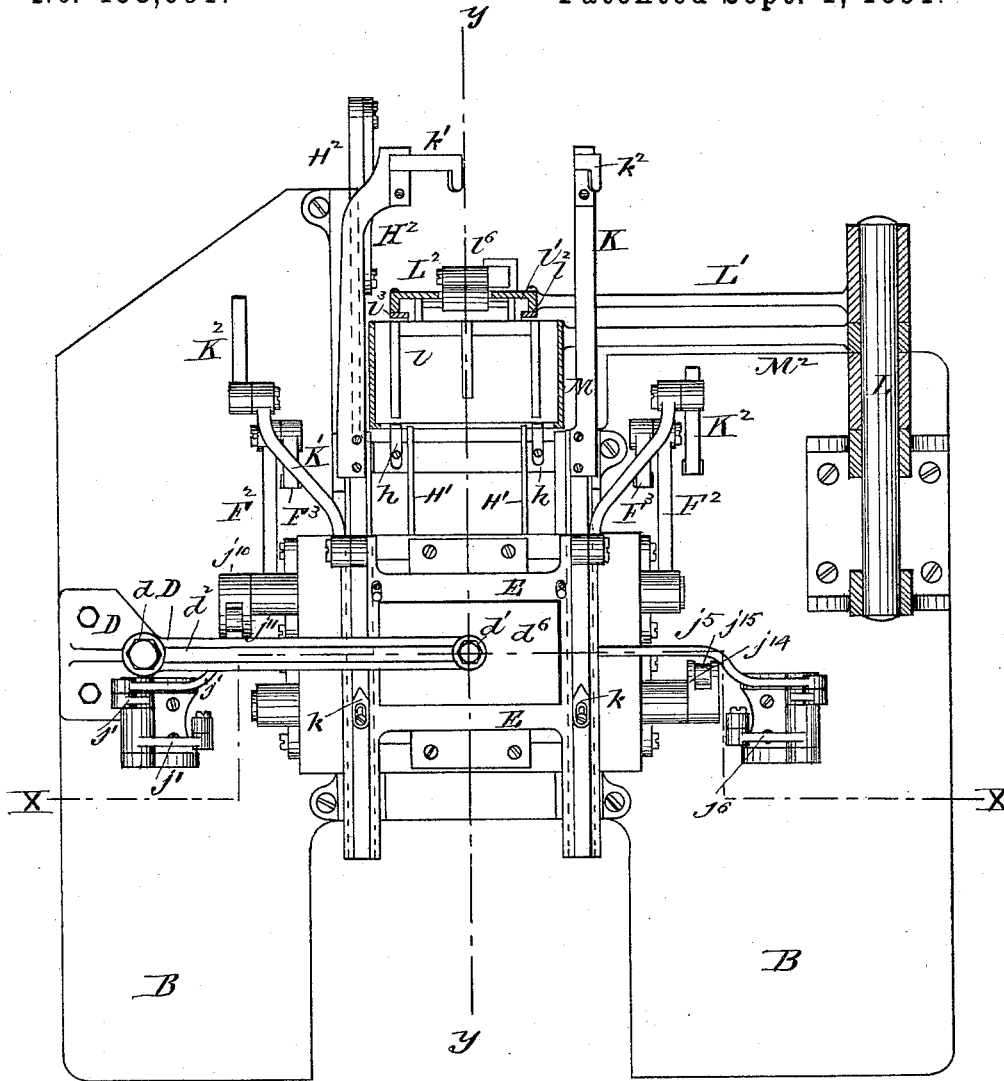


FIG. 2.

WITNESSES.

