

A. NOVICK.
FOLDING MECHANISM.
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1,303,370.

Patented May 13, 1919.

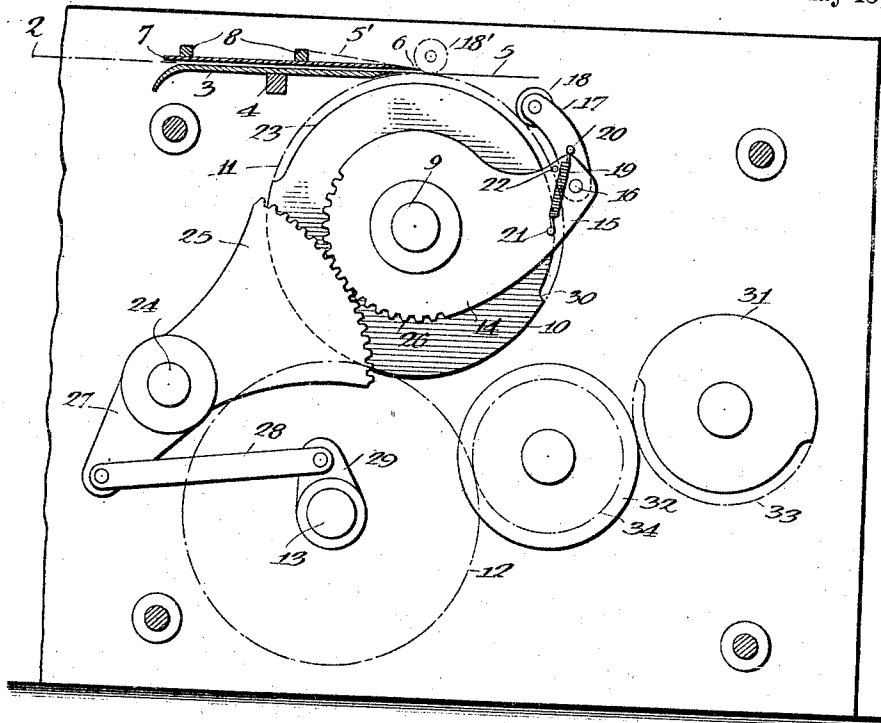


Fig. 1.

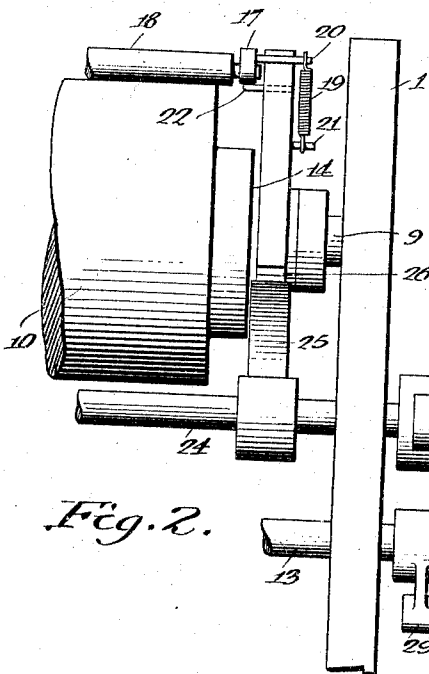


Fig. 2.

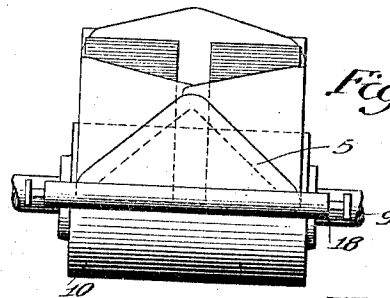


Fig. 3.

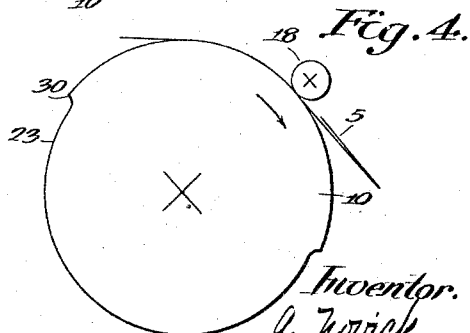


Fig. 4.

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UNITED STATES PATENT OFFICE.

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FOLDING MECHANISM.

1,303,370.

Specification of Letters Patent.

Patented May 13, 1919.

Continuation of application Serial No. 875,124, filed December 2, 1914. This application filed October 17, 1917. Serial No. 197,024.

To all whom it may concern:

Be it known that I, ABRAHAM NOVICK, a citizen of the United States, and a resident of the city of New York, county of Kings, and State of New York, have invented certain new and useful Improvements in Folding Mechanism, of which the following, together with the accompanying drawings, is a specification.

