Feb. 22, 1966 H. VOLKS ET AL Re. 25,961

ASSEMBLING INSERTS, LETTERS, ETC., INTO ENVELOPE DURING FORMATION

Original Filed July 29, 1960 11 Sheets-Sheet 1

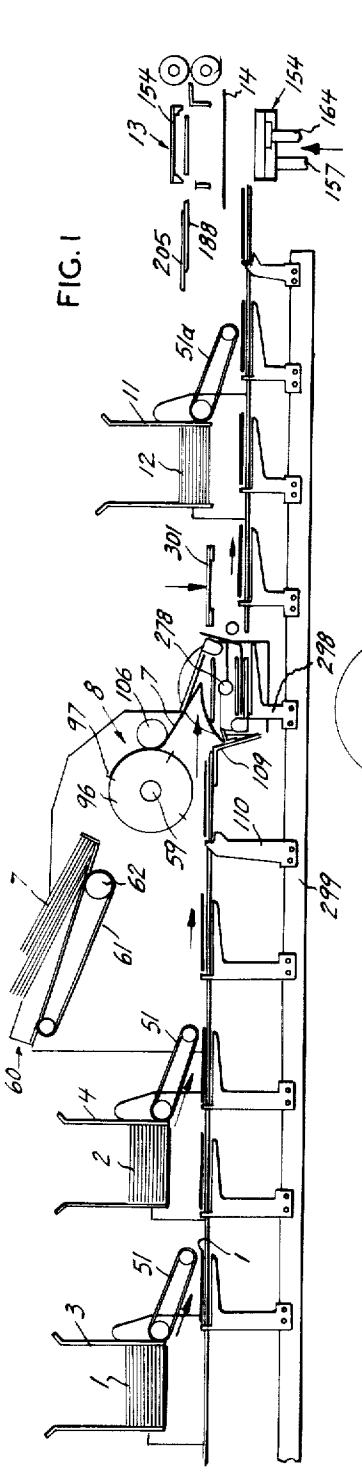


FIG. 1

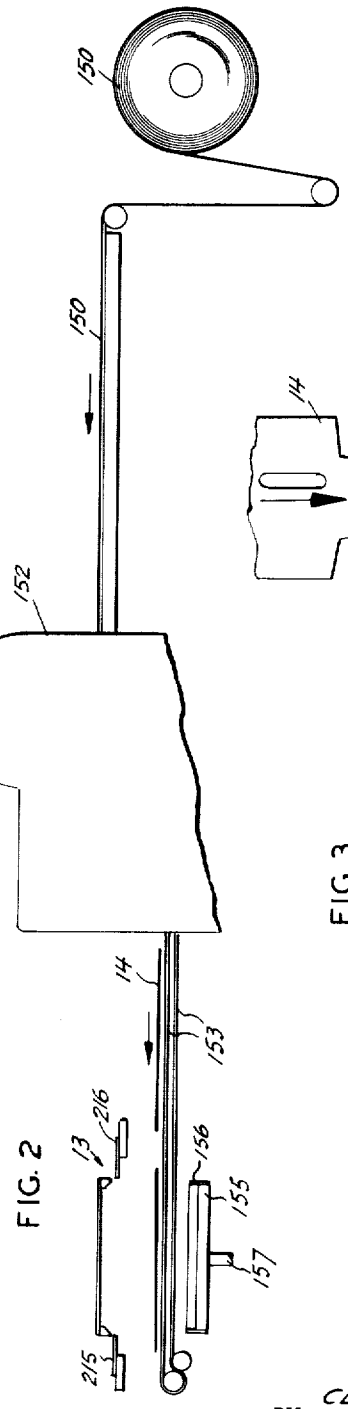


FIG. 2

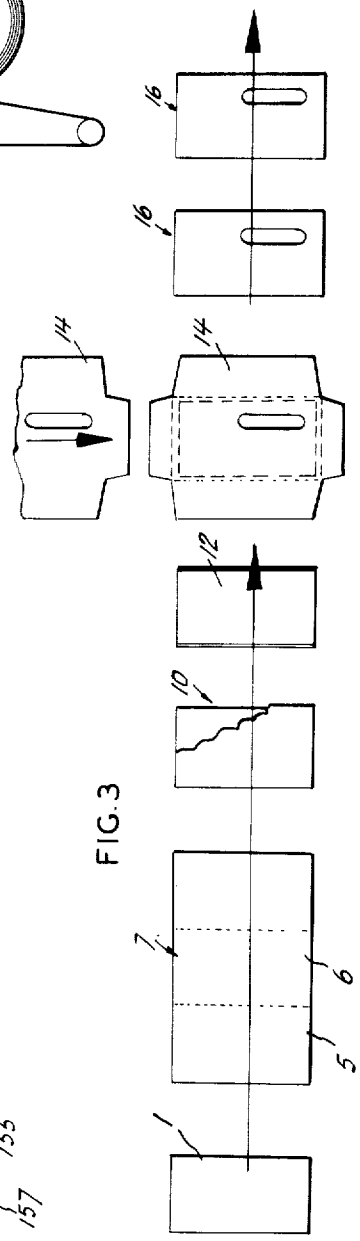


FIG. 3

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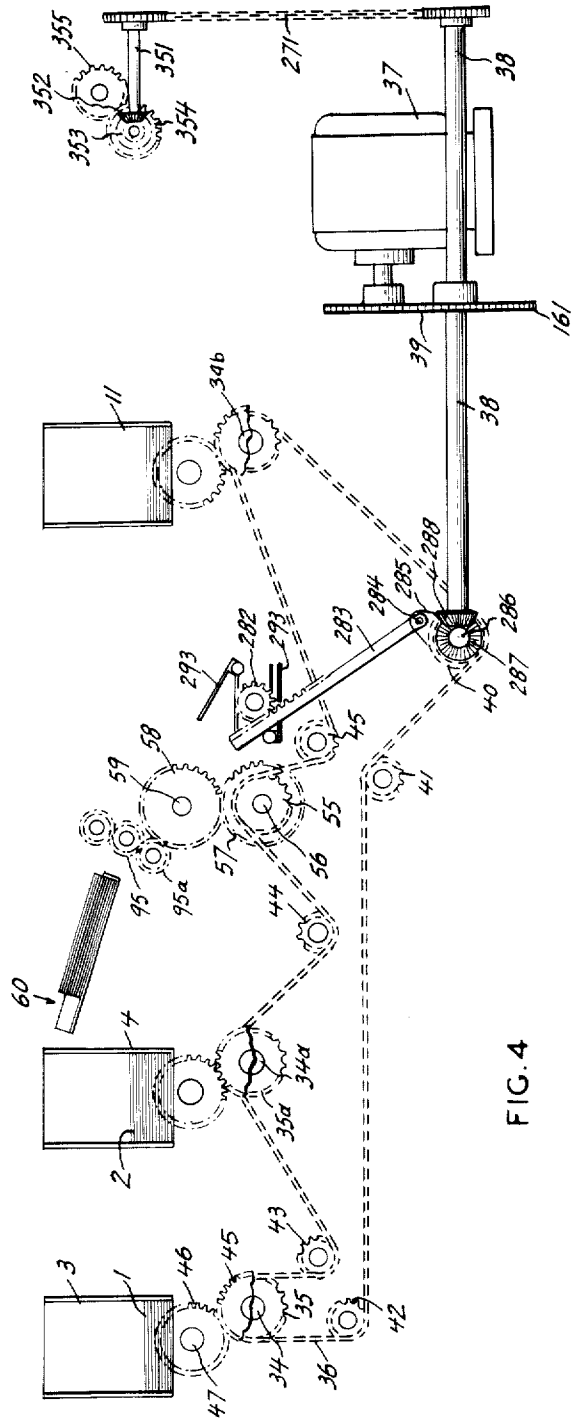


