

(No Model.)

F. H. RICHARDS.
ENVELOPE FOLDING MECHANISM.

No. 296,353.

Patented Apr. 8, 1884.

Fig. 3.

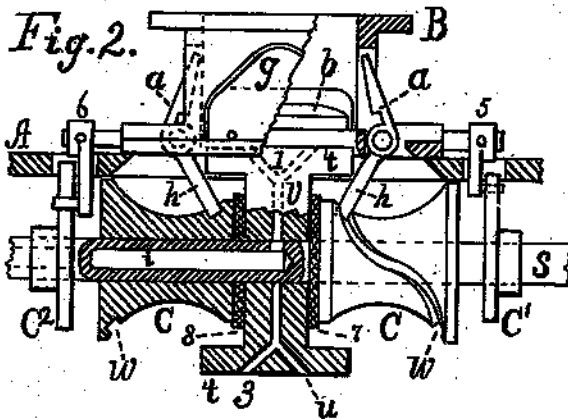
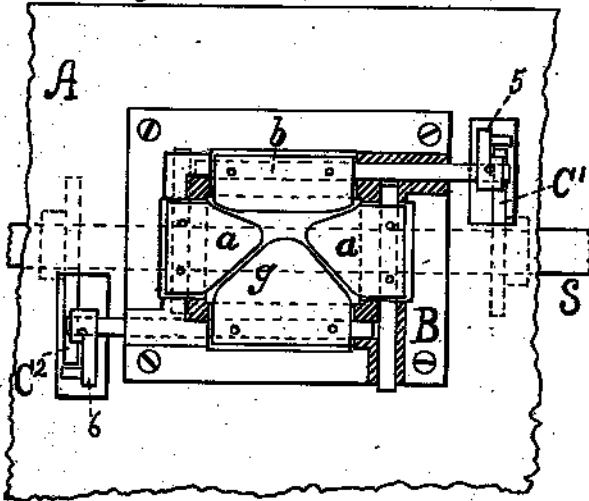
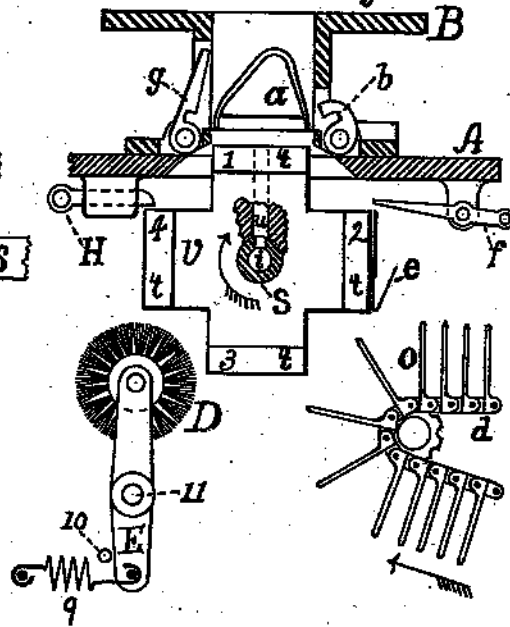


Fig. 1.



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ENVELOPE-FOLDING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 296,353, dated April 8, 1884.

Application filed March 29, 1883. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS H. RICHARDS, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain Improvements in Envelope-Folding Mechanism, of which the following is a specification.

My invention relates, chiefly, to certain improvements for operating the folding-wings of the usual forms of envelope-machines—as, for instance, those of that form thereof shown in Letters Patent No. 58,327, granted to T. V. Waymouth September 25, 1866, to the construction and operation of the bottom part of the box of such folding mechanisms, and to means for delivering the folded envelopes to the endless apron or other device for holding them until the gum on the seal-flap is dry.

In the accompanying drawings, in which the views are made in projection the better to illustrate the form and arrangement of the parts, Figure 1 is an end elevation, partially in section. Fig. 2 is a front view of a portion of the mechanism, also partially in section; and Fig. 3 is a plan, also partially in section.

In Figs. 1 and 2 the folding-wings are shown in an open position, and in Fig. 3 they are shown closed, the top of box B being broken away the better to show them. In Fig. 3 the devices for actuating the folding-wings are mostly hid from view by the table A of the machine.

