Dec. 29, 1970 J. F. GOMBAULT 3,550,351

DEVICE FOR TRANSPORTING ENVELOPES AND THE LIKE

Filed Nov. 6, 1967 4 Sheets-Sheet 1

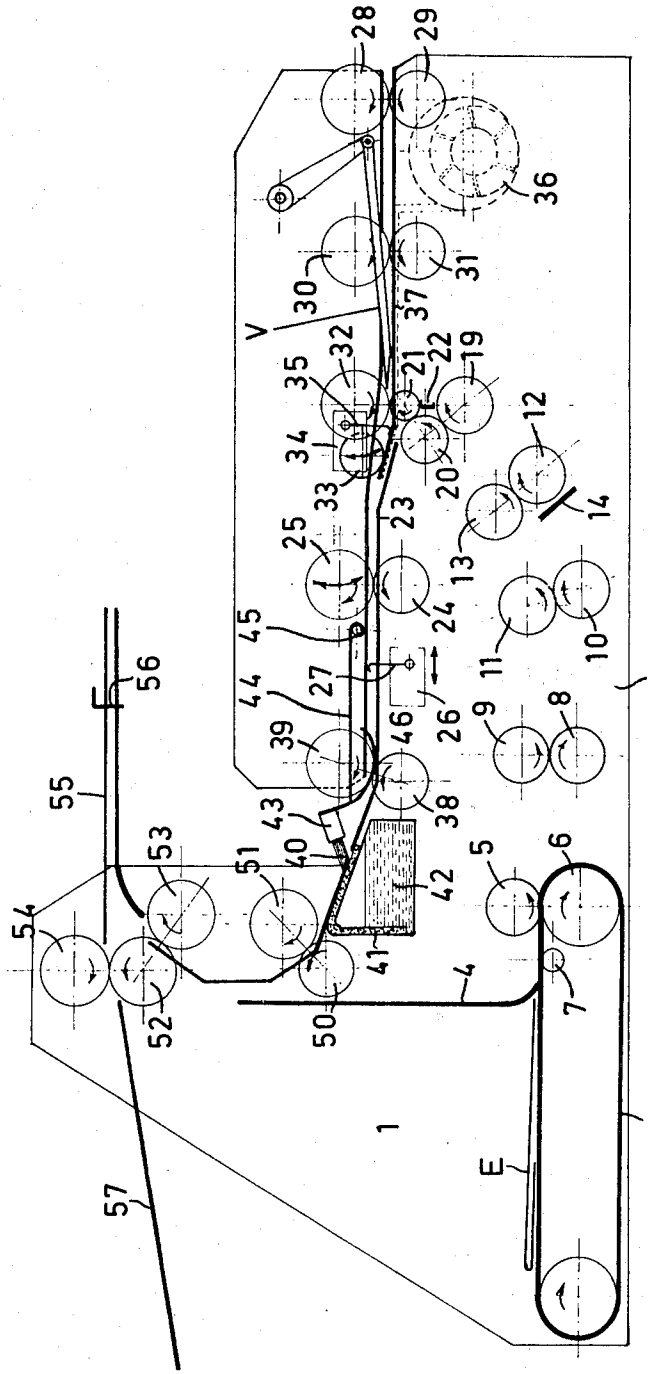


FIG.1

JACOBUS FREDERICUS GOMBAULT.
INVENTOR

Bu. Wenderoth. Lind & Ponack.
Atty's

DEVICE FOR TRANSPORTING ENVELOPES AND THE LIKE

Filed Nov. 6, 1967 4 Sheets-Sheet 2

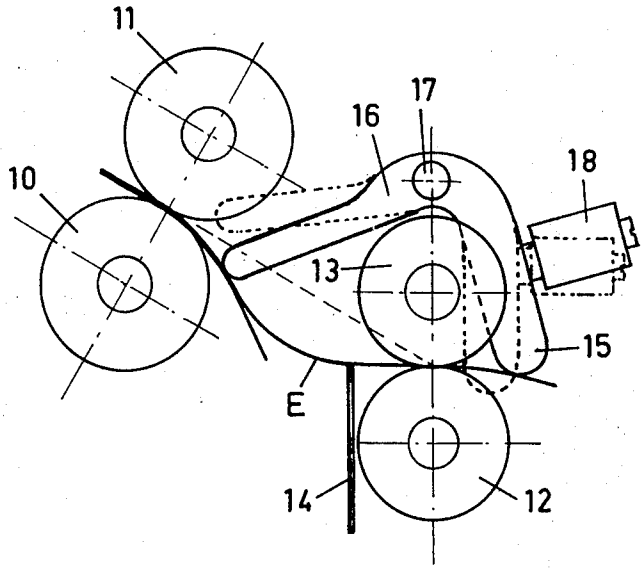


FIG.2

JACOBUS FREDERICUS GOMBAULT.
INVENTOR

Bu. Wenderoth. Lind & Ponack. Attys

Dec. 29, 1970 J. F. GOMBAULT 3,550,351

DEVICE FOR TRANSPORTING ENVELOPES AND THE LIKE

Filed Nov. 6, 1967 4 Sheets-Sheet 3