FIG. 4

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ASSEMBLING INSERTS, LETTERS, ETC., INTO ENVELOPE DURING FORMATION

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FIG. 5

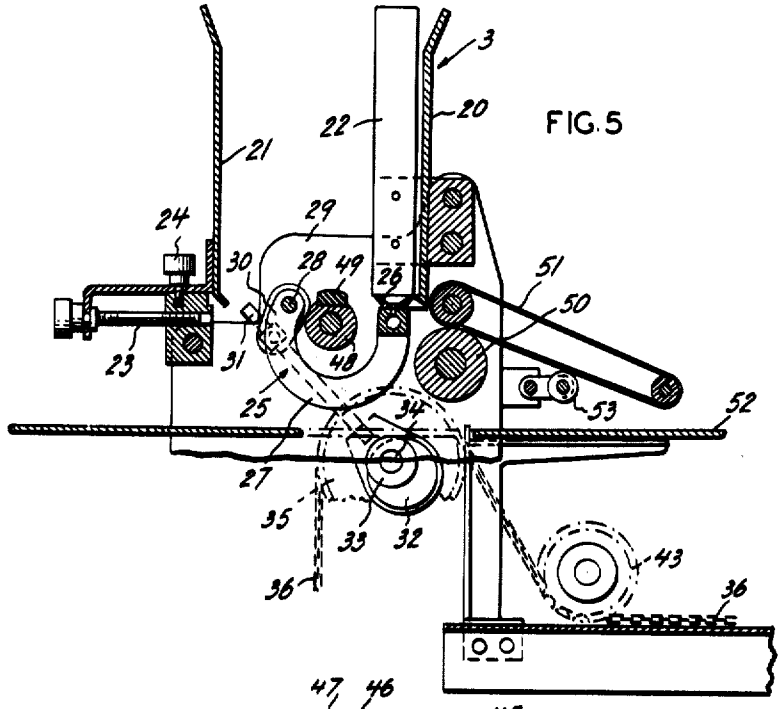
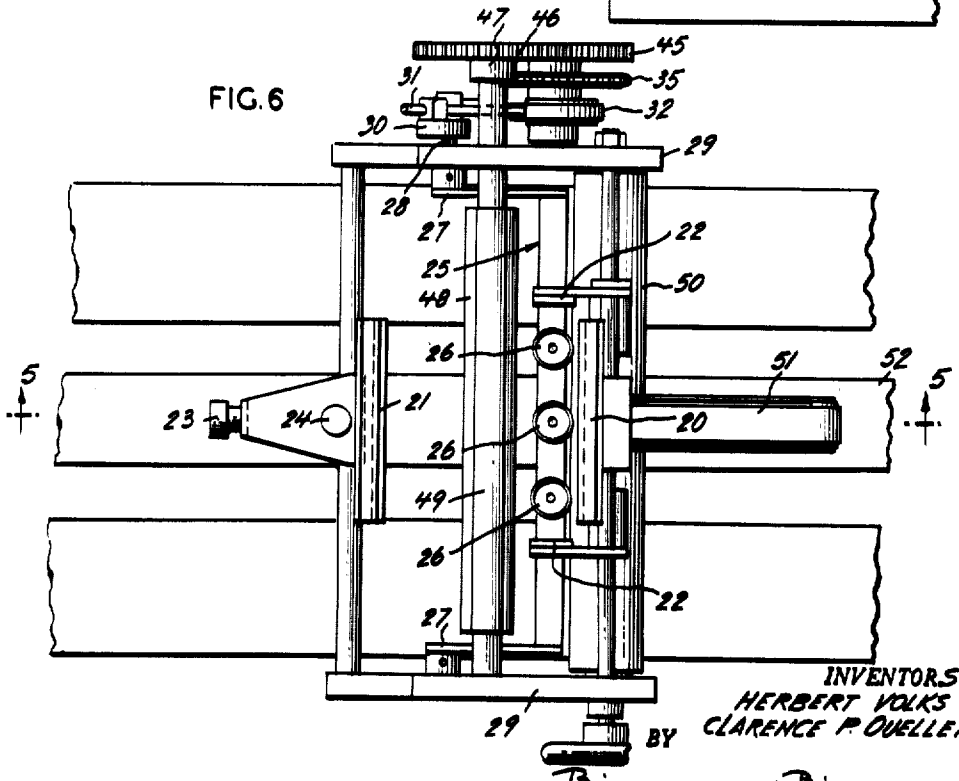


FIG. 6



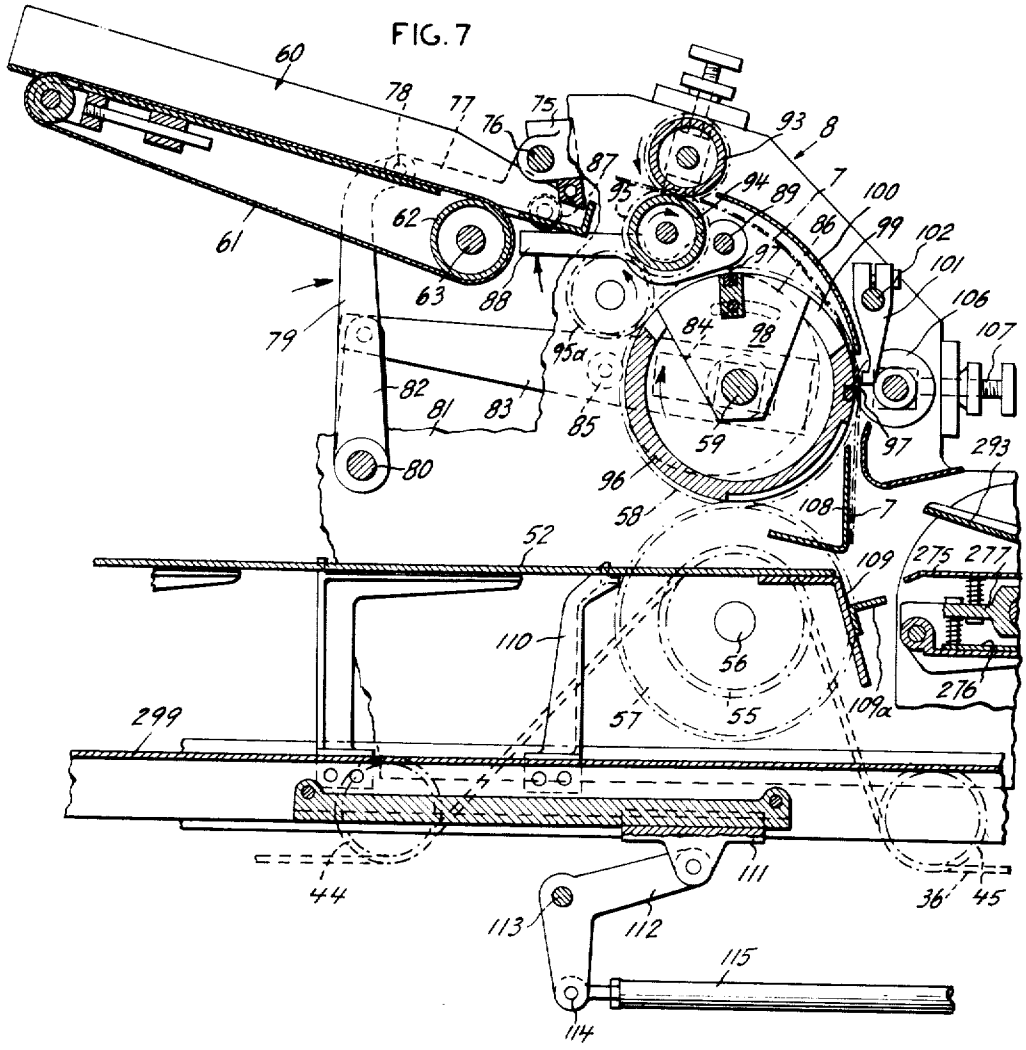
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ASSEMBLING INSERTS, LETTERS, ETC., INTO ENVELOPE DURING FORMATION