Similar letters refer to similar parts throughout all the views.

The table of the machine A is provided with the box B, of the usual form, having folding-wings *a a b g*, also of the usual description, and operating to fold the envelope in the usual manner. These folding-wings are supported upon shafts rigidly fixed therein, and herein considered and referred to as integral therewith. The arrangement of the said shaft is best seen in Fig. 3.

In addition to the usual driving-shaft of the envelope-machine, I employ a shaft, S, arranged to have preferably a continuous rotary motion uniformly with the said driving-shaft, and to carry the several cams C C C', for operating the folding-wings. A series of plates, *t*, adapted to have envelopes folded

thereon, are in the present instance arranged to be revolved about and by shaft S between cams C C by means of friction-washers 7 and 8 acting upon the opposite sides of web V, upon which the said plates *t* are formed or secured.

H is a stop arranged to operate to arrest the motion of plates *t* at the proper time and place for envelopes to be formed thereon—in the present instance by a sliding motion imparted thereto by suitable connections with the driving mechanism of the machine. (Not shown in the drawings.) An endless apron, *d*, suitably operated, and of the usual or any suitable form, is employed to receive the folded envelopes and retain them until the gum on the seal-flap is dry, and it is so placed as to receive the envelopes directly from the plate *t*, preferably in position 2, as hereinafter described, and without the assistance of the usual guides.

D is a wiping-roll, brush, or other device equivalent thereto, suitably driven, and supported in the present instance by a swinging arm, E, Fig. 1, pivoted at 11, and retained in proper position by stop 10 and spring 9.

The cams C C are made alike, or nearly so, and rigidly fixed upon shaft S in reversed positions, corresponding to the reversed positions of wings *a a*, as shown in Fig. 2. The cams C are made concave, as shown, and provided with spiral cam-grooves *w* in their concave surfaces. By employing a cam of this description for the purpose and in the manner shown, all connections intermediate to the cam and the arm of the said folding-wing are avoided, thereby securing the utmost certainty of operation, and so simplifying the machine as to render the other mechanisms thereof much more accessible.

Cams C' and C' (shown in side view in Fig. 2) are shown in the present instance of such peripheral outline as to impart the desired motions to close wings *b* and *g*, respectively, by means of arms 5 and 6, the return motion of the said wings being effected by springs or their equivalent. (Not shown in the drawings.)

The operation of my improved envelope-folding mechanism is as follows: The envelope-

blank having been delivered upon box B and driven down by the creasing-plunger upon the plate *t*, forming the bottom of said box in position 1, the rotary motion of cams C C operates, by means of grooves *w* and arms *h*, to close the end-folding wings *a*, and in proper order cam C², by means of arm 6, closes back-folding wing *g*, and cam C³, by means of arm 5, closes seal-flap-folding wing *b*. The further motion of shaft S and its cams now returns the folding-wings *a* to their original positions, the wings *b g* being returned to their corresponding positions by means of springs (not shown) or their equivalent, and the stop H being then withdrawn by connections (not shown) allows the shaft S, by means of the friction-washers 7 and 8, to rotate the web *v*, with the plates *t* thereon, until the plate *t* from position 1, having the folded envelope thereon, reaches position 2, when a reverse motion of stop H arrests the motion of plates *t*, and the envelope *e* falls from the plate then at 2 into space O of the endless apron *d*. During the interval of rotation of the plates *t*, that one passing from position 3 to position 4 is operated upon by a suitably-constructed wiper, D, to remove from the surface thereof any extraneous matter before it reaches the position to again have folded thereon another envelope.

For the purpose of retaining the folded envelope upon the plate *t* during its passage from position 1 to position 2, the said plates are formed with suitable perforations or grooves in their surface and passages *u*, which, during the rotation thereof, communicate with a passage, *i*, in shaft S, in which a sufficient vacuum is formed for that purpose. The passage *i* is so formed and located in shaft S that its communication with passage *u* of the plate then forming the bottom of box B will be made immediately before the commencement of and continue during the rotation of the said plate *t*. When the motion of the plate *t* is arrested, the shaft S, by continuing its rotation, closes the communication of passage *i* with passage *u*, whereby the vacuum therein is destroyed and the folded envelope allowed to fall into space O of endless apron *d*. To insure the prompt delivery of the envelope from the plate at position 2 into space O, there is provided a finger, *f*, Fig. 1, adapted to be moved by suitable mechanism (not shown in the drawings) in front of plate *t*, to knock the envelope *e* therefrom.