Samuel S. Butler
Benjamin F. Southwick

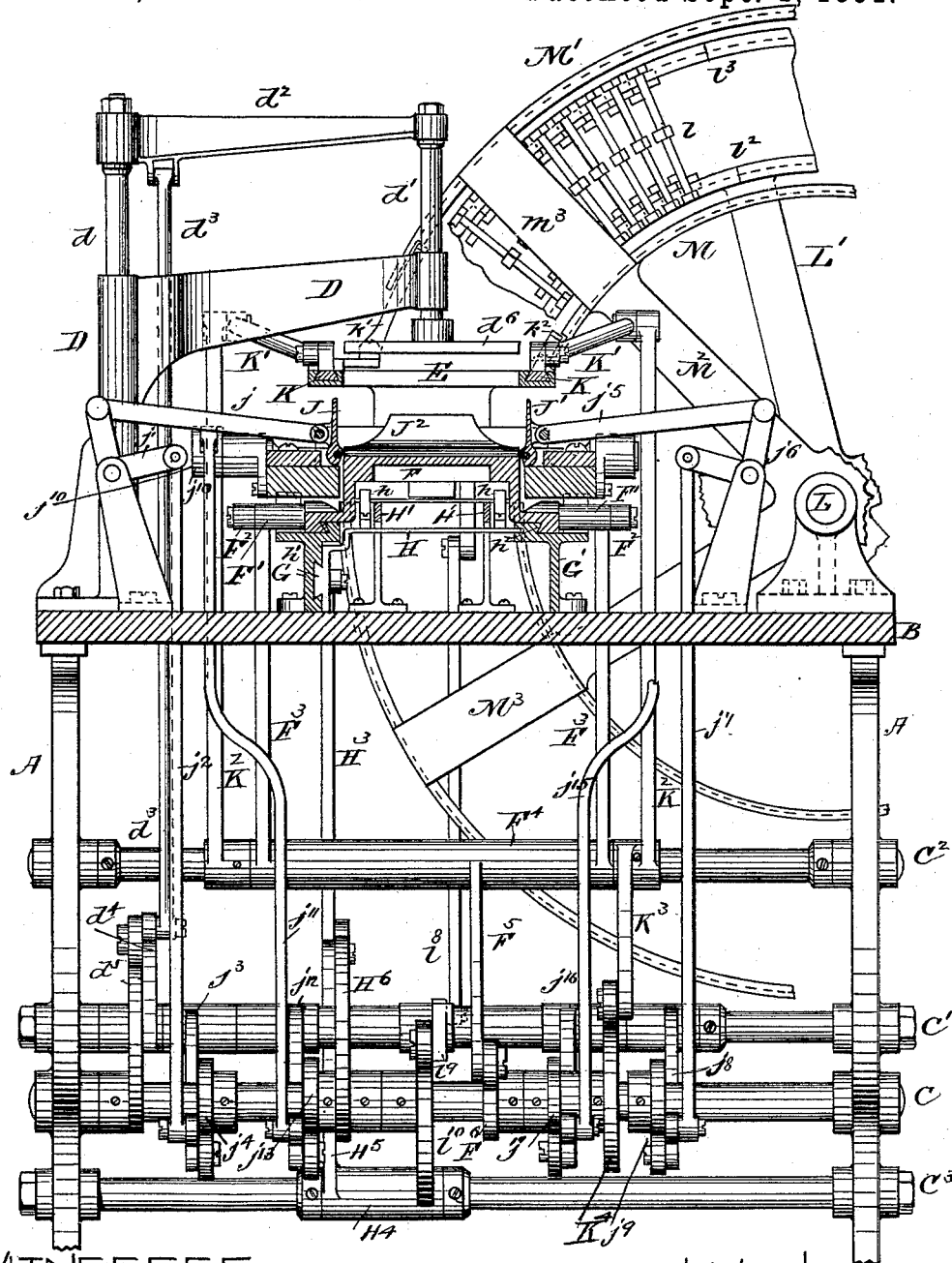
INVENTORS

Joseph Dennis
William S. Metcalfe
John A. Sherman

4 Sheets—Sheet 2.

ENVELOPE MACHINE.

Patented Sept. 1, 1891.



INVENTORS.