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FIG. 7



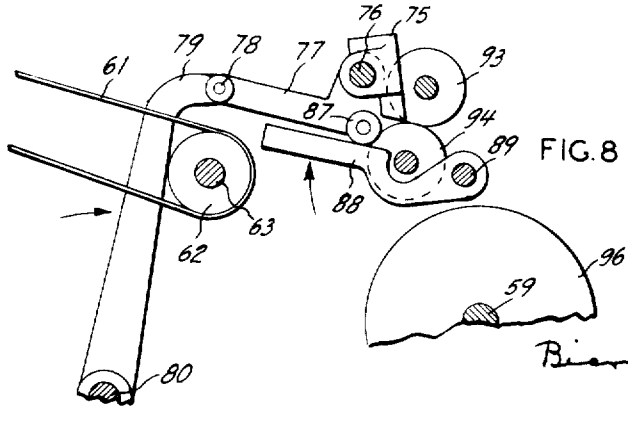


FIG. 8

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FIG. 9

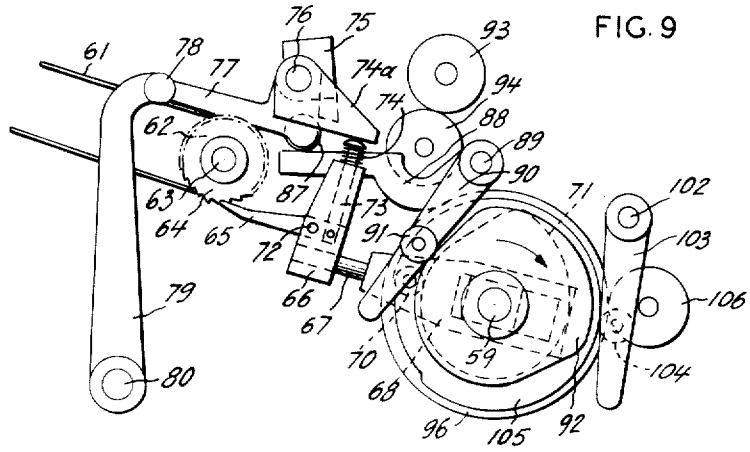
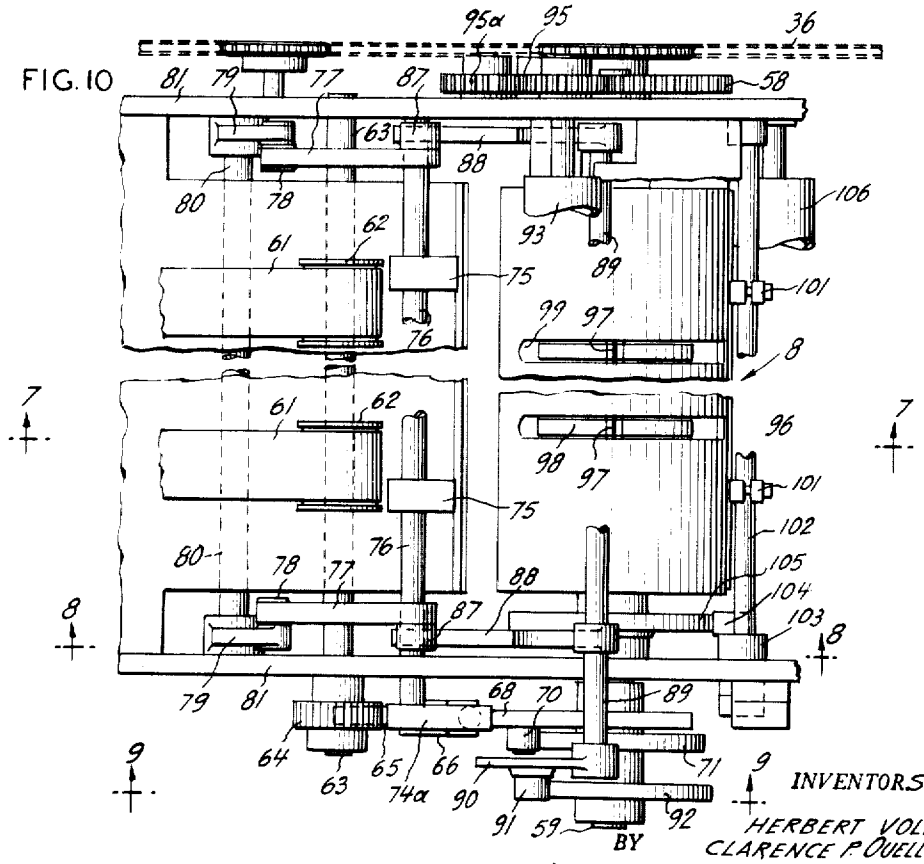


