June 5, 1956 H. F. AFFELDER 2,748,675

ENVELOPE MAKING MACHINE

Filed Oct. 6, 1951 4 Sheets-Sheet 1

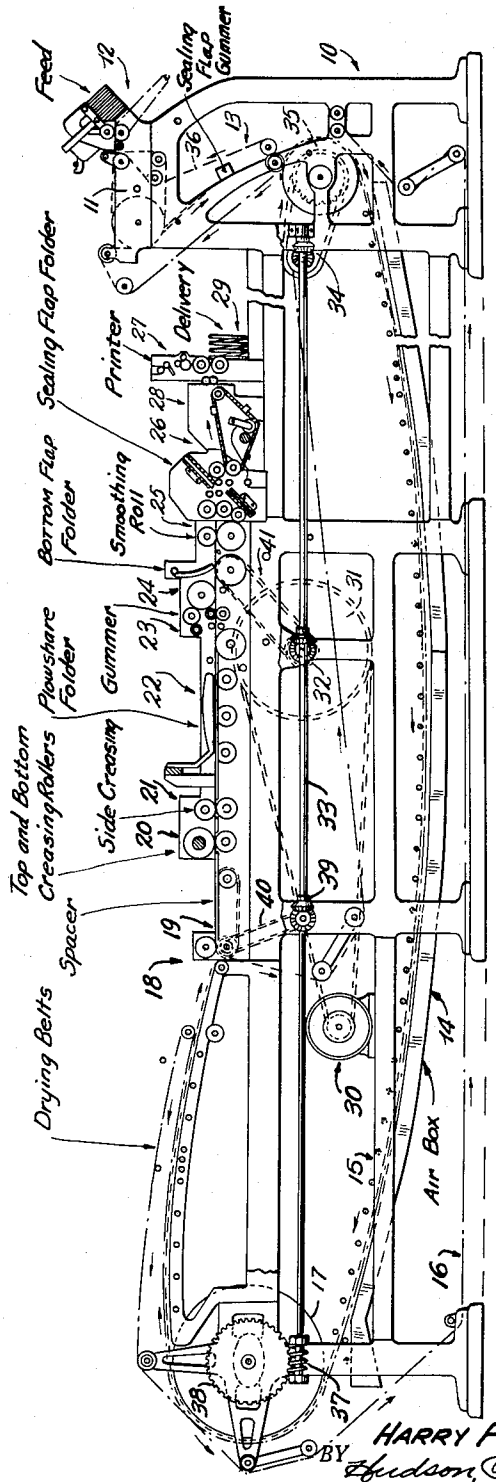


FIG. 1

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ENVELOPE MAKING MACHINE

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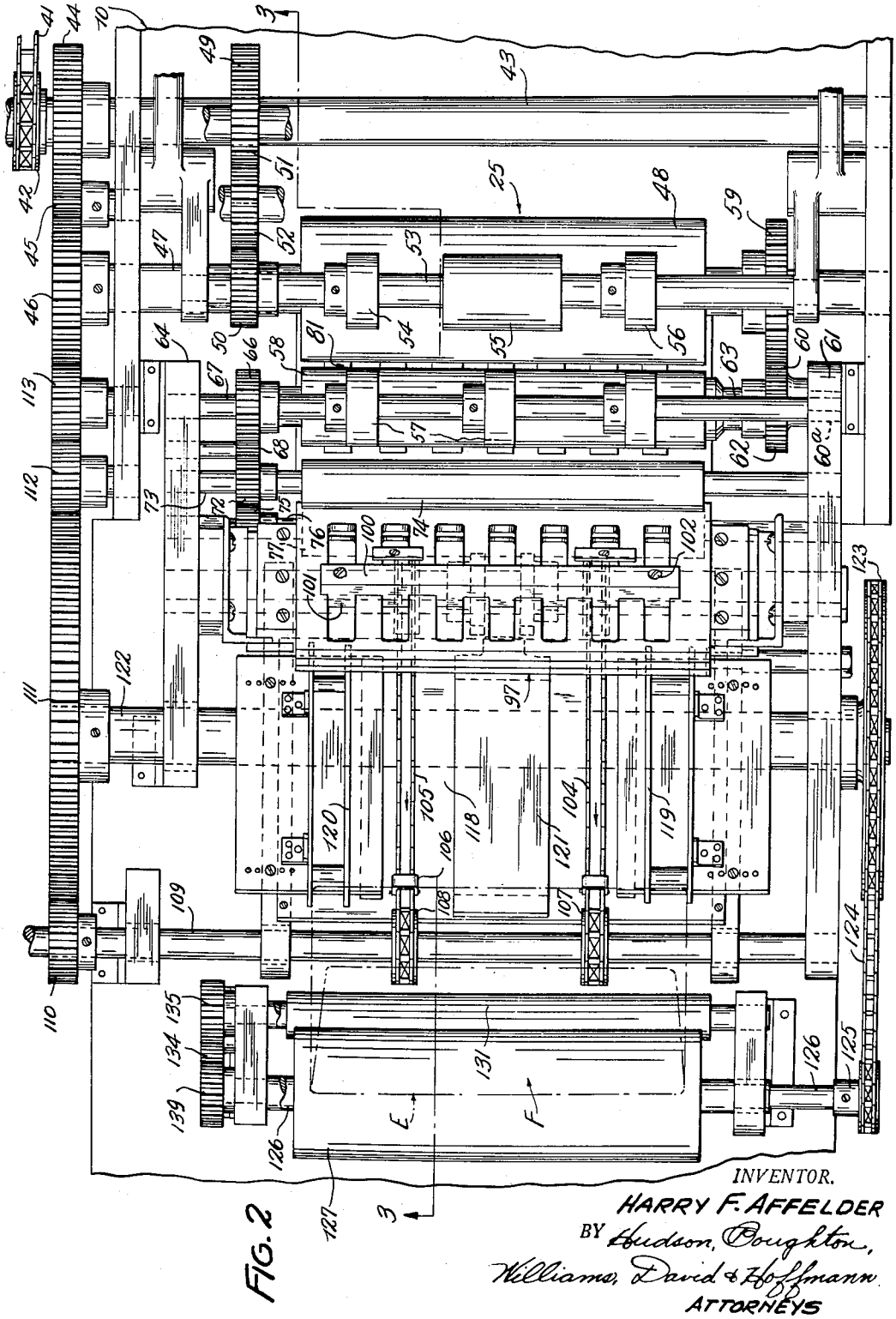