Joseph, Dennis
William S. Metcalfe
John A. Sherman

Fig-2

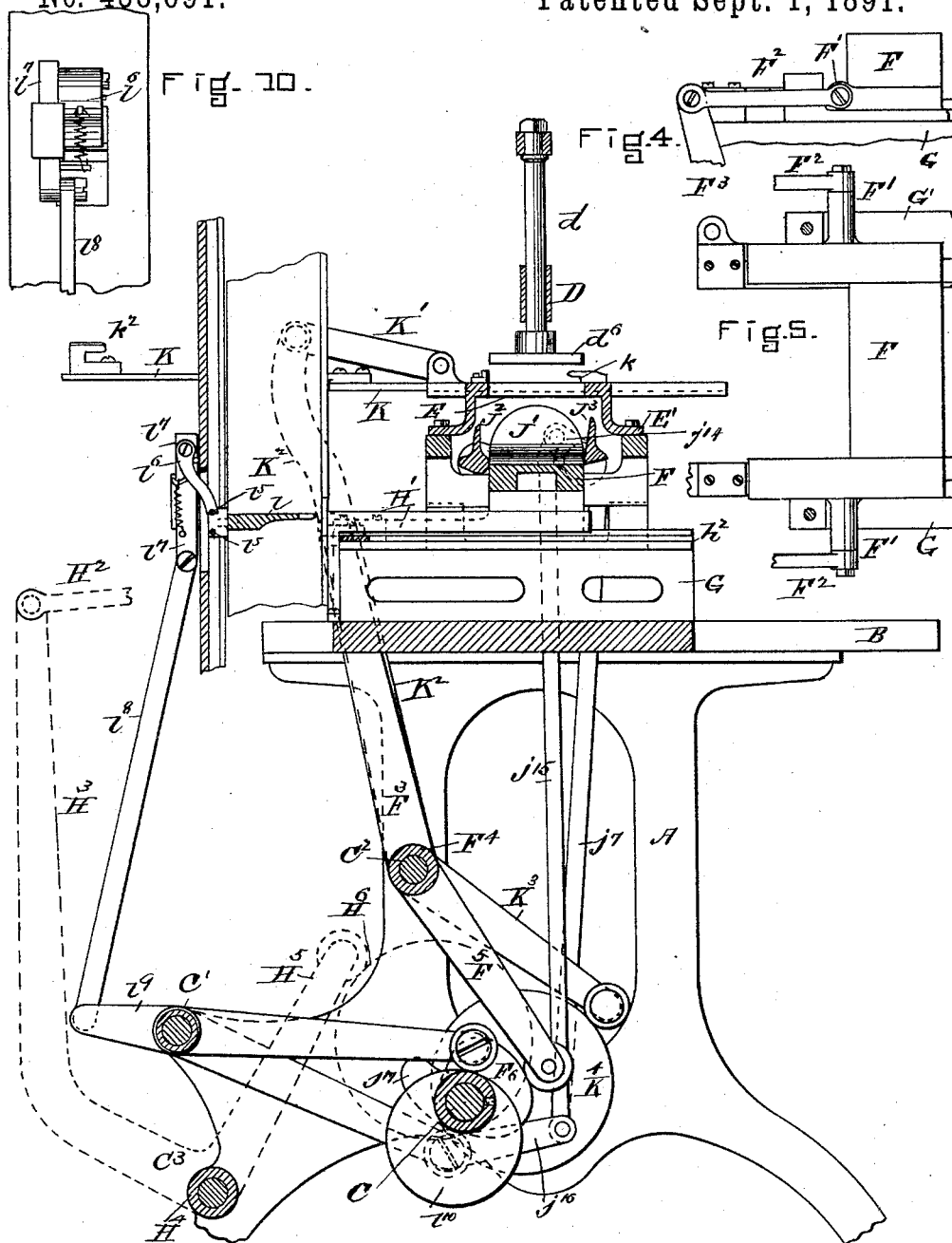
(No Model.)

4 Sheets—Sheet 3.

J. DENNIS, W. S. METCALFE & J. A. SHERMAN.
ENVELOPE MACHINE.

No. 458,691.

Patented Sept. 1, 1891.



WITNESSES.

Samuel, S. Butler
Benjamin, F. Bruthwick

FIG-3.

INVENTORS

Joseph. Dennis
William S. Metcalfe
John A. Sherman

(No Model.)

4 Sheets—Sheet 4.

J. DENNIS. W. S. METCALFE & J. A. SHERMAN.
ENVELOPE MACHINE.

No. 458,691.

Patented Sept. 1, 1891.