FIG. 10



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ASSEMBLING INSERTS, LETTERS, ETC., INTO ENVELOPE DURING FORMATION

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FIG. 11

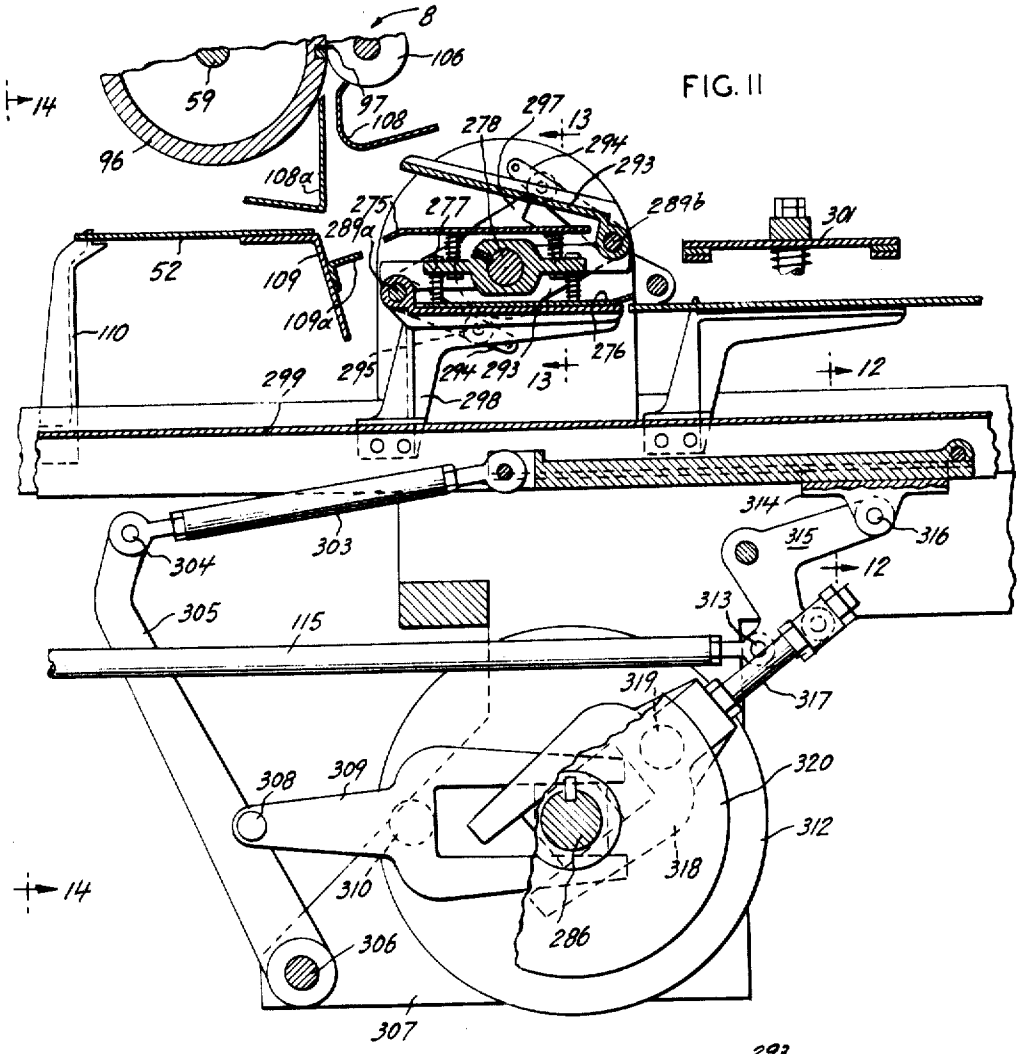


FIG. 12

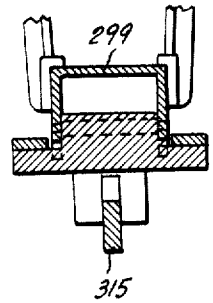
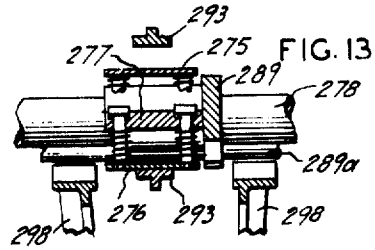
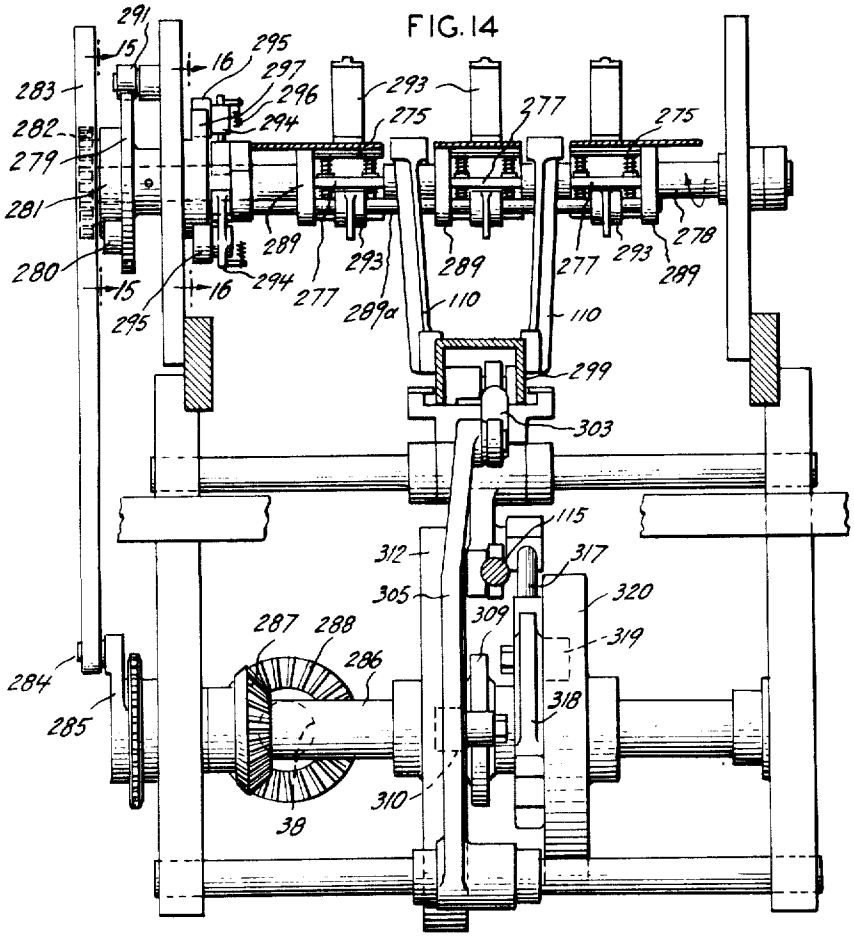


FIG. 13



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FIG. 14



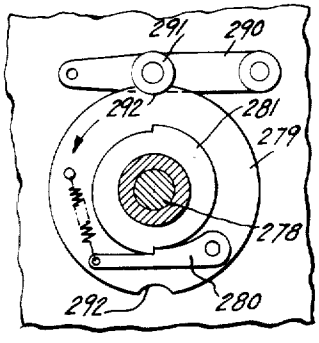


FIG. 15

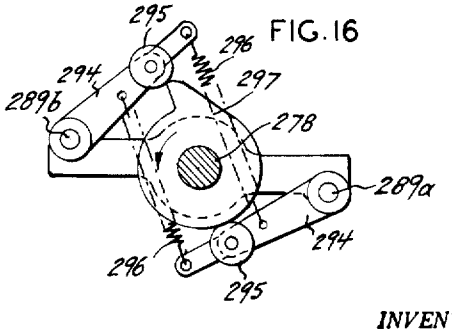


FIG. 16

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Feb. 22, 1966 H. VOLKS ET AL Re. 25,961