FIG. 2

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ENVELOPE MAKING MACHINE

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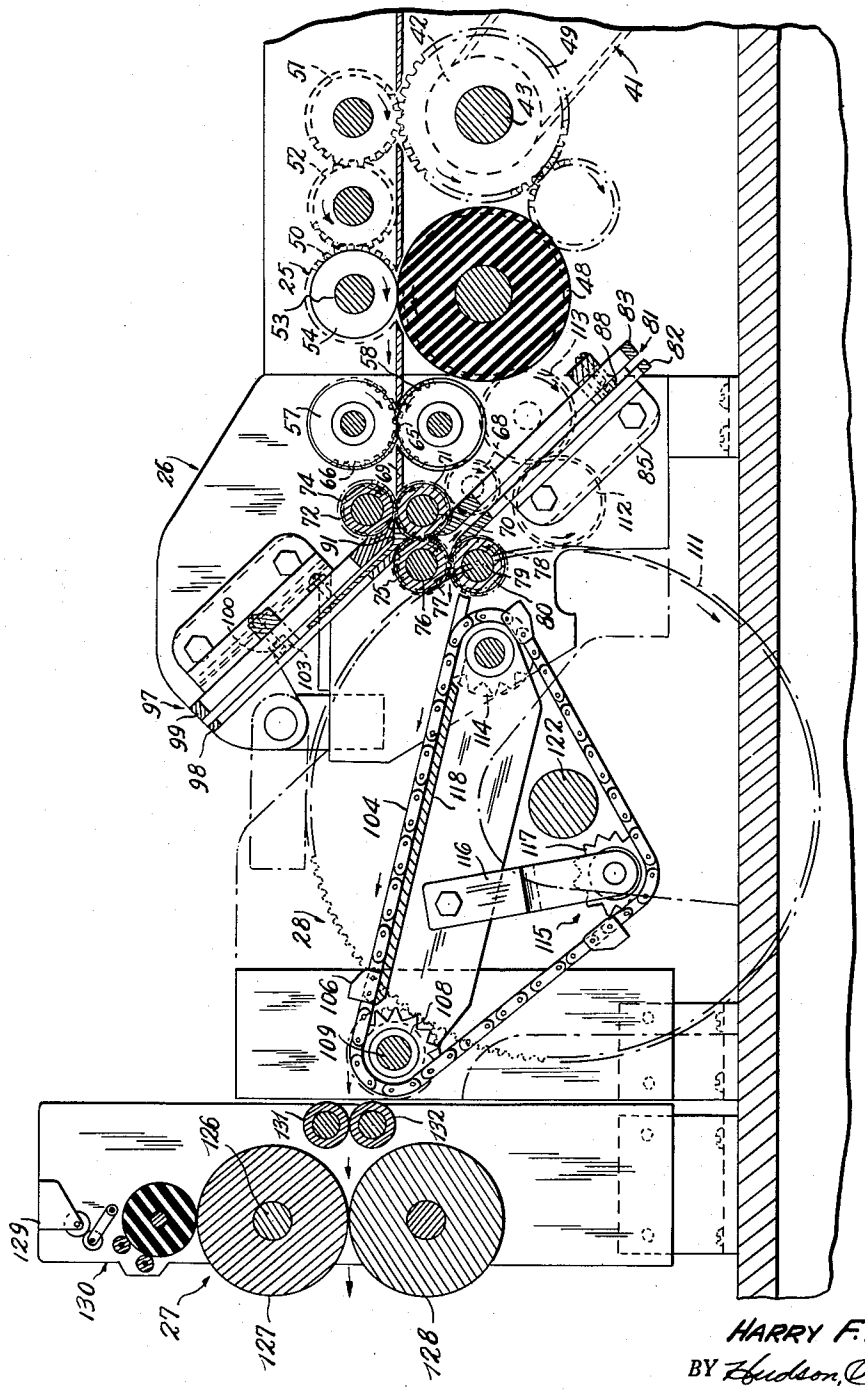


FIG. 3

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ENVELOPE MAKING MACHINE

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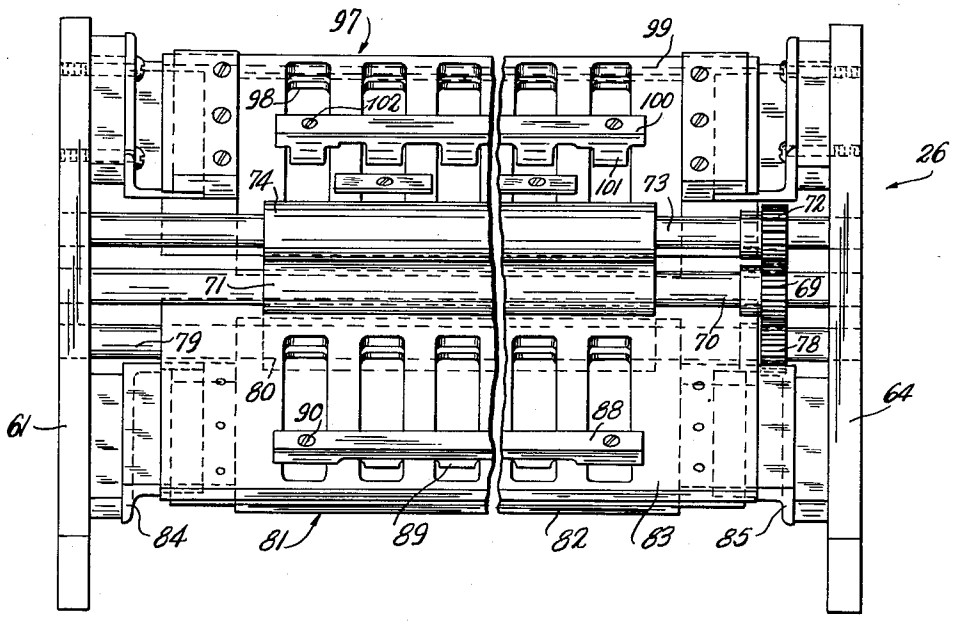