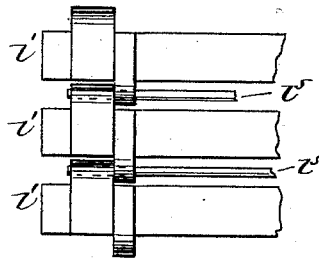


Fig. 5-

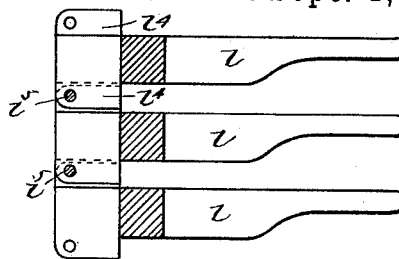


Fig. 7-

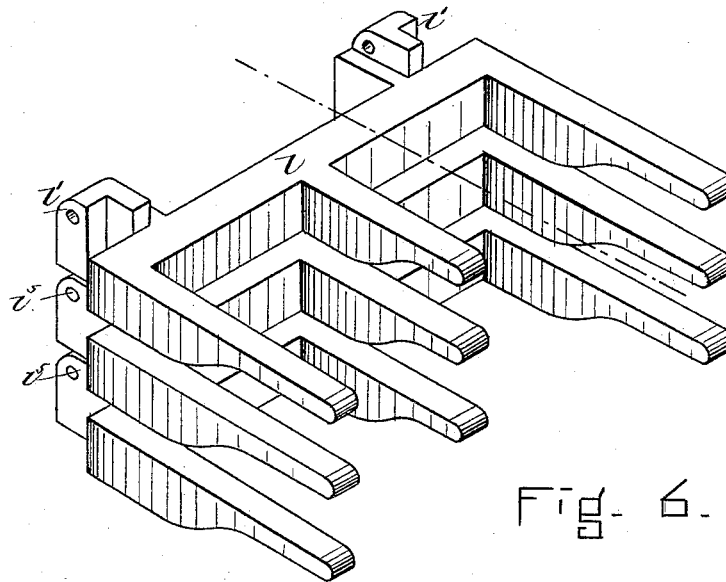


Fig. 6-

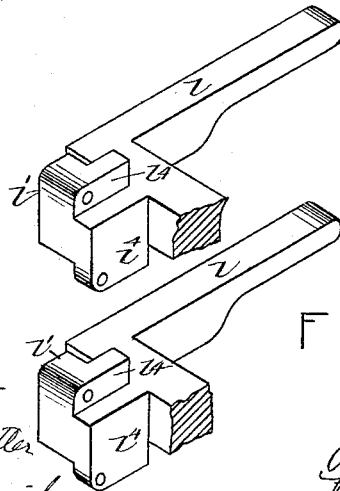


Fig. 9-
INVENTORS.

WITNESSES.

Samuel, S. Butler
Benjamin, F. Southwick

Joseph, Dennis
William S. Metcalfe
John A. Sherman

UNITED STATES PATENT OFFICE.

JOSEPH DENNIS, WILLIAM SHERRAN METCALFE, AND JOHN AMES SHERMAN,
OF WORCESTER, MASSACHUSETTS.

ENVELOPE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 458,691, dated September 1, 1891.

Application filed July 5, 1890. Serial No. 357,765. (No model.)

To all whom it may concern:

Be it known that we, JOSEPH DENNIS, WILLIAM SHERRAN METCALFE, and JOHN AMES SHERMAN, all of Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Envelope-Machines, of which the following is a specification.

Our improvement relates to the mechanism for folding and drying envelope-blanks which have been gummed; and it consists more especially in a folding-box having a removable bottom and in a drier of peculiar construction and mechanism for use in connection with these two parts, whereby they may be operated to the best advantage.

In the drawings, Figure 1 is a plan of a machine embodying our invention. Fig. 2 is a front elevation, partly in section, on line $x x$ of Fig. 1; and Fig. 3 is a side elevation, also partly in section, on line $y y$ of Fig. 1. Fig. 4 is a side view showing the bottom of the folding-box in detail, Fig. 5 being a plan of the same. Fig. 6 is a perspective view of three of the fingers of the drier removed from the drier itself. Fig. 7 is a section on lines $z z$ of Fig. 6. Fig. 8 is a rear view showing so much of the fingers as is shown in Fig. 7, and Fig. 9 is a perspective showing portions of two fingers lying disconnected, one above the other. Fig. 10 is a rear view of the pawl for moving the fingers.