ASSEMBLING INSERTS, LETTERS, ETC., INTO ENVELOPE DURING FORMATION

Original Filed July 29, 1960 11 Sheets-Sheet 8

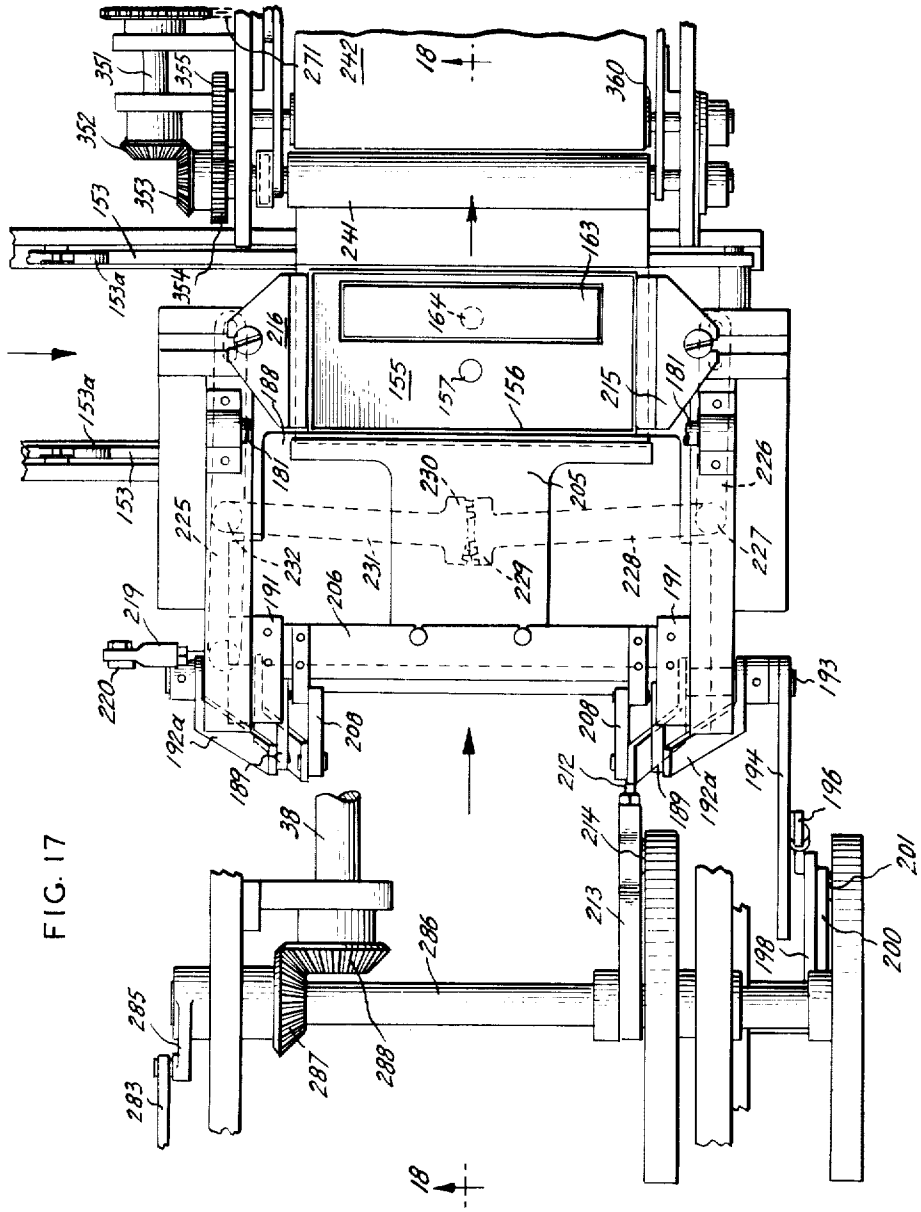
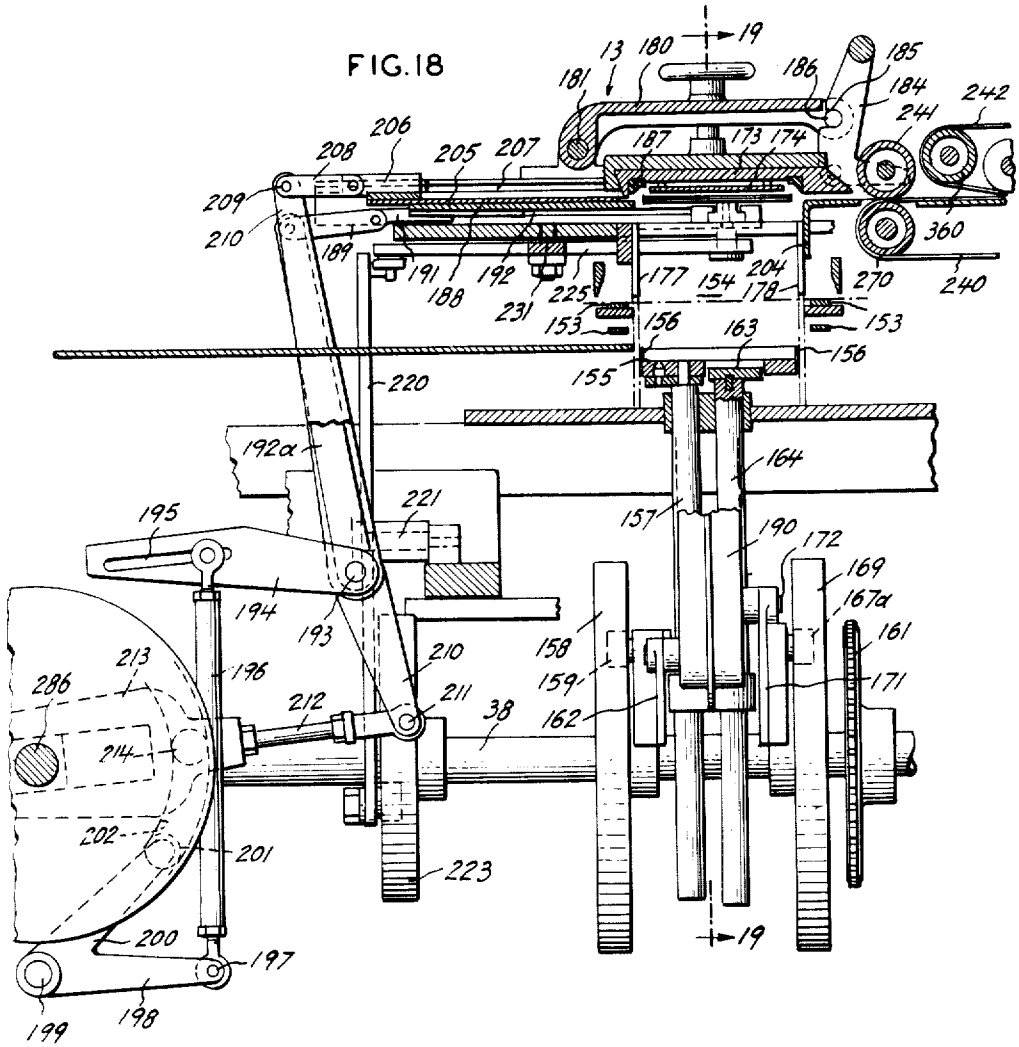


FIG. 17

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ASSEMBLING INSERTS, LETTERS, ETC., INTO ENVELOPE DURING FORMATION
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FIG. 18



