July 24, 1956 V. E. HEYWOOD 2,755,906

FEED AND DISCHARGE MECHANISM FOR ENVELOPE CONVEYOR

Filed Dec. 5, 1952 3 Sheets-Sheet 1

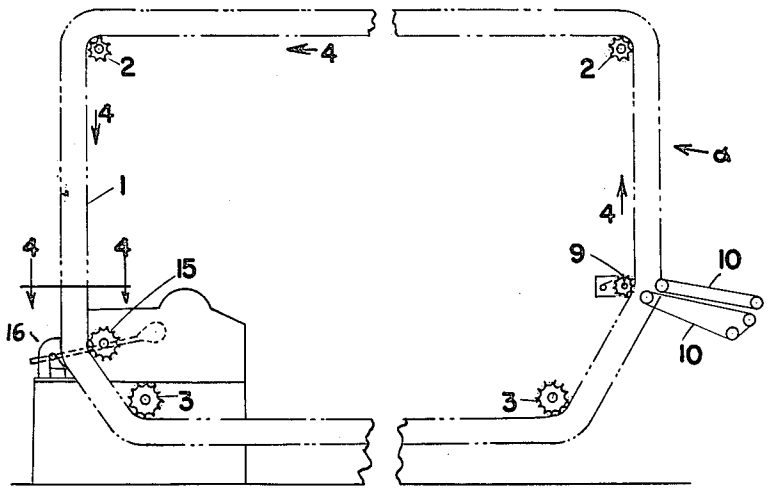


Fig. 1.

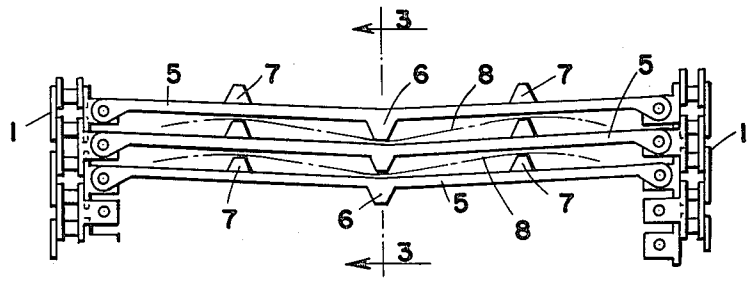


Fig. 2.