With the mechanism shown in the drawings may be used any of the well-known forms of blank-feed mechanism and gumming mechanism which may be thought desirable. Such mechanisms are not shown in the drawings, as they are well known and would only serve to confuse the description of our invention. In the drawings, A represents the frame of the machine which supports a table B.

C is the cam-shaft.

C', C², and C³ are girts upon which various levers are mounted, as will be hereinafter described.

Upon a table B is mounted the support D, in which slides the rods $d d'$, connected by the cross-bar d^2 and operated by the connecting-rod d^3 , connected to the lever d^4 , which is moved by the cam d^5 in the customary manner. On the lower end of the rod d' is

mounted the plunger d^6 of the customary form, and adapted to act with the former or creaser bed E to crease the envelope-blank and place it upon the bed F of the folding-box.

Upon the table B are mounted ways G G', upon the upper side of which is a dovetailed slide which carries the bed of the folding-box F. The bed of the folding-box is shaped in scross-section, as shown in Fig. 2, and its purpose is, having received the envelope and supported it during the process of folding, to move out of the way and allow the folded envelope to drop upon the skids H', which lie below it. For this purpose it may be moved in a variety of ways and given either a reciprocating or oscillating motion. We prefer, as the simplest mode of moving the bed which now occurs to us, to cause it to reciprocate in the manner to be described.

To each side of the bed of the folding-box there is attached a stud F'. Each stud is connected by a connecting-rod F² with rocker-arm F³, mounted on a sleeve F⁴ upon the girt C². The arm F⁵ extends from this sleeve to the cam F⁶ on the shaft C, which is so shaped as to give to the folding-bed its reciprocating movement. By means of this cam, after the envelope has been properly folded and stuck, the bed of the folding-box is moved forward and out of the way rapidly, so that the envelope is left in place under the folders, and being unsupported drops upon the skids H', which are supported on the table B, and the upper surface of which is just below the bottom of the bed F of the folding-box. The carriage H is provided with hooks h , which project above the upper surface of the skids, and are intended to carry the envelope which has been properly folded into the drier, the upper surface of the skids being on a line with the finger on which the folded envelope is to be laid. The carriage H is mounted in a dovetailed groove h' in the support G, which supports one side of it. The other side of the carriage is supported in a groove h^2 in the support G', as will be seen in Fig. 2. The carriage H is given its reciprocating motion by means of connecting-rod H³, rocker-arm H³, sleeve H⁴ on the girt C³, and rocker-arm H³, operated by the cam H⁶. By this means the carriage is moved toward and from the drier,

the envelope being carried into the drier by means of the hooks *h*.

The folding-box comprises, in addition to the sliding bed *F*, four folders *J*, *J'*, *J²*, and *J³*.

5 These folders are of the ordinary construction, except that the folder *J³* is cut out or arched between its bearings, in the manner shown in Fig. 3, in order to allow the floor of the folding-box to slide out underneath it.

10 The mechanism for operating folder *J* consists of the connecting-rod *j*, bell-crank *j'*, connecting-rod *j²*, and the lever *j³*, fulcrumed on girt *C³*, held by a spring in the usual manner against the cam *j⁴* on cam-shaft *C*. The folder

15 *J'* is operated by the connecting-rod *j⁵*, bell-crank *j⁶*, connecting-rod *j⁷*, lever *j⁸*, and cam *j⁹*, as with the other folders. The folder *J²* has pinned to it a crank-arm *j¹⁰*, to which is connected the connecting-rod *j¹¹*, connected

20 to the lever *j¹²*, which is operated by the cam *j¹³*. *j¹⁴* is a crank-arm connected in the same way with the folder *J³* and operated by means of the connecting-rod *j¹⁵*, lever *j¹⁶*, and cam *j¹⁷*. These folders are operated in the order *J³* *J²*

25 *J* *J'*, in order to properly fold the envelope; but they may be adjusted so as to operate in any other desired order.