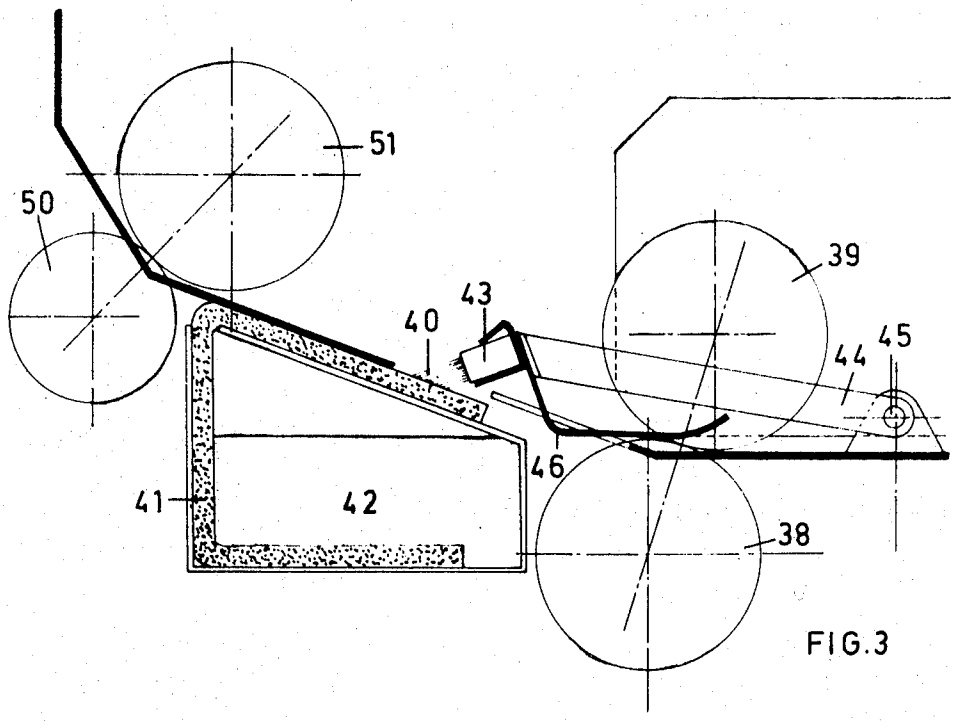


FIG.3

JACOBUS FREDERICUS GOMBAULT.
INVENTOR.
BY Wenderoth, Lind & Ponack
Attys

DEVICE FOR TRANSPORTING ENVELOPES AND THE LIKE

Filed Nov. 6, 1967 4 Sheets-Sheet 4

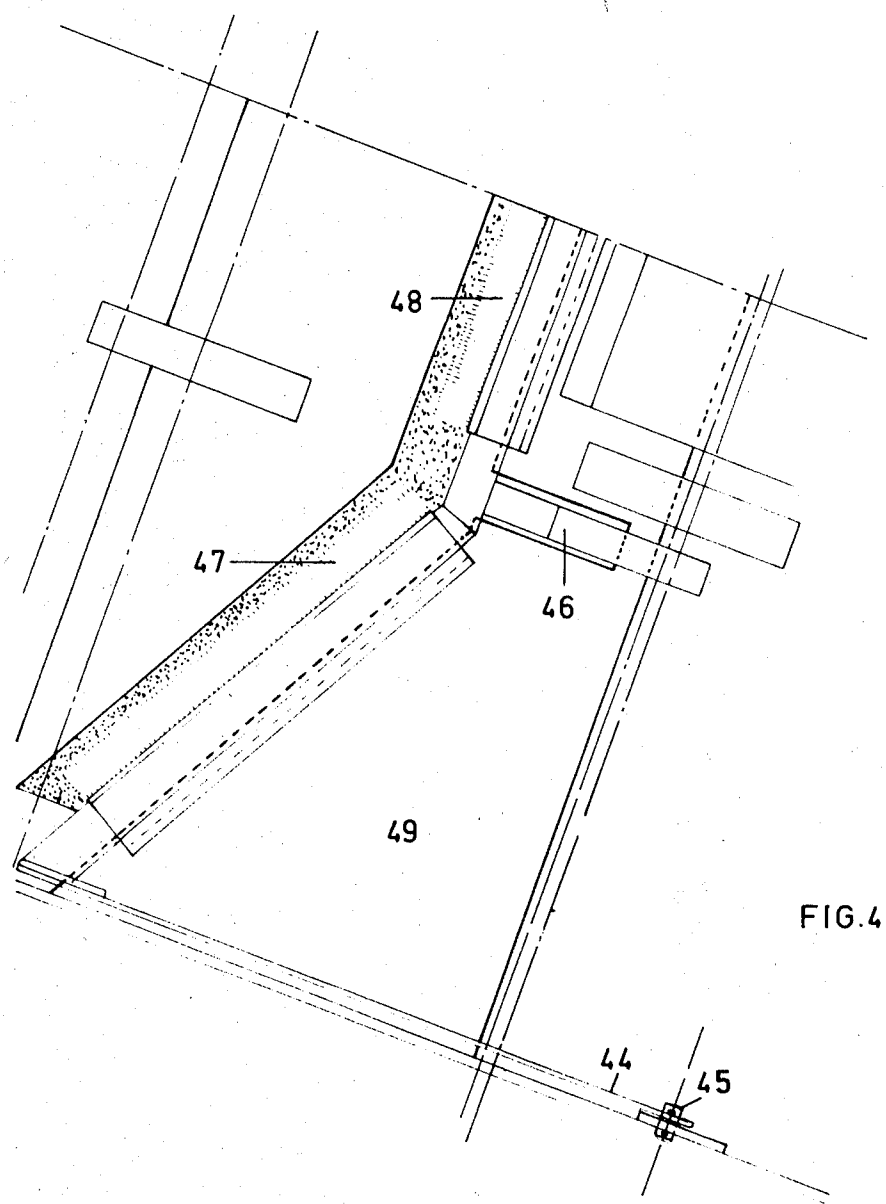


FIG.4

JACOBUS FREDERICUS GOMBAULT.
INVENTOR.
BY Woodworth, Lind & Ponack
Atty's

United States Patent Office 3,550,351 Patented Dec. 29, 1970

3,550,351

DEVICE FOR TRANSPORTING ENVELOPES AND THE LIKE

Jacobus Fredericus Gombault, Drachten, Netherlands, assignor to Hadewe Eerste Nederlandse Duplicatorfabrieken N.V., Drachten, Netherlands

Filed Nov. 6, 1967, Ser. No. 680,904
Claims priority, application Netherlands, June 29, 1967, 6709095
Int. Cl. B65b 11/48, 43/31
U.S. Cl. 53—187 10 Claims

ABSTRACT OF THE DISCLOSURE

A device for transporting envelopes in a flap-trailing manner throughout a filling and closing machine wherein the initial opening of the folded over flap of the envelopes taken from associated storage means, the subsequent introduction of enclosure, the moistening of the flap gum layer and the attendant sealed closing of a filled envelope by reversing the direction of envelope travel take place fully automatically.