FIG. 4

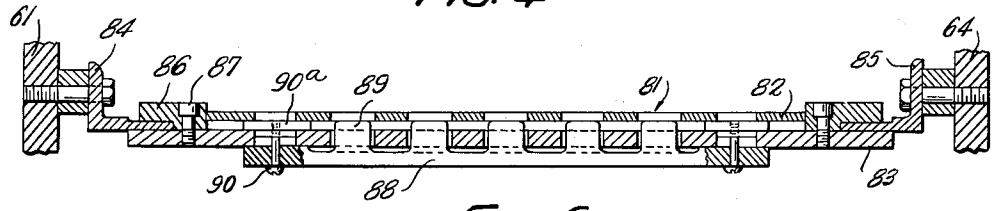


FIG. 6

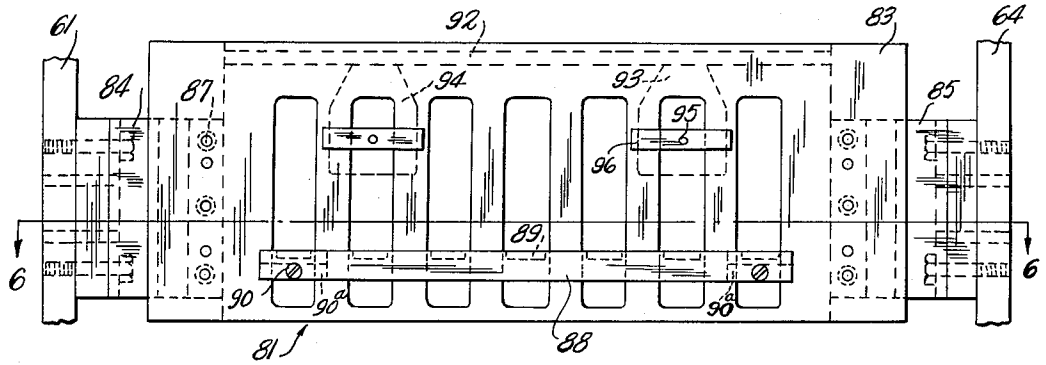


FIG. 5

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United States Patent Office 2,748,675 Patented June 5, 1956

2,748,675

ENVELOPE MAKING MACHINE

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Application October 6, 1951, Serial No. 250,177

6 Claims. (Cl. 93—62)

This invention relates to an envelope making machine and, more particularly, to the combination in such a machine of an improved means for folding the top or sealing flap of envelopes produced thereby.

The conventional envelope making machine is adapted to make envelopes from blanks by first gumming the top or sealing flap, then folding and sealing the side and bottom flaps, the envelope being delivered with the top flap creased at the point of fold, but either unfolded or folded upon the body of the envelope in the position assumed when it is subsequently sealed. Modern business methods have, however, created a demand for envelopes which are supplied with the top or sealing flap reverse folded; that is, with the said top or sealing flap folded back upon the face of the main body of the envelope. This facilitates the placing of addresses or other information upon the obverse side of the sealing flap of the envelope or on the outer surface of the bottom or side flaps thereof by conventional mechanisms such as addressing machines or the like, since a stack of envelopes with the top flaps thus folded is of uniform height at all points thereover, thus permitting proper operation of the addressing machine. In contrast thereto, envelopes with extended top flaps or with conventionally folded top flaps must either be presented with the said flaps extended or must be reverse folded by a separate operation in order to effect printing or addressing of the normally concealed or inner faces of the said flaps. A separate folding operation increases the handling time and costs while a stack of envelopes having the sealing flaps extended is not of uniform height in all areas, since there will be two or more thicknesses of paper in the envelope body portion of the stack for every single thickness of paper in the flap portion of the stack. This results in difficulties in operating the conventional addressing or printing machines since the feeding mechanisms thereof frequently will not operate properly on a stack of articles of such non-uniform height.

An object of this invention is to provide an improved envelope making machine which forms the envelopes from blanks and delivers the completed envelope with the sealing or top flap folded back upon the outer face or customary address side of the main body of the envelope.

Another object of the invention is to provide an improved envelope making machine as defined in the preceding paragraph and in which means are provided to print upon either face of the top or sealing flap after the latter has been folded, or passed through the folding mechanism with the top flap extended, and before the envelope is delivered from the machine.

A further object of the invention is to provide an envelope making machine with an improved folding mechanism for the top or sealing flap of the envelope such that the said flap may be folded either against the front face or the back of the envelope or with the sealing or top flap unfolded and extending in alignment with the main body of the envelope.

A still further object of the invention is to provide an

improved envelope making machine of the type mentioned above and provided with an improved folding means which is readily adapted to fold the top or sealing flap in either direction and which also acts to remove the curl of said flap resulting from the gumming thereof so that a separate decurling operation is not needed.

An additional object of the invention is to provide an envelope making machine with an improved folding mechanism which has no reciprocating parts, is self timing, is readily adapted to operate upon envelopes of different sizes, and which requires less time for set-up or adjustment when the machine is altered to make envelopes of size different from those previously produced.