The former *E* is mounted on suitable supports upon the table *B*. In it are ways in which slides the blank-carrier *K*, this blank-carrier consisting of two slides which are given identically the same motion by means of mechanism to be described, each of which is provided with a hook *k* for conveying the

30 blank to the former and a hook *k'* *k²* for withdrawing the dried envelope from the drier. As shown in the drawings, these hooks are curved to conform with the hooks of the drier, being so shaped in order that they may reach

40 between the fingers of the drier and the guides *M* *M'*, and being long, so as to draw an envelope from one of the higher fingers of the drier where the envelope lies at an angle—say about forty-five degrees—to the plane of

45 the carriage, this being very desirable in cases where a rocking lifting-plate—a device well known for the purpose—is used to receive the dried envelope, and stand it vertically in a receiver, as the plate need only be rocked

50 through a fraction of a right angle. The two parts of the carrier are entirely disconnected, but are operated as one from the same cam. Each is provided with the connecting-rod *K'*, which connects with the rocker-arm *K²*, and

55 each of these levers is mounted on a hub keyed to the girt *C²*, which is capable of a rocking motion. One of these hubs is provided with an arm *K³*, carrying a roller which rides on the cam *K⁴*, so that as the cam moves the rocker-arm *K³* moves the girt *C²* and the two arms *K²*, and consequently the two parts

60 of the carrier, at the same time.

Our drying mechanism is as follows: Upon the stud *L* is fixedly mounted arms *L'*. On these arms is mounted a circular trough or track *L²*, in which are laid a set of fingers, these fingers being provided with projections

or ears *l'* at their inner ends, so that they fill the entire width of the track. These fingers are preferably kept in place by means of 7c rings *l²* *l³*, which cover these projections and are made fast to the track, so as to form with the track a trough or ways in which the fingers may slide. These rings are best made in sections, so that any section may be re- 75 moved, and the fingers which happen to be retained in place thereby may also be removed for purposes of repairing. We prefer to connect these fingers together in the manner shown in Figs. 6, 7, 8, and 9—that is to say, 80 each finger is provided on each side of its face with two or more ears *l⁴*, so arranged that the ears of one finger will interlock with the ears of the next, these ears being provided with holes which register when 85 the fingers are in position. The fingers are held together by hinge-pins *l⁵*, which pass through these holes and fasten the fingers together. By this means an annular chain of 90 fingers is formed, which lies in the track and is capable of being moved therein. These fingers are moved, as shown in the drawings, by a pawl *l⁶*, which is mounted on the slide *l'* and operated by a connecting-rod *l⁷*, attached to said slide and passing down to the lever *l⁸*, 95 mounted on the girt *C'*, operated by the cam *l¹⁰*, this cam being so shaped and timed that the fingers will remain in position while the envelope is being introduced into the drier, and will then be pushed around by means of 100 the pawl *l⁶*, so that the carrier *K* may withdraw from the drier the dried envelope by means of the hooks *k'* *k²*. It is evident that as the fingers fill the track entirely they need not of necessity be fastened together, but 105 may simply push each other round, or they may be fastened together in some other way than that described. In any case pins or a ratchet of some form should be provided, against which the pawl *l⁶* shall act, as shown 110 in the drawings, and pins *l⁵* answer this purpose. Guides *M* *M'* are provided to keep the envelopes from slipping off the fingers. The guides *M* are mounted upon arms *M²*, fixedly mounted upon the shaft *L*, and the guide *M'* 115 is connected to the guide *M* and held in position by the cross-bar *M³*, connected therewith.

The shape of the track or ways is immaterial, though we prefer to make them circular, as shown, and we do not limit ourselves to the form of the fingers or means of supporting them in the track. They may be mounted upon the periphery of a stationary cylinder or any other suitable support, the 125 main feature of this part of our invention being a collection of fingers mounted in stationary ways and conforming in general shape thereto, so that the fingers may be pushed round intermittently, although under constant support all the time, and yet any finger 130 may be easily replaced by another finger, in case it is necessary to repair the drier.