For an envelope filling machine to be considered reliable by the user, it is not only essential that the machine should be able to work undisturbedly, but in addition, a clear view and easy accessibility of the critical points are necessary.

The object of the invention is to arrive at fully automatized separating, opening, filling, moistening and closing of envelopes or the like with simple expedients and/or provisions in the transport system.

According to the invention this is achieved in that at determinate locations in the transport track of the envelopes, which latter are disposed therein with the folding lines of their flaps directed backwards in a trailing manner, means are provided, controllable by an envelope or continuously operative, by which any of the following can occur: The flap of an envelope can be opened; the filling with contents can take place, and/or the flaps can be moistened. In one embodiment, the means for opening the flap may consist of pairs of rollers arranged one pair behind and one pair at some distance from the other, the drive of which is such that the circumferential velocity of the second pair of rollers is less than that of the first pair of rollers, and with means being provided to have the consequently occurring bulging of the envelope take place on the same side with its flap, and further including means between the pairs of rollers on the bulging side of the envelope to further open the flap.

The means for bulging the envelope on the side of its flap can be so arranged or positioned that a curve is formed in the transport track for the envelopes.

Another embodiment consists of the application of a tiltable lever, one leg of which extends behind the last pair of rollers on the transport track of the envelope, whereas the other leg can be so pressed against an envelope present between the pairs of rollers that said envelope is bulged in the direction of the flap. For completing the opening of the envelope flap a stripper in the form of a plate or similar flat element disposed between the pairs of rollers may be used.

After the envelope flap is fully opened in the manner discribed above, it lies, considered in the direction of transportation, in a trailing manner at the back of the envelope. In this condition the further transportation takes place.

A filling station on the transport track for inserting contents into the envelope is characterized in that at the location of the filling station a bent guiding plate is provided in the transport track, whereas additional means are

provided by which air can be blown between the track of the envelope and the path of the contents.

Furthermore, means can be provided in the filling station which can be controlled by a moving envelope whereby the action of the envelope transport system upon the envelope reaching the filling station can be interrupted.

For automatically putting the transport system into action again after the contents have been introduced into an envelope residing at the filling station, means are provided in the feeding system responsive to the contents which will switch in again the hitherto inoperative porton of the envelope transport system after any contents have passed by. If the transport system of the invention is combined with a closing system for the envelopes, means are further provided for moistening the gum layer on the flap of the envelope, said moistening means consisting of brushes, felt or any other moisture holding material set in a holder, and said holder carrying means extending into the path of the envelopes and capable of keeping the brushes or the like outside the path. Preferably the brushes have, or the moisture holding material has, the shape of a U having its legs bent open, whereas the means extending into the path of the envelopes are disposed at about the same distance from the center of the path as the bending points of said U-shape piece.

Finally it is possible to close the envelope by having it pass between a pair of guides between which a fixed stop is disposed, and so positioned that the folding line of the flap is transported between two folding rollers, whereafter said folding rollers close the envelope and in doing so pull the envelope out between the guides. An embodiment is contemplated in which the stop is not fixed but only exerts a pressure in the direction of the folding rollers. This avoids the necessity of a re-adjustment in case of alternation in the envelope-size.

A very compact construction of a preferred application of the invention is now further explained in conjunction with the illustrative drawings, it being understood that a transport track having the above explained characteristic features could also have a quite different form or that some of the functions explained could be omitted in case these functions have already been provided for in another manner, e.g. by connecting a closing mechanism to a postage meter.