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3 Sheets-Sheet 2

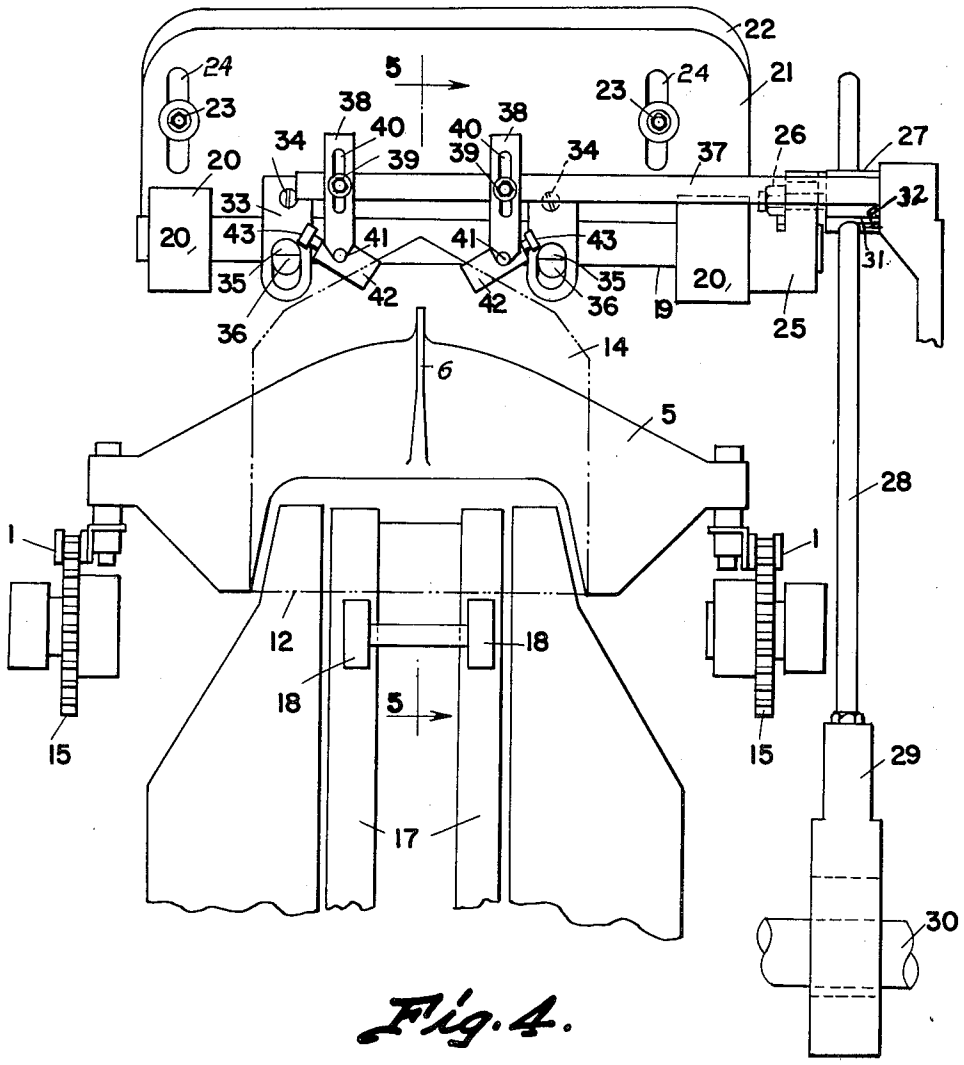


Fig. 4.

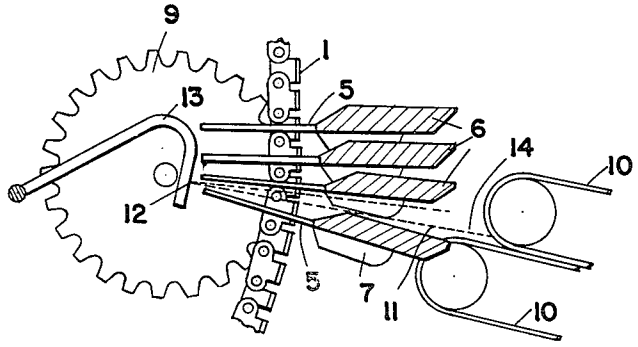


Fig. 3.

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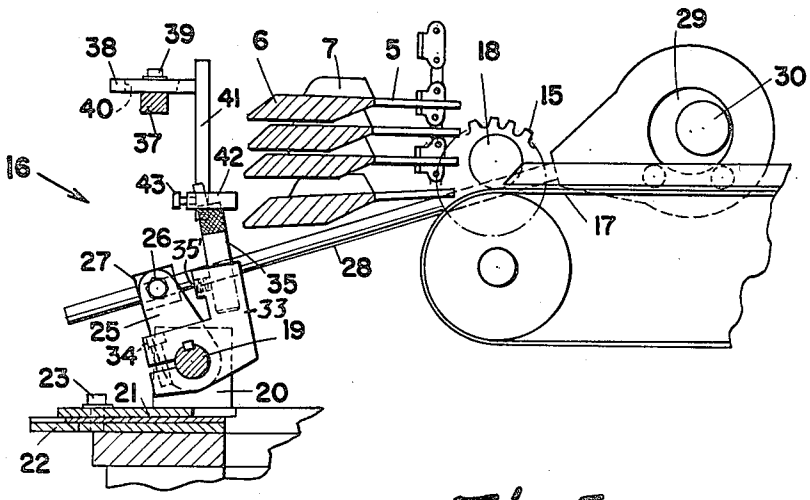


Fig. 5.

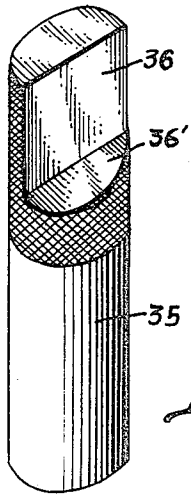


Fig. 6.

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United States Patent Office 2,755,906 Patented July 24, 1956

2,755,906

FEED AND DISCHARGE MECHANISM FOR ENVELOPE CONVEYOR

Vincent E. Heywood, Worcester, Mass., assignor to United States Envelope Company, Springfield, Mass., a corporation of Maine

Application December 5, 1952, Serial No. 324,331

4 Claims. (Cl. 198—24)

This invention relates to envelope drier mechanism of the endless chain type, and in particular embodies improvements and refinements in the chain type of envelope drier shown and described by my United States Letters Patent No. 2,604,829, July 29, 1952, Drier Mechanism for Envelope Machines.