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ASSEMBLING INSERTS, LETTERS, ETC., INTO ENVELOPE DURING FORMATION

Original Filed July 29, 1960 11 Sheets-Sheet 10

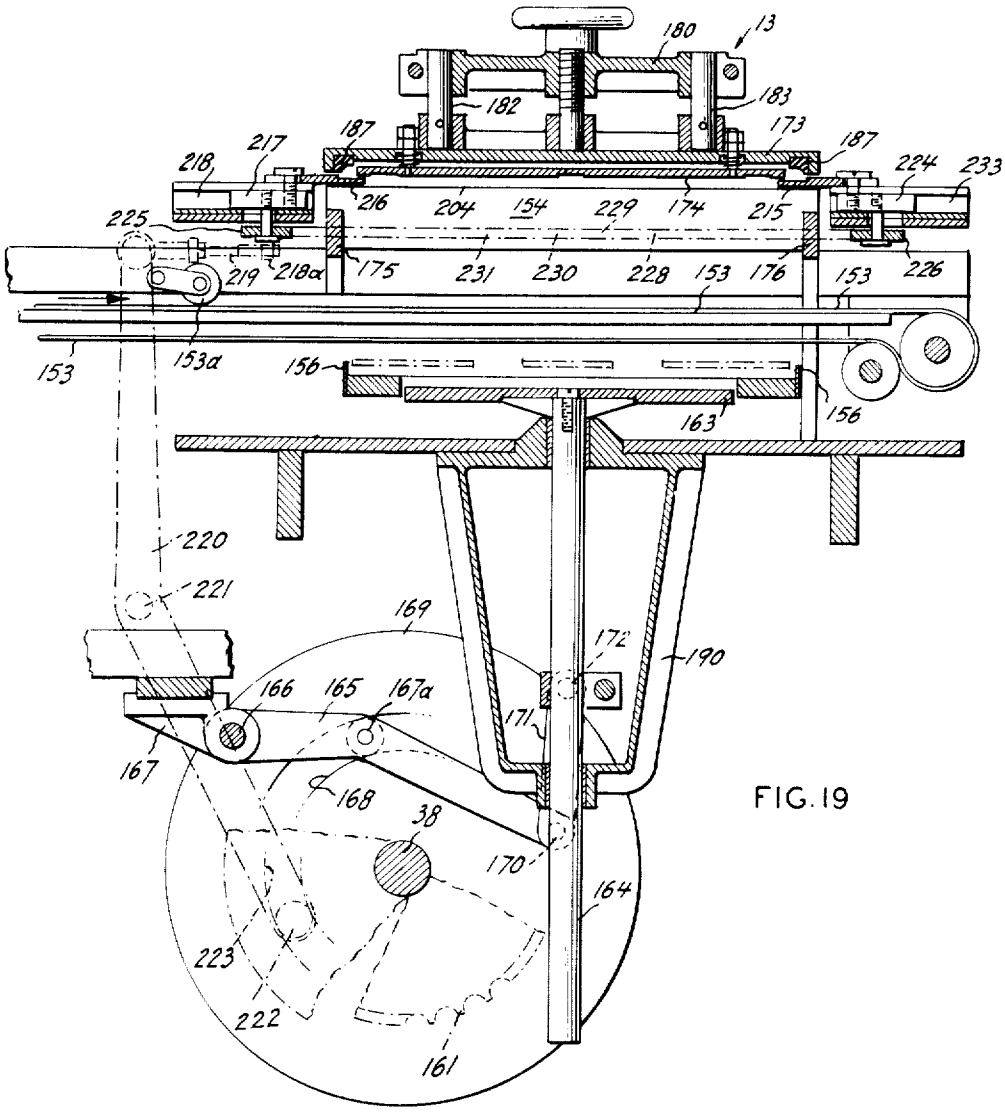


FIG. 19

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ASSEMBLING INSERTS, LETTERS, ETC., INTO ENVELOPE DURING FORMATION

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FIG. 20

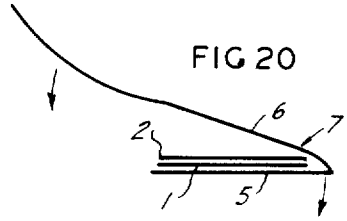


FIG. 21

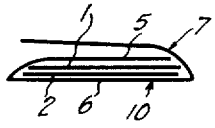
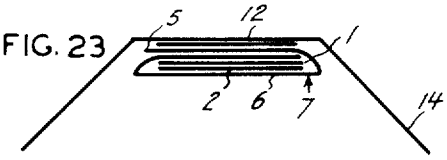


FIG. 22



FIG. 23



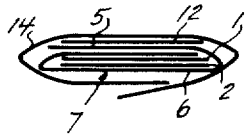


FIG. 24

FIG. 25

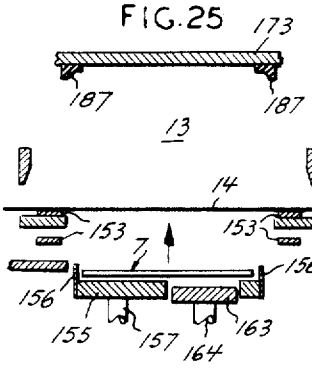


FIG. 26

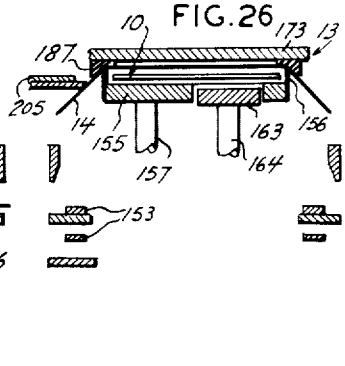
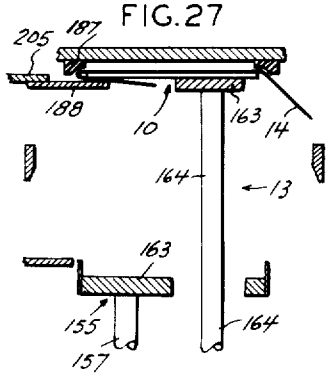


FIG. 27



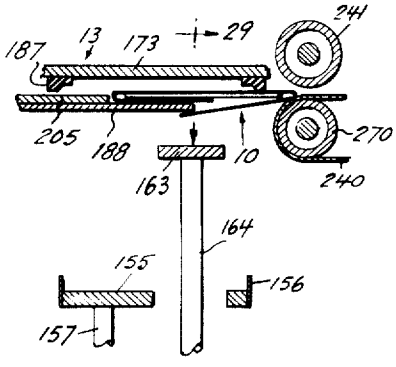


FIG. 28 29

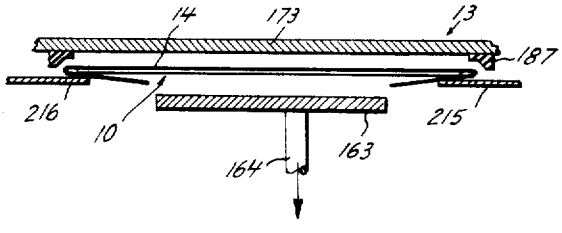


FIG. 29

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United States Patent Office

Re. 25,961
Reissued Feb. 22, 1966

25,961

ASSEMBLING INSERTS, LETTERS, ETC., INTO ENVELOPE DURING FORMATION

Herbert Volks, New York, N.Y., and Clarence P. Ouellette, Springfield, Mass., assignors to En Mail Machine Corporation, New York, N.Y., a corporation of Delaware

Original No. 3,059,391, dated Oct. 23, 1962, Ser. No. 46,209, July 29, 1960. Application for reissue Oct. 23, 1964, Ser. No. 420,472

9 Claims. (Cl. 53—206)

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue.

This invention relates to a method and apparatus for enclosing a letter, and if desired, one or more inserts or enclosures within an envelope, and it comprehends a method and apparatus by which the inserts are removed from one or more magazines; are placed upon a sheet, such as a letter; and an envelope is formed from strip material and is delivered to a position where the letter, which has been folded around the inserts, is disposed against the envelope, which then has its flaps folded and sealed down to enclose the letter and the inserts.