In the drawing:

FIG. 1 schematically depicts a longitudinal section of a device according to the invention;

FIG. 2 is an enlarged schematic elevational detail view of the means for opening the flap of an envelope;

FIG. 3 is an enlarged semi-schematic cross-sectional view of the moistening means; and

FIG. 4 is a partial top plan view thereof.

In the drawing, **1** indicates generally a storage or supply cabinet means in which a number of empty envelopes E can be received in the usual manner, i.e. having their flaps closed and downwardly directed. An endless conveyor **2** is shown which serves for feeding envelopes into the device, although any suitable other means could be used.

A side **3** of the device is depicted in which the various bearing pedestals for shafts and the like are disposed. An adjustable plate **4** is used for the purpose of assuring that each time only one envelope E, i.e. the lowermost of the pile, is withdrawn from the supply means **1**. **6** represents a return roller of the belt conveyor **2**, and **5** an upper roller, whereas **7** is a stop roller with respect to which the plate **4** is adjustable. Pairs of transport rollers are represented by **8, 9, 10, 11**, and **12, 13**, the lowermost **8, 10** and **12** being continually driven. The uppermost rollers **9, 11** and **13** are pressed on in the direction of the accessory rollers by suitable spring pressure or otherwise. A knife **14** or similar flat organ is disposed in the

space between the pairs of rollers **10**, **11** and **12**, **13**, the purpose of which will be discussed.

In FIG. 2 the pairs of rollers **10**, **11** and **12**, **13** are again illustrated and wherein the hinging point **17** of a two-armed lever **15**, **16** is disposed above the pair of rollers **12**, **13** with leg **15** of said lever having been made heavier by a weight **18** applied thereto. As long as no envelope E is present between the pairs of rollers **10**, **11** and **12**, **13**, the position of the lever **15**, **16** is as shown in dotted lines (FIG. 2). The position in full lines is the one in which an envelope E is held between the pair of rollers **12** and **13**, wherein the leg **15** of the lever is pushed away and the lever pivots about the point **17**. Above the pair of rollers **12**, **13**, and preferably to the right, as shown in FIG. 1, a pair of rollers **19**, **20** is disposed, serving for further transport of an envelope, whereas another roller **21** cooperates with roller **20** for reversing the direction of movement of an envelope moving through the device. For still furthering this, a stop **22** is provided which will deflect the front of the envelope upwards. The means discussed up to now have for object to feed an envelope E from the storage means **1** to a filling station, still to be discussed, at which the flap of the envelope is opened, pointing backwards.

In the filling station there is an angled guiding plate **23**, a pair of transport rollers **24** and **25**, and further a microswitch **26** is provided forwardly thereof in the direction of travel with the control arm **27** disposed in the path of the envelopes to be transported. A double arrow indicates that the microswitch **26** is adjustable, or adjustably mounted, i.e. it can be adapted to the size of an envelope to be filled.

Conveying rollers are represented by **28**, **29**, **30**, **31** and **32**, the object of which is to feed and fill content material such as invoices, folders and the like, or folded letters, into the envelope present at the filling station. A transport roller is represented at **33**, and a microswitch by **34**, the control arm of which is disposed in the path of the contents to be transported. An air pump is represented at **36**, and is capable of feeding air to the filling station by means of a pipe **37**. The object and operation of these parts will be discussed later.

Transport rollers **38** and **39** serve for further transporting a filled and still opened envelope to a moistening device. Said moistening device consists of a number of brushes or U-shape strips of felt **40** which are received in a holder **43**, wherein the legs of the U are bent outwardly. The brushes **40** rest on a wick **41** which is hung in a tray of moistening fluid **42**, e.g. water. The holder **43** is attached to a lever **44** which is rotatable around pivotal mounting **45**, and holder **43** carries a protrusion **46** reaching into the path of the envelopes to be transported. Related structure is further given in detail in FIGS. 3 and 4.