The present invention relates to folding mechanism for paper or cardboard, and has particular reference to such mechanism as is adapted to the folding of flaps on envelop blanks. As herein shown, the invention is embodied in a mechanism for folding over the back or bottom flap of an envelop blank upon the previously folded side or end flaps thereof, and in this respect said mechanism constitutes an improvement and modification of the back or bottom flap folding mechanism which is shown and described in my copending application Serial No. 182,195, filed July 23, 1917. The present application constitutes a continuation of my allowed application Serial No. 875,124, filed December 2, 1914.

The invention resides in the provision of novel instrumentalities for action on successively advanced blanks or sheets, each of which upon its arrival at a predetermined point in its travel has its advancing flap turned back on a line of fold at right angles to the direction of advance of said blank or sheet, the folding mechanism thereafter cooperating with suitable forwarding instrumentalities for continuing the advance of the folded blank or sheet substantially in its original direction. The above and other objects are attained by an arrangement and combination of devices as hereinafter described, reference being had in this connection to the accompanying drawings, in which—

Figure 1 is a side view of so much of an envelop machine as is necessary to illustrate the invention, the frame of the machine on one side being removed to disclose the mechanism more clearly.

Fig. 2 is a fragmentary end view of the mechanism which is shown in Fig. 1.

Fig. 3 is a top plan view of a portion of the mechanism shown in Fig. 1.

Fig. 4 is a diagrammatic view illustrating the cooperation of the folding instrumentalities

in the act of continuing the advance of a folded blank or sheet.

Like reference characters refer to like parts in the different figures.

As herein shown, the folding mechanism of my invention is incorporated in an envelop machine of the type wherein successive blanks are continuously forwarded between pairs of cooperating rolls or the like, not shown, and during said movement are successively subjected to the various operations of cutting, gumming, folding and the like, to form completed envelopes. In such a machine, the operating mechanism is ordinarily supported by a pair of spaced longitudinal side frames 1, 1, and in Fig. 1 the nearer of said frames has been removed, to disclose the mechanism more clearly. As herein shown, the envelop blanks in such a machine are advanced between the side frames 1, 1 in a plane corresponding to the line 2, Fig. 1, by mechanism which forms no part of the present invention, and which, therefore, is not here shown nor described, each blank finally arriving on a stationary plate 3 which is held between the side frames 1, 1 by any suitable supporting means, such as a cross bar 4. Each blank is brought to rest on said plate 3 in a predetermined position of registration, as fixed by the overhang of its advancing portion or flap 5 beyond the edge 6 of a superposed forming plate 7, the latter being carried by any suitable supporting means, such as a cross bar 8. Any suitable blank arresting and registering means may be employed for bringing a blank to rest in the position shown in Fig. 1, with its flap 5, as here shown the back or bottom flap of the completed envelop, projecting beyond edge 6 of the forming plate 7; such means, for instance, may be embodied in a pair of registering pins, not shown, adapted to engage the reentrant angles in the side edges of the blank which define the line of fold of said flap 5.

Below the supporting plate 3 and the forming plate 7 is journaled a shaft 9, which carries a roll 10, with whose periphery the forming plate 7, in the position shown in Fig. 1, is substantially tangential, at the edge 6 thereof. The shaft 9 is continuously rotated at a constant speed through a suitable operative connection, not shown, to the preceding rotating parts of the envelop

machine, and said shaft 9 carries a gear 11 which is in mesh with a gear 12 on shaft 13. A pair of disks 14, 14, only one of which is shown in Figs. 1 and 2, are loosely journaled on the ends of shaft 9 beyond the ends of the roll 10; and said disks have radial extensions 15 which project beyond the periphery of roll 10, as shown in Fig. 1. Pivoted to each extension 15, by means of a pin 16, is an arm 17, and the free ends of said arms 17 provide journals for a roll 18 whose axis is parallel to the axis of roll 10. A spring 19 attached at 20 and 21 to the arm 17 and extension 15 respectively, operates to yieldingly draw the roll 18 inwardly toward the axis of roll 10, and this inward movement is limited by a stop pin 22, which projects from the extension 15 and engages the edge of arm 17. The stop pin 22 prevents the roll 18 from making contact with a cutaway portion 23 of the periphery of roll 10, which is provided for a purpose hereinafter described; in other words, in the rotation of roll 10, the roll 18 is only permitted to make contact with the unrecessed peripheral surface thereof which lies substantially opposite to the cutaway portion 23.

The disks 14 are adapted to be oscillated from a rock shaft 24, which carries a segmental gear 25 in mesh with a segmental toothed portion 26 on one of the disks 14. If desired, both disks 14 may be similarly engaged and actuated. The rock shaft 24 has a crank 27 which is pivotally connected by means of a link 28 with a crank 29 on shaft 13, whereby the continuous rotation of said shaft 13 imparts a rocking or oscillating movement to the gear segment 25, and thus to the two disks 14 and the roll 18 carried thereby.