The operation of our machine will be read-

ily understood by all skilled in the art. The blank having been gummed is placed upon the slides K K, which are in their extreme forward position, with its edge against the hook *k*. The slides are then moved to the back of the machine, so that the blank is over the former E. The plunger then descends and carries the blank through the former and deposits it on the folding-bed and is withdrawn, the slides K K also moving back to receive another blank, after which the bed of the folding-box is withdrawn, so that the envelope falls through the box onto the skids H' in front of the hooks *h* on carriage H. The folding-box then opens again and the carriage moves forward to place the envelope between the fingers of the drier, the bed of the folding-box moving back into place and the various parts of the folding-box operating to fold another envelope. After the carriage has laid the envelope in the drier the drier-fingers are moved down, so that another empty finger will be found in place to receive the next wet envelope.

A dried envelope is withdrawn from the drier by means of the hooks *k'* *k*² simultaneously with the introduction of the freshly-gummed envelope. The hooks pass into the drier on each side of empty fingers. The drier moves so that a finger containing an envelope comes within reach of the hooks *k'* *k*², which withdraw it as the carriage goes back to get a fresh blank to be formed.

The dried envelope may be moved from the carriage by hand or automatically, as seems best, many varieties of ways of removing the envelope from a carriage being well known.

What we claim as our invention is—

1. In an envelope-machine, in combination, a reciprocating carriage adapted to receive the blank and to convey it to a predetermined point, a folding-box and means for conveying the blank from said carriage thereto, said folding-box being provided with a reciprocating bottom, and a second reciprocating carriage located in a plane below said folding-box and adapted to receive the folded envelope and convey it away, substantially as described.

2. In combination with a folding-box having a horizontally-reciprocating bottom and means whereby said bottom is reciprocated, a reciprocating carriage located in a plane below the path of said folding-box bottom to receive the contents of said folding-box at one extremity of its movement, as set forth.

3. In an envelope-machine, a folding-box having a horizontally-reciprocating bottom, in combination with means, substantially as described, whereby said bottom may be reciprocated, as set forth.

4. In an envelope-machine, a folding-box consisting of a suitable number of folders and a reciprocating bed, one of said folders having a portion of its axial edge cut away, as and for the purposes described.

5. In an envelope-machine, a drier consisting of an annular trough or way located in a vertical plane and a series of fingers located therein, in combination with the means, substantially as described, whereby said fingers are moved intermittently, as set forth.

6. In an envelope-machine, a drier consisting of a set of fingers located in ways, in combination with a pawl located behind said drier and adapted to engage with each of said fingers in turn, and means, substantially as described, whereby said pawl is reciprocated, as set forth.

7. In an envelope-machine, a drier having removable fingers located in ways and held in place by rings *l*² *l*³, said rings being also removable, as and for the purposes set forth.

8. In an envelope-machine, the blank-carrier K, located in a plane above the axis of the drier and provided with hooks *k'* *k*², said hooks being curved and one of said hooks being longer than the other, in combination with the forming and drying mechanism, said carrier and said drier being moved, as described, with relation to each other, whereby when the carrier is moved to convey a blank to the forming mechanism its hooks pass into the upper part of said drier and are adapted to engage therein with an envelope and are withdrawn therefrom when the carrier returns to receive a fresh blank, as set forth.

9. In an envelope-machine, a carrier for conveying an envelope to the drier, and the separate blank-carrier K, located in a plane above said first-named carrier and provided with hooks *k'* *k*², in combination with the forming mechanism and the drier, and means whereby said forming mechanism, said carriers, and said drier may be moved, as described, in relation to each other, all as set forth.

10. In an envelope-machine, in combination with a stationary track, a set of fingers located therein, one side of said track being longer than the other side and said fingers being shaped to fit therein in contact with each other, as set forth.

11. In an envelope-drier, a set of movable fingers connected together, as described, whereby one edge of said set is longer than the other edge, in combination with means whereby said fingers shall be supported and means whereby said fingers shall be moved intermittently, all substantially as set forth.

In testimony whereof we have hereunto subscribed our names this 2d day of July, A. D. 1890.

JOSEPH DENNIS,
WILLIAM SHERRAN METCALFE,
JOHN AMES SHERMAN.

Witnesses:

WILLIAM ALBERT WARDEN,
BENJAMIN FRANKLIN SOUTHWICK.