In FIG. 4 only one of the side brushes is indicated at **47** and part of the center one, inasmuch as FIG. 4 shows namely a top view of one-half of the moistening device. The transport of an envelope takes place along the guiding plate **49**, and as clearly appears from FIG. 4 the moistening practically occurs only on the gum coating or layer of a transported envelope. Additional transport rollers are represented by **50**, **51**, **52**, **53** and **54** for conveying a filled, still open and moistened envelope. A guide or a receptacle partition **55** having an adjustable stop **56** to accommodate different size envelopes is shown, wherein said stop **56** may possibly also be designed resiliently so that the forwardmost edge of an envelope upon engaging the stop **56** moves it against spring pressure. In this way the direction of movement of an envelope can be reversed, as will be explained in more detail. This could possibly also be applicable to envelopes which are stored therein differently from what is represented in FIG. 1. During the reversing, an envelope could be made to pass along a rim which opens the flap.

The operation of the device is as follows. An envelope

E is fed from the storage means **1** by the conveyor **2** and the roller **5**, said envelope being conveyed by the rollers **8**, **9** and **10**, **11** into the space between the adjacent pairs of rollers **10**, **11** and **12**, **13**. Since the speed of the rollers **10**, **11** is slightly greater than that of the rollers **12**, **13** the envelope E will be bulged out downwardly whereby the flap of the envelope tends to open a little. In the further transport between the rollers **12** and **13** the envelope is led along the edge of a plate or stripper **14**, or a similar flat organ, and in doing so the flap is then fully opened. In this flap-trailing position the envelope is now further transported through the machine. If the lever device of FIG. 2 is applied, the envelope E having passed the pair of rollers **12**, **13** will turn the arm **15** of the lever counterclockwise and in doing so the arm **16** enters against or into the path of the envelope so that the same is bulged out in a further positive manner as represented. It is apparent that the opening of the flap is initiated as shown in FIG. 2, and in the further transport between the rollers **12** and **13**, the flap of the envelope is then fully opened by the plate **14**. As soon as an envelope has passed, the lever **15**, **16**, **17** will return to the position shown in dotted lines by consequence of the weight **18** applied to the right-hand part making it heavier than the left one. In this embodiment the transport track need not be curved at the location in question as is desired in the embodiment without lever.

The opened envelope is transported further and arrives between the nip of the rollers **19** and **20** where it passes along a stop **22** which serves to reverse or bend the envelope over so that it is further transported by the cooperative transport rollers **20** and **21**. Next, the envelope is projected upon the plate **23** being subsequently seized then by the transport rollers **24** and **25**. Since the control arm **27** of the micro-switch **26** is disposed in the path or track of the envelope, the front edge of the envelope will be capable of deflecting the control arm **27**. Now this moving of arm **27** results in the roller **25** being lifted out of conveying engagement as represented by a double arrow, so that no further transportation of the envelope takes place. Furthermore, the entire supply as explained up to now is stopped. At this condition the envelope's flap is pinched between the rollers **20** and **21**, so that the envelope's position will not be changed. In the meantime the contents to be inserted in the envelope have been fed by the pairs of transport rollers **28**, **29**, **30**, **31** and **32** and said incoming contents now contact the control arm **35** of the micro-switch **34**. At that very moment, the transport roller **33** is moved downwards, as indicated by the double arrow, in consequence of which the contents are transported further. In putting in action the microswitch **26** a suitable set of fingers V has at the same time been operatively motivated to bring them into an envelope along its sides by a suitable mechanism known in the art. These fingers have for their object to open the envelope and keep it opened during its being filled.

During the filling of the contents into the envelope by the transport roller **33**, a small amount of air is blown against said contents by the pump **36** from below by way of a slopingly directed nozzle and through the pipe **37**. This will make the contents and the side of the envelope lying over them to slightly bulge, and in case a window envelope is used, the contents will not be able to touch the edge of the window.

Also the occurring friction can be reduced by the periodic or continuous use of said pump **36** to supply the desired amount of air without any difficulty. It is observed that the transport of the contents by the roller **33** is controlled by the contents themselves when they engage and trip the control arm **35** of the micro-switch **34**.