The present invention provides, in lieu of the suction removal mechanism of said patent, a positively-acting mechanical ejecting means, operating in synchronism with the movement of the chain drier, to push each envelope as it completes the drying cycle from between the chain's fingers or leaves substantially at the instant of the latter's release of said envelope.

Other and further objects and advantages of the invention will be apparent from the following detailed description, taken in connection wih the accompanying drawings, in which

Fig. 1 is a side elevational view, with certain parts broken away, illustrating envelope drier mechanism of the type disclosed by my aforesaid patent, the same being equipped, at the left-hand side of Fig. 1, with envelope discharge mechanism in accordance with the present invention.

Fig. 2 is a large scale fragmentary view of the chain and finger construction of said patented drier mechanism, as viewed in the direction of arrow *a*, Fig. 1.

Fig. 3 is a fragmentary sectional view, taken in the plane of line 3—3 of Fig. 2, showing the action of such parts in receiving envelopes that are fed successively to said drier mechanism.

Fig. 4 is a fragmentary large scale plan view of the envelope discharge mechanism of the present invention, as viewed from the plane of line 4—4 of Fig. 1.

Fig. 5 is a vertical sectional view of said discharge mechanism, taken substantially in the plane of line 5—5 of Fig. 4.

Fig. 6 is a large scale perspective view of one of the pusher elements shown in Figs. 4 and 5.

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

The essential elements of my aforesaid patented drier mechanism, per se, are shown by Figs. 1, 2 and 3. Said drier includes a pair of spaced parallel endless conveyor chains **1, 1**, each of which is trained about upper sprockets **2, 2** and lower sprockets **3, 3** that define for both of said chains the substantially rectangular path shown by Fig. 1. Through this path the two chains **1, 1** move in unison, in the directions shown by arrows **4, 4** and with them move a series of transverse envelope-supporting leaves or fingers **5, 5**, each connected at its opposite sides, as shown in Fig. 2, to individual matching links of the two chains **1, 1**.

Each finger or leaf **5** provides on one face a central projection **6**, and on its opposite face a pair of spaced projections **7, 7** offset oppositely from the center of said leaf. As descibed in my aforesaid patent, these projections, by reason of their envelope warping or flexing action depicted by broken lines **8, 8** in Fig. 2, impose an

effective frictional restraint against any slippage or displacement of each envelope within its space or pocket between adjacent leaves **5, 5**. This slight flexure also has a stiffening effect, which effectively ovecomes any tendency for an envelope's trailing seal flap **14**, projecting beyond and overhanging such space or pocket, to sag or bend, thereby to avoid any fouling of adjacent envelopes in the drier by the wet glue on their respective extended seal flaps.

The feed or delivery of successive envelopes to the successive pockets of the drier takes place at a point in the upward moving right-hand course (Fig. 1) of the drier path, where the chains **1, 1** undergo a deviation from straight line travel by passage about a pair of alined sprockets **9, 9**. As shown in Fig. 3 the effect of this change in direction of chain travel on each successive pocket is to create momentarily, between the respective projections **7, 7** and **6** thereof, the necessary gap for the flatwise entrance to such opened-up pocket of an envelope; for this purpose, at each such separation or spreading of adjacent leaves **5, 5**, any suitably timed feeding devices, here shown as belts **10, 10** procure the flatwise projection of an envelope, wet seal flap **14** trailing, into said unobstructed temporarily distended space. In Fig. 3, the broken lines **11** show a so-entered envelope, as brought to a stop between two temporarily distended leaves **5, 5**, not by any obstruction on the inner end of either leaf, but by the contact of said envelop's leading bottom fold **12** with a suitable stationary barrier **13**; as thus positioned in the drier, each envelope's trailing seal flap **14** projects well beyond the outer ends of the pocket-forming leaves **5, 5**.

Beyond the sprockets **9, 9** the chains **1, 1** resume their straight line travel, thereby to restore the parallelism of the traveling leaves **5, 5** and to establish (see Fig. 2) the above-described holding action of their projections **6** and **7, 7**, on the respective intervening envelopes. As the envelope-carrying leaves pass about each pair of upper sprockets **2, 2**, their hold on said envelopes is momentarily released, but no displacement of such envelopes takes place, since similar appropriately curved barrier or stop elements, not shown, are provided, at each such sprocket location, for the successive envelopes' bottom folds **12** to rest upon, until the hold on each envelope of the leaves **5, 5** is restored.