It is an object of the invention to provide an apparatus which operates as above described, and by which the preparation of mailing material is greatly facilitated.

It is an object of the invention to provide a machine of this character by means of which the contents of an envelope will be assembled, folded, presented to an envelope blank and the flaps of the envelope blank folded down and sealed.

More particularly, the invention contemplates the provision of an apparatus in which enclosures or inserts are collected; the same are placed between portions of a partly-folded letter sheet; the letter sheet is then completely folded around the inserts; the folded letter sheet and its contents are then presented against the inner surface of an envelope blank and the flaps of the envelope blanks are then folded down and sealed to thus enclose the letter and its contents. If the envelope used is of the window type, a sheet or card bearing the name and address of an addressee will be deposited on top of the folded letter sheet prior to the presentation of the same against the envelope blank so that the name and address on the card will become visible through the window opening in the envelope.

With these and other objects to be hereinafter set forth in view, we have devised the arrangement of parts to be described and more particularly pointed out in the claims appended hereto.

In the accompanying drawings, wherein an illustrative embodiment of the invention is disclosed,

FIG. 1 is a diagrammatic view of an apparatus constructed according to the invention;

FIG. 2 is a diagrammatic view of the envelope producing and feeding means;

FIG. 3 is a diagrammatic view illustrating the steps pursued in preparing the inserts or enclosures, letter sheet and envelope and producing the envelope-enclosed mailing piece;

FIG. 4 is a view showing the driving mechanism for the various units of the apparatus;

FIG. 5 is a sectional view of one of the magazines for the inserts or enclosures and the feed mechanism associated therewith, the view being taken substantially on the line **5—5** of FIG. 6, looking in the direction of the arrows;

FIG. 6 is a top plan view of the structure disclosed in FIG. 5;

FIG. 7 is a sectional view through the mechanism for feeding and creasing the letter sheet, the view being taken substantially on the line **7—7** of FIG. 10, looking in the direction of the arrows;

FIG. 8 is a view showing the suction picker mechanism for handling the letter sheets, the view being taken substantially on the line **8—8** of FIG. 10, looking in the direction of the arrows;

FIG 9 is a view taken substantially on the line **9—9** of FIG. 10, looking in the direction of the arrows;

FIG. 10 is a plan view of the letter sheet feeding and creasing apparatus, with some of the parts fragmentarily shown in order to disclose construction;

FIG. 11 is a sectional view constituting an extension of the right end of FIG. 7;

FIG. 12 is a sectional view, taken substantially on the line **12—12** of FIG. 11, looking in the direction of the arrows;

FIG. 13 is a sectional view, taken substantially on the line **13—13** of FIG. 11, looking in the direction of the arrows;

FIG. 14 is an end view of the apparatus shown in FIG. 11 as viewed from the line **14—14** of FIG. 11, looking in the direction of the arrows;

FIG. 15 is a view showing the clutch used in connection with the letter sheet folders, the view being taken on the line **15—15** of FIG. 14, looking in the direction of the arrows;

FIG. 16 is a sectional view, taken substantially on the line **16—16** of FIG. 14, looking in the direction of the arrows;

FIG. 17 is a plan view of the envelope folding mechanism and parts associated therewith;

FIG. 18 is a sectional view, taken substantially on the line **18—18** of FIG. 17, looking in the direction of the arrows;

FIG. 19 is a sectional view, taken substantially on the line **19—19** of FIG. 18, looking in the direction of the arrows;

FIGS. 20 to 24 inclusive are diagrammatic views showing respectively, the delivery of the inserts or enclosures to the letter sheet; the folding of the letter sheet around the inserts; the placement of the address card or sheet onto the folded letter sheet; the positioning of the letter sheet, inserts and address card against an envelope blank, and the folding of the flaps of the envelope blank to cause the produced envelope to enclose the letter sheet, the inserts and the address card;

FIGS. 25 to 28 inclusive are diagrammatic views showing the steps involved in delivering the material for enclosure to the envelope blank and folding the flaps of the envelope blank around such material, and

FIG. 29 is a sectional view, taken substantially on the line **29—29** of FIG. 28, looking in the direction of the arrows.

By reference to FIGS. 1, 2, 3 and 20 to 24 inclusive, the steps performed by the apparatus of the present invention will be seen. The apparatus feeds one or more inserts or enclosures to a position between folded parts of a sheet, such as a letter sheet, and the completion of the folding of the letter sheet around the inserts to encircle them is then performed. In the event that an envelope of the window type is employed, an address card or sheet is placed on top of the folded letter sheet and the folded letter sheet bearing the address card is then transported to a station where it is presented against an envelope blank which has its several flaps infolded and then sealed to thereby enclose its contents consisting of the letter sheet, the inserts enclosed therein and the address cards, as aforesaid. Means are provided for producing and sup-

plying the envelopes to the envelope-filling and folding station.

In FIG. 3, one of the inserts is shown at 1, the same consisting of a sheet or card, and in FIG. 20, two inserts, indicated respectively at 1 and 2, are shown in superposed relation, the insert shown at 1 being that taken from the magazine 3 in FIG. 1, while the insert shown at 2 is taken from the magazine shown at 4. Inserts taken from these magazines are transported, by means to be described, to the station where they are entered between the folds 5 and 6 (FIG. 20) of a letter sheet 7 preparatory to being enclosed by the letter sheet. This station is generally indicated at **8** in FIG. 1. At said station, the completion of the operation of folding the letter sheet around the inserts 1 and 2 takes place, so that when the letter sheet and its contained contents leaves the aforementioned station, it is in the form shown in FIG. 21.

The resultant packet, shown at **10** in FIGS. 3 and 21, consists of the folded letter sheet and enclosed inserts, and it now proceeds to an address-card delivery station 11 (FIG. 1) whereat a card **12** bearing the name and address of the addressee is deposited on top of the folded letter sheet. The card **12**, and the packet **10** are now carried to the enveloping station 13, where an envelope blank **14**, delivered from the envelope blank producing apparatus, diagrammatically shown in FIG. 2, is positioned above the letter sheet and its associated inserts and the address card. These elements are elevated and are brought into contact with the envelope blank, which then has its flaps folded around its contents to enclose them, the envelope-enclosed material then proceeding from the apparatus as indicated at **16** in FIGS. 3 and 24. In the drawings, the means for supplying two enclosures or inserts for each envelope is shown, but it will be understood that this number can be increased or decreased as required. One of the units for supplying the inserts is shown in detail in FIGS. 5 and 6, wherein it will be noted that the inserts, in the form of cards or sheets, are stacked in a magazine and supported and aligned by side plates **20**, **21** and **22**, some of these plates being adjustable relatively to the others, by means of the adjusting screws **23**, to compensate for differently-sized inserts. A set screw **24** serves to maintain the guide plates in the selected positions of adjustment.

At **25** is shown a suction picker, provided with the suction cups **26**. The picker **25** is provided at its opposite ends with the curved arms **27**, secured on rocking shafts **28**, mounted for oscillating movement in the side frames **29** of the unit. Shaft **28** is rocked by means of an arm **30** secured to it and to which is adjustably attached one end of a rod **31**, having its opposite end provided with an eccentric yoke **32** engaged by an eccentric **33** on shaft **34**. Shaft **34** carries a sprocket **35** which is driven by a chain **36** operative in the manner shown in FIG. 4.