As soon as the contents have passed the control arm **35**, the latter returns to its initial position and the roller **33** will be lifted automatically as well. The various movements may be realized by electro-magnets. Immediately after the contents have passed the control arm **35** of the

micro-switch **34** the entire transport will be put in action again and the pair of rollers **24, 25** will continue the transport of the now filled envelope, while still possessing an open trailing flap. As the envelope continues, the forwardmost edge engages and deflects the protrusion **46** of the moistening device, whereby the holder **43** with the felt strips **40** moves upwards so that the envelope body will not be moistened now. As soon as the flap of the envelope has passed the protrusion **46**, the holder **43** will move downwards and the felt strips, see FIGS. 3 and 4, will apply moisture onto the gum layer of the envelope flap. This occurs only at the predetermined locations where said gum layer has been applied to the flap of the envelope, and preferably not along its entire width, as achieved by the angular spacing of laterally outermost felt strips **47** (FIG. 4) from the center felt strips **48**, leaving the small intermediate portions of the gum layer unmoistened where they contact the transport rollers **50, 51** and **52, 53** disposed behind it. Therefore, said rollers are of a width which corresponds to the distance between the felt strips or discs **47** and **48**, and will not be poluted by wet gum.

The envelope that has passed the rollers **52** and **53** is then led into a receptacle partition or drawer **55**, the bottom **56** of which forms a stop. However, the adjustable, relative spacing of the stop from the rollers **52, 53** is such that the trailing flap of the envelope remains in contact with the roller **52**, said flap then being reversely led between the cooperating counter rotating rollers **52** and **54** so that the envelope is closed, and in its closed and filled condition is delivered at a depositing table **57** extending outside the device.

The device is built up from relatively simple and very durable parts. Although a very compact construction is possible, all parts are readily accessible, and they can be inspected or replaced in case of repair or servicing needs.

I claim:

1. A transporting, filling, and moistening device for envelopes and the like having a folding-line for a flap and a gummed flap adjacent an open-sided pocket constituting an envelope body, and further having a folded lower edge opposite the flap folding-line, said device comprising in combination:

(a) a circuitous transport path and conveying means for the envelopes, and including a plurality of spaced pairs of cooperating rollers forming at least a part of said transport path and conveying means;

(b) means for infeed conveying the envelopes from a storage means, wherein they are disposed in superposed, unsealed, flap-folded-down condition, into the transport path in an initially folded, lower-edge-forwardmost condition;

(c) means operatively connected with said transport conveying means for:

(1) initially commencing; and

(2) subsequently completing unfolding of said flap; and

(3) for further helping effect conveying said envelope along said transport path in a flap-open, flap-trailing condition with the flap generally disposed substantially in the plane of said envelope body;

(d) filling station means disposed in alignment with but offset from and further along said transport path, and including electrical circuitry operatively connected to effect at least partial stop-and-start control of the transport conveying means, said electrical circuitry having limit switch means adjacent said transport path, and having an activating arm extending into said transport path which arm is activated by envelope engagement thereagainst during travel along said path for effecting filling the envelope with content matter;

(e) further means including flap-moistening means disposed beyond the filling station means, and adjacent to and having a portion extending into said transport path and activated mechanically by engagement of said envelope traveling therealong to effect moistening only the gummed trailing flap after the envelope body has passed by; and

(f) further means disposed in superposed relation above the infeed conveying means for subsequently reversing envelope transport direction sealing and dispensing said sealed envelope from said device in a condition with the flap fold-line in a forwardmost direction.

2. The device as defined in claim **1** wherein the means of paragraph (c)(1) include two pair of cooperating contra-rotating, peripherally engaging rollers constituting part of the general transport or conveying means; means operatively connected with and driving said two pair of rollers at different relative speeds with the pair first engaged by said envelope having a circumferential velocity sufficiently greater than the second pair, so that at least an initial bulging is imparted to said envelope in an intermediate area thereof between said two pairs of rollers; said two pair of rollers including means for relatively disposing them in a predetermined spaced-apart manner along the transport path a distance sufficiently less than the envelope distance between its lower folded edge and the folding-line of the flap so that the bulging occurs in the direction of the flap-closed-side of the envelope.