The finger *f* is shown in the drawings pivotally supported; but that construction is not essential to its purpose.

I do not limit myself to the use of a series of plates with surfaces adapted to have envelopes folded thereon, and parallel to the axis of shaft S, as herein shown and described; but the said series of plates may be arranged to be rotated about a vertical or inclined axis, or to be moved into position horizontally, or arranged in a chain or belt form, or otherwise, as may be preferred. The first-named ar-

angement, being the one shown in the drawings, is, however, believed to be most desirable, and is therefore selected to illustrate my invention.

For the purpose of keeping the surface of plates *t* free from extraneous matter, I do not limit myself to a roll or brush, D, arranged to operate by rotation only, as I am aware that a belt of various materials, also arrangements of reciprocating brushes or other wipers, can be employed.

The shaft S is herein described as having a continuous rotary motion, that being considered most desirable; but it is obvious that a reciprocating rotary motion thereof may be employed. In that case the plates *t* can be driven by a ratchet and pawl directly therefrom without the aid of friction-surfaces. The said plates may also be driven by direct independent connections with the principal shaft or other mechanism of the machine by well-known devices.

The number of plates *t* in the series may be two or more; but four are believed most advantageous. They may be provided with the usual adjustable periphery for governing the thickness of the envelopes.

I claim as my invention—

1. In an envelope-folding mechanism, in combination, the folding-box B and a series of plates, *t*, adapted to have envelopes folded thereon, arranged substantially as described, to each successively form the bottom of box B.

2. In an envelope-folding mechanism, the box B, having folding-wings *a a b g*, and a series of plates, *t*, adapted to have envelopes folded thereon and arranged to be revolved about an axis, all in combination and arranged to operate substantially as described.

3. In an envelope-folding mechanism, in combination, the plate *t*, arranged for envelopes to be folded thereon, folding-wing *a*, having an arm adapted to move in a groove in cam C, and cam C, arranged to rotate upon an axis at right angles to the axis of wing *a*, all arranged to operate substantially as shown and described.

4. In an envelope-folding mechanism, in combination, the box B, with its folding-wings, cams C C C², and shaft S, and series of plates *t*, supported by and arranged to revolve about said shaft.

5. In an envelope-machine, in combination, a folding mechanism having a series of plates, *t*, adapted to each successively have envelopes folded thereon, and endless apron *d*, to receive the folded envelopes therefrom.

6. In an envelope-machine, in combination, a series of plates, *t*, adapted to have envelopes folded thereon, endless apron *d*, and mechanism, substantially as described, adapted to transfer folded envelopes from said plates to said apron.

7. In an envelope-folding mechanism, in combination, a series of plates, *t*, mechanism adapted to move said plates successively into

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position for envelopes to be folded thereon by the same folding devices, and mechanism, substantially such as described, to arrest the motion of said plates *t* at the proper time and place for envelopes to be folded thereon.

5 8. In an envelope-machine, in combination, a series of plates, *t*, adapted to have envelopes folded thereon, supported upon a rotating shaft, *S*, and a wiping roll or mechanism, *D*, adapted to operate upon the surface of said plates, substantially for the purpose described.

10 9. In an envelope-folding mechanism, in combination, a folding-wing, *b* or *g*, provided with arm 5 or 6, adapted to be operated directly by cam *C* or *C'* upon shaft *S*, parallel to

the axis of said folding-wing, and cam *C* or *C'*, all constructed and arranged substantially as described.

10. In an envelope-folding mechanism, plates *t*, adapted to have envelopes folded thereon, and having air-passages therein, substantially as described, in combination with hollow shaft *S*, supporting said plates, and having passage *i*, arranged to operate substantially as described.

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