The discharge or removal of successive envelopes from the drier pockets occurs in Fig. 1 at a point in the downward moving left-hand course of the drier path, where the chains **1, 1** are constrained to undergo a deviation from straight line travel by passage about a pair of aligned sprockets **15, 15**. The effect of this, as described in my aforesaid patent, is to release each envelope from the hold of its two leaves **5, 5**, just as the leading such leaf moves into an out-of-parallel relation to the following leaf, as shown by Fig. 5 herein; thereupon each so-released envelope is adapted to be discharged from the drier mechanism by a movement, bottom fold **12** foremost, which is a continuation of its entering movement at the sprockets **9, 9**, but in opposite direction thereto, due to the drier chain travel which has bodily carried the successive envelopes, from entry to discharge, through a 180° path of movement.

This discharge movement for each so-released envelope is effected, according to the present invention, by a pusher mechanism, designated generally at **16**, which is of the construction shown by Figs. 4, 5 and 6. This mechanism, at the instant of each envelope's release by the projections **6** and **7, 7** of its pocket (see Fig. 5) operates against the still slightly-warped edge of the envelope's seal flap **14** to move the envelope flatwise through the temporary gap between said projections, far enough for the envelope's opposite extremity (bottom fold **12**) to be

seized by a suitable constantly running high speed conveying means. The latter may consist, as here shown, of a pair of traveling endless belts 17, 17 whose upper courses, substantially in the plane of envelope release, are engaged by suitable cooperating rollers 18, 18. Successive envelopes projected by pusher mechanism 16 into the bight between belts 17, 17 and rollers 18, 18 may be delivered by said belts, one after another to appropriate instrumentalities, for further operations thereon, for example to the closure flap folding and envelope stacking mechanism shown by my United States Letters Patent No. 2,612,088, dated September 30, 1952.

The pusher mechanism 16 comprises a horizontal rock shaft 19 supported in suitable bearing blocks 20, 20 provided by a base plate 21, the latter being mounted for inward and outward adjustment on a suitable horizontal support 22, by means of retaining bolts 23, 23 passing through elongated slots 24, 24 of said base plate. Secured to one end of rock shaft 19 is an arm 25, whose free end has a swivel connection, as shown at 26, to a member 27 which is suitably apertured for the passage through same of an actuating rod 28. At its other end, rod 28 is connected to an eccentric 29, encircling a rotating shaft 30 which is so driven, by gearing not shown, as to make one revolution for each delivery of an envelope to the drier.

Each revolution of shaft 30 produces, through the above-described connecting devices, a back and forth rocking movement of shaft 19, for each envelope that is brought by the drier's travel into the discharge position shown by Fig. 5. The member 27 is split, as shown at 31, at one side of the aperture through same, and carries a screw 32 by which to tighten or loosen said member's engagement with the rod 28, to allow for the aforesaid inward or outward adjustment of base plate 21.

The rock shaft 19 carries a pair of spaced angular brackets 33, 33 which are similarly split, to permit of being adjusted, both endwise and angularly on said shaft, said brackets for his purpose having screws 34, 34 by which to tighten or loosen same on said shaft. Each bracket 33 provides a substantially vertical socket or hole, within which is received the cylindrical lower end of an upstanding pusher element 35. The latter's upper end, as shown in Fig. 6, is slabbed or cut to provide a flat substantially vertical surface 36, for pushing against the seal flap edges of successive envelopes, and a flat substantially horizontal surface 36'. The latter supports such edges against any tendency of same to sag, when said envelopes, as each reaches the discharge position shown in Fig. 5, spring back to an unwarped or unflexed condition. Each pusher element 35 is held in its socket by a set screw 35', loosening of which permits the element's vertical adjustment, to dispose support surface 36' at the most advantageous level, and also its angular adjustment, to establish substantial parallelism of pusher surface 36 with the seal flap edge portion contacted thereby.

The pusher elements 35, 35 are operative, at each clockwise rocking of shaft 19, to impart to each envelope, substantially at the instant of its release by the drier leaves, a flatwise displacement, inwardly of the drier, that accomplishes in every case the seizure and rapid full withdrawal of such envelope by the belts 17 and rollers 18. The above described adjustments of the pusher elements 35, 35 and also of the base plate 21 and member 27, enable the parts to be positioned so as to operate to the best advantage on all envelopes, regardless of size and shape, that are within the capacity of the drier to handle.