The invention further resides in certain novel features of construction and combination and arrangements of parts, and further objects and advantages of the invention will be apparent to those skilled in the art to which it pertains from the following description of the present preferred embodiment thereof described with reference to the accompanying drawings, in which similar reference characters represent corresponding parts in the several views, in which:

Fig. 1 is a somewhat schematic view of an envelope making machine embodying the present preferred form of the invention, the view being principally in side elevation but with certain parts omitted and others broken away;

Fig. 2 is a fragmentary, enlarged plan view of the novel top flap folding and printing portion of the machine shown in Fig. 1;

Fig. 3 is a sectional view taken substantially on the section indicating line 3—3 of Fig. 2 with parts broken away;

Fig. 4 is a detached front elevational view of the novel folding assembly showing a deflector member or bar in place in the upper portion only of the assembly;

Fig. 5 is an enlarged detached view of the lower portion of the folding assembly shown in Fig. 4, as seen when looking at right angles to the surface of the assembly, a deflecting bar being shown in place therein; and

Fig. 6 is a sectional view taken substantially on the line 6—6 of Fig. 5 and looking in the direction indicated by the arrows.

The envelope making machine in which the invention is here illustrated as embodied is of the general type disclosed in U. S. Patent 1,396,906 issued to Winkler et al. on November 15, 1921. Therefore, only so much of the machine is here illustrated and described as is necessary to reveal the manner in which the instant invention is embodied and functions in such a machine in combination with the conventional mechanisms thereof.

As shown in Fig. 1, the envelope making machine comprises an elongated frame, generally designated **10**, one end of which has a raised portion **11** on which is provided a conventional feeding mechanism **12**. This feeding mechanism is of the type adapted to receive suitably shaped blanks in stacked arrangement and to feed the latter one at a time in overlapping relationship with the side of the blanks corresponding to the inner side of the completed envelopes lowermost and with the top or sealing flaps trailing in overlapping relationship and with their adjacent trailing edges spaced with respect to each other, as is well known in the art.

The envelope blanks thus fed are conveyed by suitable belts past a sealing flap gumming mechanism, generally designated **13**, where the exposed margins or portions of the top or sealing flaps are supplied with glue, gum or other adhesive, the envelope blanks being continuously carried past the said gumming mechanism and from thence above an airbox **14**, extending longitudinally beneath the frame **10**, by means of drying belts **15** and **16**.

As is well known in the art, the belts **15** and **16** extend about a driving drum **17** supported at the rear of the frame **10** and continue forwardly from the said rear portion of the frame to an intermediate portion thereof, generally designated **18**, extending substantially horizontally and to which the blanks are delivered by the drying belts.

The intermediate or table-like portion **18** of the envelope machine is provided with a separating or spacing mechanism, generally designated **19**, which sequentially exerts an accelerating force upon each envelope blank, thus moving it rapidly forwardly and separating the blanks which heretofore have traveled in the overlapping arrangement in which they were fed. From the spacer or separating mechanism **19**, the blanks then move sequentially through top and bottom creasing rollers **20** and side creasing rolls **21** which may be of conventional construction and which provide scoring or creasing of the blank intermediate the main body and the sides, top and bottom flaps thereof to facilitate folding of these portions. From the creasing rolls **21** the blanks are moved through a suitable side flap folding mechanism **22**, which may be of the "plowshare" type and which acts to fold the side flaps inwardly upon the main body of the envelope. From the side flap folding mechanism the blanks next pass through a means **23** for applying paste, gum or other adhesive to the margins of the overlapping flaps, and thereafter the bottom flap is folded back upon the gummed side flaps by a conventional mechanism **24**, the bottom flap then being smoothed upon the gummed side flaps by smoothing rollers **25**, as is well understood in the art.

The mechanisms thus far described are conventional and operate as will be readily understood to provide a partially completed envelope moving towards the right of the machine, as viewed in Fig. 1, with the side and bottom flaps folded and sealed in overlapping relationship, thus forming the main body of the envelope. This partially completed envelope is traveling through the machine with its top flap trailing and with the inner surface thereof uppermost.

The partially completed envelopes next pass through the novel top or sealing flap folding means **26** which, as hereinafter described, is capable of processing the envelopes in any of three different modes: namely, (1) folding the said top flaps in the conventional manner with their inner surfaces against the backs of the envelopes; or, (2) folding the top flaps in the reverse manner so that the said flaps are folded back against the front or address side of the envelopes; or (3) by passing the envelopes through the folding mechanism without folding of the top flap. In any of the above-mentioned modes of handling the envelopes, however, the folding mechanism imparts an uncurling action upon the top flap to remove therefrom the inherent curl produced by the gumming and drying operations.

From the top or sealing flap folding mechanism **26** the envelopes next pass through a printing mechanism, generally designated **27**, which is adapted to print any desired information upon the envelope as it passes therethrough, the envelopes being presented in proper position for the printing by a registry mechanism, generally designated **28**, which conveys the envelopes from the folding mechanism to the printing mechanism. From the printing mechanism **27** the envelopes are delivered and stacked by conventional mechanism **29** and may be removed for boxing or other operations.

Power for operating the entire envelope making machine is preferably derived from a single source of power, as, for example, from an electric motor **30** which is supported upon the frame **10** and is connected with the various above-mentioned mechanisms for forming the envelope. For this purpose the motor **30** is shown as having a chain drive to a sprocket wheel **31** which is connected through bevel gears **32** with a jack shaft **33** extending longitudinally of the frame **10** and suitably rotatably supported thereon. Adjacent the forward end of

the jack shaft **33** are bevel gears **34** providing a power takeoff for a belt drum **35** about which the drying belts **15** and **16** pass. The gears **34** also provide a power takeoff for the mechanism for operating the feeding mechanism **12** and the belt or other mechanism **36** for carrying the fed blanks through the gumming mechanism **13**.

Adjacent its rear end, the jack shaft **33** carries a worm **37** which drives a worm wheel **38** connected with the drum **17** for the drying belts **15** and **16**. Intermediate its ends, the shaft **33** is provided with another set of bevel gears **39** which operate through a suitable sprocket and chain drive **40** to provide the drive for the spacer mechanism **19**. The creasing rolls or mechanisms **20**, **21**, the gummer **23**, folding mechanism **24** and the smoothing rollers **25** are also driven from the jack shaft **33** in timed relationship with respect to each other, this being preferably effected through suitable trains of gears which have been omitted for the sake of simplicity and clarity but which are operatively connected with the spacer mechanism as will be readily understood by those skilled in the art.