3. The device as defined in claim **2** wherein the means of paragraph (c)(1) further includes additional means in the form of a pivotal lever disposed adjacent the second pair of rollers; said lever including a first leg portion extending into the transport path to be engaged and activated by said envelope passing therethrough, and a second leg portion then responsively moving to engage, supplementally and more positively bulge the envelope in the aforestated direction, to help commence the initial unfolding of said flap.

4. The device as defined in claim **2** wherein the means for relatively disposing the two pair of rollers in the predetermined spaced apart manner include means mounting the pairs at an angle relative to each other to impart a curvature or change of direction to the transport path.

5. The device as defined in claim **1**, wherein the filling station means of paragraph (d) includes a filling platform plate disposed in said transport path and with a fixed angularly offset flap-support-and-air guide portion; and means including an electrical circuit with limit switch means in the line of the transport path and activated responsive to envelope engagement for stopping at least a part of the conveying rollers at a predetermined place of the filling station, means for holding said envelope stationary during filling, and means initiating the content filling and switching means engaged by said contents during filling to subsequently restart said stopped conveying rollers.

6. The device as defined in claim **1** wherein the flap-moistening means of paragraph (e) further include moisture-holding material set in a holder, said holder having a part thereof constituting the aforesaid portion extending into the path of said envelope, and said latter means disposed so as to enable said moisture holding material to be pivotally moved out of and back into the path and to selectively engage only the gummed flap of said envelope.

7. The device as defined in claim **6** wherein the moisture-holding material is bent in a U-shape having the legs outwardly open, and said portion extending into the path of said envelope are disposed at about the same distance from the center of the path as that of the bending area of said U-shape material.

8. The device as defined in claim **6**, wherein the envelopes being transported are of a kind having a generally triangularly shaped flap with angularly converging side portions in the direction of the apex of the flap; and the moistening means includes moisture holding means set in a holder in an angular fashion corresponding generally to the angular disposition of the converging flap side por-

tions and adapted to engagingly overlie the gummed portions of said flap at a predetermined time.

9. The device as defined in claim 6 wherein the flap-moistening means include separated moisture holding means set in said holder and disposed to correlate with the gummed flap and with certain of the said conveying rollers so that the envelope flap is moistened in major predetermined areas while not being moistened in other minimal predetermined areas the latter of which permit continuing transport and non-pollution of at least certain of said rollers by said otherwise moistened gummed areas of said flap.

10. The device as defined in claim 1, wherein the means of paragraph (f) include means defining an envelope-receptacle with an adjustable abutment adjustable to accommodate different size envelopes; a set of three relatively engaging rollers the middle one of which is common to forming a pair of contra-rotating rollers constituting the last pair of the general transport conveying rollers prior to the dispensing of said envelope from the device, and further to forming with the other of the three rollers a pair of contra-rotating envelope sealing and dispensing rollers; said latter commonly related pairs of rollers having the planes through the respective pairs of rollers disposed at an angle to one another and so related relative

to each other and to said envelope receptacle with adjustable abutment, that the direction of travel and orientation of the envelope is changed so that said moistened flap is commenced to be folded toward sealing condition by the first of said commonly related rollers and subsequently completely sealed and simultaneously ejected by and during the generally reversely directed travel effected by and through said dispensing rollers in its stated condition with the flap fold-line now in a forwardmost direction.

References Cited

UNITED STATES PATENTS

Re. 25,961	2/1966	Volks	53—206
1,172,209	2/1916	Hill	53—191
1,641,406	9/1927	Alden	53—186X
1,886,119	11/1932	Price	53—187
2,019,212	10/1935	Clare	53—206X
3,197,936	8/1965	Messmer	53—187X

WAYNE A. MORSE, JR., Primary Examiner

U.S. Cl. X. R.

53—191, 383, 385, 391; 93—36