My invention also makes provision for additional or supplemental support of each released envelope's seal flap edge, just prior to the action of pushers 35, 35 thereon. This may be required for envelopes of thin or light-weight paper stock, in order to overcome the tendency of their seal flaps to sag or deflect, in such manner as to prevent effective action thereon of the strikers or

pushers 35, 35. As shown in Figs. 4 and 5, a stationary bar 37, parallel with rock shaft 19, carries a pair of brackets 38, 38 which are mounted for inward and outward adjustment on said bar, by passage of their retaining screws 39, 39 through elongated slots 40, 40 of said brackets. Each bracket 38 provides a depending rod 41, on which is carried a horizontally extending finger 42, the latter being adjustable both vertically and angularly on its associated rod, by the loosening of its retaining screw 43. By the several adjustments above described the fingers 42, 42 are positioned for any given size of envelope, so that their inner portions are in the seal flap path at the proper level to prevent undue sagging or deflection of each seal flap, just before its edge is contacted by the strikers 35, 35. The latter's uniform action, in initiating the discharge movement of each envelope from the drier, is thus assured.

I claim:

1. In drier mechanism for envelope machines, a traveling endless conveyor having opposite substantially vertical courses and opposite substantially horizontal courses, said conveyor comprising a pair of parallel laterally spaced chains connected for movement in unison, and a series of closely-spaced leaves supported by said chains and extending transversely thereof, to form a series of pockets or spaces, each adapted, when its leaves are parallel, to restrain a contained envelope's movement, means for spreading the leaves of each space into non-parallel relation at a predetermined envelope-receiving position and at a predetermined envelope-discharging position in combination with means for feeding an envelope to each space on the latter's arrival at envelope-receiving position, means for stopping each so-fed envelope with its trailing seal flap extended appreciably beyond the outer ends of its space-defining leaves, and pusher mechanism operative on each envelope seal flap at said envelope-discharging position of its drier space to discharge said envelope from said space by a movement constituting a continuation or extension of its feed movement into said space.

2. In drier mechanism for envelope machines, a traveling endless conveyor having opposite substantially vertical courses and opposite substantially horizontal courses, said conveyor comprising a pair of parallel laterally spaced chains connected for movement in unison, and a series of closely-spaced leaves supported by said chains and extending transversely thereof, to form a series of pockets or spaces, each adapted, when its leaves are parallel, to restrain a contained envelope's movement, means for spreading the leaves of each space into non-parallel relation at a predetermined envelope-receiving position and at a predetermined envelope-discharging position in combination with means for feeding an envelope to each space on the latter's arrival at envelope-receiving position, means for stopping each so-fed envelope with its trailing seal flap extended appreciably beyond the outer ends of its space-defining leaves, pusher mechanism operative on each envelope seal flap at said envelope-discharging position of its drier space to discharge said envelope from said space by a movement constituting a continuation or extension of its feed movement into said space, and means for adjusting said pusher mechanism toward and away from the path of said extended envelope seal flaps.

3. In drier mechanism for envelope machines, a traveling endless conveyor having opposite substantially vertical courses and opposite substantially horizontal courses, said conveyor comprising a pair of parallel laterally spaced chains connected for movement in unison, and a series of closely-spaced leaves supported by said chains and extending transversely thereof, to form a series of pockets or spaces, each adapted, when its leaves are parallel, to restrain a contained envelope's movement, means for spreading the leaves of each space into non-parallel relation at a predetermined envelope-receiving

position and at a predetermined envelope-discharging position in combination with means for feeding an envelope to each space on the latter's arrival at envelope-receiving position, means for stopping each so-fed envelope with its trailing seal flap extended appreciably beyond the outer ends of its space-defining leaves, means in the path of said extended seal flaps, substantially at the envelope-discharge position of said spaces, for supporting each seal flap edge against deflection, and pusher means operative against each so-supported edge to discharge each envelope from its drier space by a movement that is a continuation or extension of its feed movement into said space.

4. In drier mechanism according to claim 1, a pusher mechanism comprising a pair of upstanding pusher elements, each presenting a flat substantially vertical pusher surface, and a flat substantially horizontal support surface, for the edges of said envelope seal flaps.

References Cited in the file of this patent

UNITED STATES PATENTS

2,604,829	Heywood	July 29, 1952
2,648,420	Best et al.	Aug. 11, 1953