The novel flap folding mechanism **26**, the printing mechanism **27**, the registry mechanism **28**, and the delivery mechanism are also driven in timed relationship with respect to each other and from the main power motor by a takeoff comprising a sprocket and chain assembly, generally designated **41**, and which may be connected with the shaft on which is mounted the main sprocket wheel **31**.

Referring now to Figs. 2 and 3, it will be seen that the chain of the sprocket and chain assembly **41** passes about a sprocket **42** connected with a shaft **43** supported in the frame **10**. This shaft is provided with a spur gear **44** which meshes with an idler gear **45** running in mesh with a gear **46** on a shaft **47**. The shaft **47** extends transversely of the frame **10** and is provided with a roller or drum **48** forming the lower member of the smoothing roll assembly, generally designated **25**. The shaft **43**, intermediate the sides of the frame **10**, is also provided with a gear **49** which drives a gear **50** through the intermeshing gears **51** and **52**. The gear **50** is connected with a shaft **53** which carries spaced rollers **54**, **55** and **56** cooperating with the larger roller **48** to effect the smoothing operation upon the bottom and side flaps after they have been provided with adhesive and folded in overlapping relationship.

From the smoothing mechanism **25** the envelopes are fed forwardly to the folding mechanism **26** by cooperating upper and lower rollers **57** and **58**, the upper roller **57** preferably being formed of a plurality of narrow spaced members, while the lower roller is an elongated unitary member. These rollers are driven in timed relationship with respect to each other and to the smoothing rolls by a geared drive from the shaft **47** of the latter. Thus, as will be seen in Fig. 2, the shaft **47** is provided with a gear **59** which meshes with an idler gear **60** rotatably supported, as indicated at **60***a*, in a side member **61** of a supplementary frame connected with the main frame **10**. The gear **60** meshes with a gear **62** connected with one end of the shaft **63** for the lower roller **58** of the two aforementioned rollers **57**, **58**, the other end of this shaft being journalled in a side frame member **64** similar to the member **61**. The shaft **63**, adjacent the frame member **64**, is provided with a gear **65** directly beneath and meshing with a gear **66** on the shaft **67** for the upper roller **57**.

The aforementioned gear **65** on the shaft **63**, and which is beneath the gear **66**, also meshes with an idler gear **68** supported on the supplemental frame **64**. The latter gear in turn meshes with a gear **69** on a shaft **70** extending transversely of the machine and having an elongated roller **71** intermediate its ends. The gear **69** in turn meshes with a gear **72** on a shaft **73** supported directly above the shaft **70** and having an elongated roller **74** intermediate its ends cooperating with the roller **71**. The pair of rollers **71**, **74** form a part of the folding mechanism **26** and serve to feed the envelopes therethrough. The gear **69** is also in mesh with a gear **75** on a shaft **76**, which

shaft is parallel with the shaft **70** and is provided with an elongated roller **77** intermediate its ends cooperating with the roller **71** on the shaft **70**. The gear **75** meshes with a gear **78** on a shaft **79** directly beneath the shaft **76** and the shaft **79** is provided with an elongated roller **80** which cooperates with the roller **77** to form the second pair of feeding rollers of the folding mechanism **26**.

Between the rollers **71** and **80** is positioned one of the envelope body diverting assemblies **81** of the folding mechanism. As shown in Figs. 5 and 6, this assembly comprises lower and upper plates **82, 83** which are secured together in spaced, parallel relationship and are removably clamped to side bracket members **84** and **85** carried by the supplementary side frames **61** and **64**, respectively. The bracket members **84** and **85** each have one leg bolted to the said side frame members while the other leg thereof is clamped between a plate such as **86** and the lower plate **83** of the diverting assembly by screws such as **87**. It will be apparent therefore that by loosening screws **87** the clamping plates **86** may be loosened and the entire diverting assembly **81** slipped from the machine.

The plates **82, 83** of the envelope body diverting assembly **81** are preferably disposed at an angle of substantially 45° with respect to the path of travel of an envelope through the machine and extend downwardly and rearwardly therefrom with the space between the plates being substantially in alignment with the axis of the roller **77**, as will be seen from Fig. 3. The adjacent forward edges of the plates **82** and **83** are preferably rounded and the said forward edge of the lower plate **82** extends slightly forwardly of the outer edge of the plate **83** due to the angular position of the assembly. Adjustably positioned upon the plates **82** and **83** is a stop member or bar **88**. In the illustrated embodiment, this stop bar has spaced fingers **89** which can project into elongated spaced openings in the plate members **82, 83**, see Figs. 5 and 6, the stop bar being adjustably held in position by screws, such as **90**, threaded into plate members such as **90*a***, which fit into the space between the plates **82** and **83**.

The operation of the folding mechanism thus far described is to deflect or divert the body of an envelope downwardly from its path of travel through the machine and into the space between the plates **82, 83** of the assembly **81**. Thus, as an envelope body is moved forwardly through the rollers **57, 58**, it is gripped by the rollers **71** and **74**. Then, the leading edge of the envelope body strikes a deflecting bar **91** supported adjacent but spaced from the roller **71** and intermediate the rollers **74** and **77**. This deflects the body of the envelope so that it moves downwardly between the rollers **71** and **77** whereupon the leading edge of the envelope body strikes the outer edge of the plate **82** of the assembly **81** with the result that the body of the envelope enters the space between the plates **82** and **83**, the extent of such entry being determined by the position of the stop member **88**. Consequently, the body of the envelope is diverted back towards the top flap with the angle between the inner surface of the top flap and the adjacent portion of the envelope body being greater than 180°.