The operation of the above described mechanism is as follows:—In the position of the parts shown in Fig. 1, the roll 18 is at an intermediate point in its upward oscillation, traveling toward the under side of projecting back flap 5 of the blank which is at rest on plate 3 beneath the forming plate 7. The position of continuously rotating roll 10 is such that its cutaway portion 23 is traveling beneath the roll 18, and the two rolls 18 and 10 are therefore out of contact. The further upward oscillation of roll 18 carries it into the position shown in Figs. 2 and 3, or into the position shown by dotted lines 18' in Fig. 1, and in reaching this position said roll 18 engages the projecting flap 5 and presses it upwardly and backwardly upon the forming plate 7, folding said flap over the edge 6 of said plate. The side flaps of the blank having already been gummed and folded inwardly, by mechanism which forms no part of the present invention and hence is neither shown nor described, the back flap 5 is thus superposed upon the side flaps to overlies the edges there-

of, as shown in Fig. 3 and by the broken lines 5' in Fig. 1. Substantially coincident with the arrival of roll 18 in the position 18', which is the limit of its upward oscillation, the cutaway portion 23 of roll 10 is carried past said edge 6, whereby the periphery of roll 10 is brought into operative engagement with the under side of the fold thus formed in the blank. Said fold is thus pinched and gripped between the rolls 10 and 18, and the clockwise rotation of roll 10, together with the downwardly swinging bodily movement of roll 18 in the same direction, serves to remove the folded blank from the forming plate 7 and the supporting plate 3. The peripheral surface speed of roll 10 being more rapid than the bodily movement of roll 18 in the same direction, the folded blank is gradually moved forward between the cooperating surfaces of said rolls, due to the pressure of spring 19, which draws the roll 18 inwardly. In this manner, simultaneously with its bodily clockwise movement with the rolls 10 and 18, the blank has also a forward movement of translation relative to said rolls, and in consequence thereof the folded flap 5 is pressed, throughout its entire extent, into a firm engagement with the gummed side flaps beneath the same, the entire surface of the blank being thus passed or rolled between the rolls 10 and 18, as shown in Fig. 4, before the blank is ejected. This ejection takes place with the arrival of advancing edge 30 of cutaway portion 23 opposite the roll 18, to release the rear edge of the blank from the bight of rolls 10 and 18. The forward edge of the blank, with its folded flap 5 pressed into place, is simultaneously seized between suitable feed rolls 31 and 32, the former of which may be cut away, as shown at 33, to prevent the seizure of the blank before its release from the rolls 10 and 18. The rolls 31 and 32, which have suitable intermeshing gears and are driven by a gear 34 in mesh with gear 12, are adapted to advance the folded blank to any suitable mechanism for performing further operations thereon in the completion of envelopes.

I claim,

1. In a folding mechanism, a roll revoluble in one direction, a support for holding a sheet to be folded in a plane substantially tangential to said revoluble roll, a forming plate above said support, an oscillating roll means for moving said oscillating roll toward and away from said forming plate, said revoluble roll having a portion of its periphery cooperating with said oscillating roll to withdraw the folded sheet from said forming plate.

2. In a folding mechanism, a blank support, a forming plate, an oscillating roll for folding a sheet over the edge of said forming plate, and a segmental revoluble roll

having a portion of its periphery arranged to contact with said oscillating roll to compress the folded sheet, and means for rotating said revoluble roll.

5 3. In a mechanism of the character described, the combination with a blank support, of a forming plate, a segmental revoluble roll, means for continuously revolving said roll, a revoluble folding roll for coaction with said forming plate for folding the bottom flap of a blank and for coaction with said segmental roll for removing said blank from said forming plate and for passing said blank between said rolls, means for oscillating said folding roll, and means for advancing said blank.

4. In mechanism of the class described, a plate, means for supporting a blank or sheet with a portion thereof projecting beyond one edge of said plate, an oscillating member having a path of movement toward and away from said edge and adapted to fold said projecting portion over said edge in its movement toward said edge, and rotating means concentric with said oscillating member and cooperating therewith in the reverse movement of the latter, for removing the folded blank or sheet from said supporting means.

30 5. In a folding mechanism, a support for the sheet to be folded, a stationary forming plate above said support, an oscillating roll adapted to cooperate with said forming

plate, means for moving said roll in a circular path from a position below the plane of said forming plate to a position above the edge of the forming plate, whereby a sheet held on said support and projecting beyond the forming plate will be folded over its edge, and rotating means, concentric with the path of said oscillating roll, for cooperating therewith in removing said folded sheet from said support.

6. In a folding mechanism, the combination with a forming plate, of an oscillatory roll for turning over and folding a projecting flap of a blank over said forming plate while said blank is at rest, and means, revolving concentrically to the path of movement of said folding roll for coaction with said folding roll, for removing said blank from said forming plate, for applying pressure to the folded blank and for advancing said blank.

7. In a folding mechanism, the combination with a forming plate, of oscillatory means for folding a blank about said forming plate while said blank is at rest, and revoluble means concentric with and for coaction with said oscillatory means for removing said blank from said forming plate.

Dated this 13th day of Sept., 1917.

ABRAHAM NOVICK.

Witnesses:

HARRY DURRSEE,
JOHN DAVIS.