When the travel of the body of the envelope between the plates **82, 83** is terminated as just mentioned, the continued feeding of the top or sealing flap of the envelope, which is still between the rollers **71, 74** and **71, 77** causes an outward buckling of the portion of the envelope intermediate the main body and the top or sealing flap and this buckled portion enters the bite between the rollers **77** and **80**. Consequently, the rollers **77** and **80** impart a feeding movement to both the top or sealing flap and to the main body of the envelope so that the envelope now is fed forwardly between the rollers **77** and **80** with the top or sealing flap progressively folded back upon the front of the body of the envelope, the envelope body being withdrawn from the space between the plates **82** and **83** by this feeding movement. As a result the envelope is delivered to the registry mechanism **28** with the top or sealing flap of the envelope reverse folded so that the inner face of the said flap is uppermost and may be subjected to a printing action from the printing mechanism **27**, as hereinafter described.

The above-mentioned operation of the folding mechanism has not only resulted in a folding of the sealing flap in reverse position to that in which it is normally provided, but, by virtue of the bending of the said top sealing flap in the reverse direction about the roller **71**, the curl of the margin of the sealing flap, due to the prior gumming thereof, is removed simultaneous with the folding operation and no separate uncurling operation is needed.

In addition to operating as just described, the folding mechanism may also be utilized to deliver an envelope therethrough without the top flap folded upon the body of the envelope. This may be effected by inserting a deflector bar or member **92** into the entrance of the space between the plates **82, 83** as is shown in Fig. 5. This deflector bar or member is like the member **91** and preferably has a somewhat concave outer surface and rearwardly projecting spaced lugs or portions **93, 94** extending into the space between the plates **82, 83**. The bar **92** is removably secured in place by clamping screws **95** extending through clamping bars **96** and threaded into the said projecting portions or lugs **93, 94**, the clamping screws **95** each extending through an elongated slot of one of the plate members **82, 83** with the bars **96** positioned thereover, as will be seen from Fig. 5.

When the apparatus is conditioned by the provision of a deflecting bar **92** at the entrance to the assembly **81**, envelopes passing through the machine are fed as before between the rollers **71, 74** and are deflected downwardly between the rollers **71** and **77** by the bar **91**. Now, however, the body of the envelope cannot enter into the space between the plates **82, 83** but is further deflected by the bar or member **92** into the bite of the rollers **77** and **80** so that the body of the envelope passes sequentially through the rollers **71, 74, 77** and **80** without having the body portion retarded with respect to the travel of the trailing top or sealing flap portion. There is therefore no folding action imposed upon any part of the envelope so that it is delivered with the flap still in trailing position, the curl of the margin or edge of the flap due to the gumming operation, however, having been removed by its passage between the rollers of the folding mechanism.

In accordance with this invention, the folding mechanism thereof is also provided with a means for folding the top or sealing flap of the envelopes in conventional position; that is, with the inner side of the top flap in engagement with the back of the body of the envelope. This is effected by providing an envelope body diverting assembly **97** similar to the assembly **81** but supported upon the side frames **61** and **64** in a position such that the space between the spaced lower and upper members **98** and **99** of the mechanism is inclined upwardly at an angle in the order of 45° to the path of travel of the envelopes through the mechanism. As shown in Fig. 3, the assembly **97** preferably has the space between the plates **98** and **99** substantially aligned with the axis of the roller **71** and with the inner edges of the plates **98, 99** positioned between the rollers **74** and **77**.

The envelope body diverting assembly **97**, like the assembly **81**, is provided with an adjustable stop member **100** having spaced finger portions **101** extending into the spaced slots of the plates **98, 99**, the stop member **100** being held in adjusted position by screws **102** cooperating with clamping plates **103** in the same manner that the stop member **88** of the assembly **81** is clamped. The aforementioned deflecting plate or bar **91** is formed similar to the deflecting member or bar **92** and is removably supported in the space between the plates **98** and **99** in the same manner as is the bar or member **92**.

When it is desired to fold envelopes with the top flaps disposed in the conventional manner, the deflecting bar

or member **91** is removed from the assembly **97** and the bar **92** is placed in the assembly **81**. Envelopes then passing through the machine are fed forwardly by the rollers **71** and **74** and the leading edge of the body of the envelope strikes the leading edge of the lower plate **98** of the assembly **97** so that the said body of the envelope is diverted into the space between the plates **98** and **99** with the result that body of the envelope forms an angle less than 180° as measured between the inner surface of the top flap and the body of the envelope. The movement of the body into the assembly **97** is stopped by the member **100** while the trailing top flap continues to be fed forwardly by the rollers **71** and **74** so that the portion of the envelope between the body and the top or sealing flap thereof buckles and this buckled portion is received in the bite of the rollers **71** and **77**. This imparts a feeding movement to both the body and top flap of the envelope so that the entire envelope is now fed forwardly between the rollers **77** and **80**, being deflected in this direction by the deflecting bar **92**, with the result that the envelope has the top flap folded with its inner surface upon the back of the body of the envelope and the latter is delivered with the front of the envelope uppermost. As before, the travel of an envelope between the rollers of the folding mechanism has effected a decurling operation upon the top or sealing flap due to the curvature of the flap about the small diameter rollers so that the envelope as delivered no longer has the edge of the top sealing flap curled where the gum was applied thereto.

The envelopes delivered from the folding mechanism **26** are received and conveyed to the printing mechanism **27** by the registry mechanism **28**. This mechanism, in the present preferred embodiment of the invention, comprises spaced chains **104** and **105**, see Fig. 2, which carry spaced projections or lugs such as **106** for engagement with each separate envelope E to effect orientation of the latter and delivery of the same to the printing mechanism **27** in the proper position and at the proper speed. For this purpose the chains **104** and **105** are driven by sprocket wheels **107** and **108** connected with a shaft **109** extending transversely of the machine and provided adjacent its outer end with a spur gear **110** which meshes with a larger gear **111** driven by intermeshing gears **112** and **113**, the latter being driven by the aforementioned gear **46**, see Fig. 2. The chains **104** and **105** extend about idler sprockets such as **114** adjacent the roller **80** of the feeding mechanism **26** and the tension of the chains may be adjusted by a slack adjusting means **115**, comprising a bracket **116** and sprocket **117**, as will be readily understood. The chains **104**, **105** travel adjacent the top surface of an inclined plate **118** and while the envelopes are carried thereby, side registry of the envelopes is secured by side plates or members **119** and **120**, see Fig. 3. The envelopes may be held in engagement with the chains **104** and **105** by any suitable means, for example, by a plate or strip **121** extending over the surface **118** in spaced relation thereto.

The gear **111** is supported on a shaft **122** extending transversely of the frame **10** and on the end of this shaft, opposite the gear **111**, is a sprocket wheel **123**. A chain **124** extends about the sprocket **123** and a sprocket **125** on a shaft **126** of the upper roll or member **127** of the printing couple for the printing mechanism **27**. Cooperating with the upper roll **127** is a lower or pressure roll **128** of the printing couple which may be driven at the same speed as the roll **127** by cooperating gears thereon, as is well understood in the art. Consequently, the printing couple is driven in timed relationship with the registry mechanism so that the printing is effected at the proper location on the envelope. The roll **127** is adapted to transfer the information to be printed upon the envelope in accordance with any known system of printing, ink or other printing fluid being supplied thereto from a reservoir **129** by suitable rolls or other ink feeding mechanism, generally designated **130**, see Fig. 3.

Adjacent the delivery end of the registry mechanism **28** is a pair of cooperating rollers **131** and **132** which are adapted to be driven by a gear **133** mounted on the shaft of the lower roll of the printing couple. The gear **133** meshes with an idler gear **134** which in turn meshes with a gear **135** upon the rollers **132** and the gear **135** in turn meshes with a like gear, not shown, on roller **131**. These rollers are to provide support for the envelope and to assist feeding thereof through the printing couple so that the printing is not smudged or otherwise injured by slippage between the envelope and the printing couple. It will be understood, however, that the rollers **131**, **132** are driven in timed relationship with the registry mechanism and the printing mechanism and that an envelope E does not lose contact with the registry mechanism before it has entered the printing couple so that the rolls **131** and **132** do not affect the registry imparted thereto by the mechanism **28**.

It is believed that the cooperation of the folding and printing mechanism is now clearly apparent. Suffice it to note than an envelope may be folded with its top or sealing flap in reverse position through use of the deflecting bar **91** and operation of the diverting assembly **81**. When an envelope, folded in this manner, is delivered to the registry mechanism **28**, the inner surface of the sealing flap F of the envelope E is uppermost, see Fig. 2. Consequently, the envelope, after being oriented by the side registry means **119**, **120** and by the spaced lugs such as **106** on the chins **104** and **105**, is delivered by the latter to the printing couple **127**, **128** in position for having information printed upon the said inner surface of the envelope flap by the printing roll **127**. During the travel of the envelope between the members **127**, **128** of the printing couple, it is assisted in that travel by the rolls **131**, **132**.

In the event the envelopes are to be delivered with their top or sealing flaps in normal position the diverting assembly **81** is provided with a deflecting bar or member **92** and the deflecting bar or member **91** will be removed from the diverting assembly **97**. Consequently, the envelopes are now delivered to the registry mechanism **28** with the top or sealing flaps folded in the normal position and with the fronts of the envelopes uppermost. The envelopes thus delivered are then individually oriented by the registry mechanism **28** and moved in proper registry through the printing couple **127**, **128** at which time a message may be printed upon the address or front portions of the envelopes.

In the event the envelopes are to be delivered without folding of the top or sealing flaps, both the deflecting members or bars **91**, **92** are inserted in the assemblies **81** and **97**, respectively, whereupon the envelopes are delivered to the registry mechanism with the top flaps trailing the main bodies of the envelopes and with the inner faces of those flaps uppermost. In the event the upper or top sealing flaps are substantially the same width as the main bodies of the envelopes, so that the registry lugs **106** on the chains **104**, **105** are now to engage the edges of the top flaps these lugs are properly spaced for this operation or other registry chains having properly spaced lugs are supplied. The envelopes thus delivered are oriented by the registering device and moved in registry through the printing couple, as will now be apparent, at which time printing may be effected upon both the inner surfaces of the top sealing flaps and the adjacent portion of the bodies of the envelopes, or upon one only of these surfaces as may be desired and depending upon the nature of the printing surface employed.

It will be evident that, while the mechanism herein illustrated and described is preferably employed with the registry and printing means as disclosed herein, envelopes may be manufactured and delivered with their flaps properly folded with or without printing since the printing

mechanism 27 may be readily disconnected or moved to an inoperative position. Furthermore, by simply not supplying ink to the reservoir 129, the envelopes may be made to pass therethrough without any printing thereon. It will also be apparent that the printing mechanism may be so constructed that the printing roll of the printing couple is lowermost or both rolls of the printing couple may be employed to print upon adjacent surfaces of the envelopes passing therethrough. These and other modes of using the apparatus will be readily apparent to one skilled in the art as will various alterations and details of the construction. For example, while the present preferred embodiment of the invention has the envelope body diverting assemblies 81 and 97 disposed at substantially 45° with respect to the path of travel of the envelope through the machine, it may be possible to alter this angle. Likewise, changes may be made in the mode of mounting the several parts and the drives for effecting the timed relationship of their operations. It should be noted, however, that the folding mechanism has no reciprocating parts and hence not only reduces noise and vibration of the machine but also is self-timing so that no timing of the rolls 71, 74, 77 and 80 is necessary.

It is to be understood, therefore, that while a preferred embodiment of the invention has been disclosed in considerable detail, this is only for the purposes of illustration and the invention is not considered as limited to the details of construction except as required by the spirit and scope of the appended claims.

Having thus described the invention, I claim:

1. In an envelope making machine including means to form envelopes from blanks and move the formed envelopes substantially horizontally with their flaps in trailing relationship with respect to the bodies thereof and with the inner surfaces of said flaps uppermost, the combination therewith of a top flap folding mechanism comprising means adapted to divert the body of an envelope downwardly relative to its top flap while so moving, means to arrest movement of said diverted body while continuing forward movement of the top flap of the envelope thereby causing buckling of the material of the envelope intermediate the body and the top flap thereof, means adapted to divert the body of an envelope upwardly from its substantially horizontal path of travel, means to arrest movement of said upwardly diverted body while continuing the forward movement of the top flap of the envelope thereby causing a buckling of the material of the envelope intermediate the body and the top flap thereof, means to selectively render one or the other of said diverting and associated arresting means inoperative, and means to grip the portion of the envelope buckled as the result of the said diversion of the body either upwardly or downwardly and impart a forward feeding movement therethrough to both said body and flap thereby selectively folding said flap upon either the front or the back of the body of the envelope in accordance with that one of said diverting means which is operative.

2. In an envelope making machine including means to form envelopes from blanks and move the formed envelopes with their top flaps in trailing relationship with respect to the bodies thereof, the combination therewith of a top flap folding mechanism comprising a first pair of cooperating rollers, a second pair of cooperating rollers disposed with the bite thereof out of alignment with respect to the bite of said first pair of rollers, a first pair of spaced parallel members positioned with the space therebetween extending in substantial alignment with the lower of said first pair of rollers and at an angle with respect to the path of travel of an envelope through said first pair of rollers, means between said members to determine the extent of movement of an envelope body therein, a second pair of spaced parallel members positioned with the space therebetween extending in substantial alignment with the upper of said second pair of rollers and in opposite direction with respect to said first pair of parallel members, means between said second pair of parallel members to determine the extent of movement of an envelope body therein, and removable means adapted to be positioned at the entrance between either or both of said pairs of parallel members to prevent entrance of an envelope body therebetween.

3. In an envelope making machine, the combination of means for feeding envelope blanks from a supply thereof, a gumming means, a drying means, means for conveying the fed blanks sequentially past said gumming means and said drying means in a manner to provide adhesive on a marginal portion of the top flaps of the blanks, means for creasing the top and bottom flaps and the side flaps of the blanks as the latter are moved through the machine, means for folding the creased side flaps, means for applying an adhesive to the folded side flaps, means for folding the bottom flap of each blank onto the side flaps thereof thereby providing an envelope body, means to advance the formed envelope body substantially horizontally with the top flap thereof in trailing relationship, means to divert the body of the envelope downwardly from its path of travel, means to arrest movement of the said diverted body while continuing the forward movement of the top flap of the envelope thereby causing buckling of the material of the envelope intermediate the body and the top flap thereof, means to grip said buckled portion and impart a forward feeding movement therethrough to both said body and flap thereby folding the said flap back upon the front of the body of the envelope, a printing couple spaced from said gripping and feeding means and means receiving the envelopes with flap folded back upon the front of the envelopes from said gripping means and conveying the said envelopes to said printing couple and to effect registry of said envelopes with respect to said printing couple, whereby printing is effected on the inside surface of said top flap after the latter has been folded back upon the body of the envelope.

4. In an envelope making machine, the combination of means for feeding envelope blanks from a supply thereof, a gumming means, a drying means, means for conveying the fed blanks sequentially past said gumming means and said drying means in a manner to provide adhesive on a marginal portion of the top flaps of the blanks, means for creasing the top and bottom flaps and the side flaps of the blanks as the latter are moved through the machine, means for folding the creased side flaps, means for applying an adhesive to the folded side flaps, means for folding the bottom flap of each blank onto the side flaps thereof thereby providing an envelope body, means to advance the formed envelope body substantially horizontally with the top flap thereof in trailing relationship, means adapted to divert the body of the envelope downwardly from its path of travel, means to arrest movement of the said diverted body while continuing the forward movement of the top flap of the envelope thereby causing buckling of the material of the envelope intermediate the body and the top flap thereof, means adapted to divert the body of the envelope upwardly from its substantially horizontal path of travel, means to arrest movement of the said upwardly diverted body while continuieg the forward movement of the top flap of the envelope thereby causing a buckling of the material of the envelope intermediate the body and the top flap thereof, means to selectively render one of the other of said diverting and associated arresting means inoperative, and means to grip the portion of the envelope buckled as the result of diversion either upwardly or downwardly from its path of travel and impart a forward feeding movement therethrough to both said body and flap thereby folding the said flap upon the body of the envelope in either direction in accordance with the diverting means utilized.

5. In an envelope making machine, the combination of means for feeding envelope blanks from a supply thereof, a gumming means, a drying means, means for con-

veying the fed blanks sequentially past said gumming means and said drying means in a manner to provide adhesive on a marginal portion of the top flaps of the blanks, means for creasing the top and bottom flaps and the side flaps of the blanks as the latter are moved through the machine, means for folding the creased side flaps, means for applying an adhesive to the folded side flaps, means for folding the bottom flap of each blank onto the side flaps thereof thereby providing an envelope body, means to advance the formed envelope body with the top flap thereof in trailing relationship, a first pair of cooperating rollers having the bite thereof substantially aligned with the path of travel of the envelope from said bottom flap folding means, a second pair of cooperating rollers disposed with the bite thereof out of alignment with respect to the bite of said first pair of rollers, a first pair of spaced parallel members positioned with the space therebetween extending in substantial alignment with the lower of said first pair of rollers and at an angle with respect to the path of travel of an envelope from said bottom flap folding means, means between said members to determine the extent of movement of an envelope body therein, a second pair of spaced parallel members positioned with the space therebetween extending in substantial alignment with the upper of said second pair of rollers and in opposite direction with respect to said first pair of parallel members, means between said second pair of parallel members to determine the extent of movement of an envelope body therein, and removable means adapted to be positioned at the entrance between either or both of said pair of members to prevent entrance of an envelope body therebetween.

6. The combination as defined in claim 5 and further comprising a printing couple spaced from said second pair of rollers and means to convey an envelope from said second pair of rollers to said printing couple and effect registry of the envelope with the said printing couple.

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