It will be seen in FIG. 4 that the chain **36** is primarily driven from an electric motor **37** driving a shaft **38** by means of chain **39**. Shaft **38** drives shaft **286** through miter gears **287** and **288**. Shaft **286** carries a sprocket **40** engaging the chain **36**, which chain also engages several idlers, indicated respectively at **42**, **43**, **44**, and **45a**, as well as several other sprockets to be later referred to.

Mounted on the shaft **34** is a gear **45** which meshes with a gear **46** on a shaft **47** rotative in the frames **29** of the unit. Said shaft **47** carries a friction roller **48** (FIG. 5) provided with an insert **49** arranged to frictionally contact an insert drawn from the magazine by the suction picker and force the end of the same between a roller **50** and a belt **51** to be moved thereby toward the right in FIG. 5 by a travelling carrier **52** on which it is deposited. The roller shown at **53** aids in the delivery of the insert to the carrier.

The mechanism shown in FIGS. 5 and 6 is such as to cause the inserts to be successively pulled down by the suction picker from the bottom of the stack in the magazine **3** and as each insert is pulled down and suctionally released, the friction roller **48** inserts it between the belt **51** and the roller **50** and by which it is delivered onto the carrier **52** and is moved thereby to the next station at which another insert is supplied.

Assuming that the insert-supplying station above described is that shown at 3 in FIG. 1, the insert 1 delivered therefrom and being borne by the carrier **52**, will next be transported to a second insert-delivery station, or that indicated at 4. The construction of the apparatus at that station can be similar to that already described in respect to station 3, and at station 4 there is a shaft **34a** and sprocket **35a** driven by the chain **36** as clearly seen in FIG. 4. The remainder of the apparatus at station 4 is similar to that at station 3 and it operates to supply an insert 2 which is deposited on top of the insert 1 when the latter insert is moved by carrier **52** to a position below the station 4.

The two inserts, thus supplied respectively from stations 3 and 4, and in overlying relation, are transported by the carrier **52** to the letter sheet supplying and folding station now to be described.

Chain **36** engages a sprocket **55** (FIG. 4) on a shaft **56**, carrying a gear **57** meshing with a gear **58** on a shaft **59**. The letter sheets **7** to be fed to the creasing and folding mechanism, are supported in a magazine or tray **60** provided at the bottom with a pair of intermittently-operated belt feeders **61**. At one end, each of the belts **61** extends around a drum **62**, both of the drums being mounted on the shaft **63**. Secured on shaft **63** is a ratchet wheel **64**, engaged by a pawl **65** (FIG. 9) which is adapted by its movement to rotatively move the ratchet wheel to cause travel of the belts **61**. The pawl **65** is pivotally mounted in a block **66** secured to a rod **67** attached to a yoke **68** surrounding the shaft **59**. Yoke **68** carries a cam roller **70** engaging cam **71** on shaft **59**. This arrangement is such as to cause the pawl **65** to intermittently rotate the ratchet wheel **64** at required times and thus cause an intermittent feeding movement of the belt. The pawl **65** is pivoted at **72** in the block **66** and is connected at one end to a headed stem **73**, biased by the coil spring **74**. A finger **74a** on shaft **76** permits engagement and disengagement of the pawl at the required times.

The picker mechanism for successively removing letter sheets from the magazine **60**, includes suction heads **75** on the shaft **76**. Mounted on the shaft **76** are arms **77** having their ends pivotally secured at **78** to the upper ends of levers **79**, having their lower ends secured on a rocking shaft **80** rotative in suitable bearings in the side frames **81**. Shaft **80** is oscillated by means of an arm **82** (FIG. 7) secured on the shaft **80** and pivotally connected at one end to a lever **83** having a yoke **84** embracing shaft **59**. Lever **83** carries a cam roller **85** operative against cam **86** provided on the shaft **59**. Through the construction described, the suction picket is moved back and forth or from its advanced and elevated position, shown in FIG. 8, to its retracted and lowered position shown in FIG. 9.

The arms **77** on the picker-supporting shaft **76** are provided at the bottom with rollers **87** adapted for contact with levers **88** pivotally secured at one end on a cross shaft **89**. Said shaft is oscillated by cam means, including lever **90** secured on shaft **89** and carrying a cam roller **91** in contact with a cam **92** secured on the shaft **59**. This arrangement is such that at the required times the suction picker will be raised and lowered in a manner to cause it to engage the uppermost letter sheet **7** in the magazine **60**, lift it, and present it between the feed rolls designated at **93** and **94**. Roll **94** is a driven roll, the shaft of the same carrying a gear **95**, meshing with gear **95a** that is in mesh with the gear **58**.

Mounted on the shaft **59** is the creasing drum **96**, provided with spaced creasing ribs **97** projecting from its periphery for producing spaced and parallel creases across

the letter sheet. The spacing thus produced between the creases is regulatable by adjustment of the ribs **97** relatively to one another. Such adjustment is secured by providing one of the ribs in a segment **98** adjustable on the shaft **59**, the body of the drum being apertured, as shown at **99**, to permit of adjustment of the segment as above mentioned.

As the letter sheet 7 passes from between the feed rolls **93** and **94**, it is guided to the surface of the drum **96** by means of the curved guide plates **100** and it descends thereon while being creased at two points by the ribs **97** and co-operating elements including the fingers **101**, mounted on a rocking shaft **102**, carrying lever **103**, carrying cam roller **104** engaging cam **105** secured on the shaft **59**. Pressure roll **106**, provided with adjustable pressure means **107**, co-operates in the application of the required pressure to effect the creases in each letter sheet.

As each letter sheet descends, it is guided by guides **100**, **108** and **109** and a stop flange **109a** and enters between folding means in a partly folded condition (FIG. 1). At this point the inserts 1 and 2 have reached a point for insertion between the parts 5 and 6 of the partially-folded letter sheet, and are received therein as shown in FIG. 20. The inserts are moved between the parts of the partially folded letter sheet by means of fingers **110** connected to a slide **111**, engaged by one arm of a bell-crank lever **112**, pivoted at **113** and having its other arm pivoted at **114** to a rod **115** extending from suitable cam mechanism to be described. This arrangement causes the inserts 1 and 2, or such additional inserts as may be required, to reach the position with relation to the letter sheet that is shown in FIG. 20.

The folded letter sheet, with the inserts disposed between its folded portions, enters the final folding and pressing means shown in FIG. 11. Said pressing and final folding means includes a number of spring-pressed plates **275** and **276** resiliently mounted on a plate **277** fixed on a shaft **278**. Said shaft **278** is provided with a clutch (FIG. 15) consisting of the notched disk **279** secured on the shaft **278**, the spring-biased dog **280** secured on disk **279**, the ratchet member **281**, and the pivoted arm **290** having roller **291** for engagement with either of the two notches **292** in the disk **279**. This clutch provides for a half revolution of shaft **279**. Ratchet member **281** carries a gear **282** engaged by a rack **283**, the lower end of the rack being connected at **284** to a crank arm **285** extending from shaft **286**. Shaft **286** carries a bevel gear **287** meshing with a bevel gear **288** on the drive shaft **38**.

Mounted on the shaft **278** are frames **289** in which shafts **289a** and **289b** are pivotally mounted, said shafts being capable of oscillating movement. Each of the shafts **289a** and **289b** carries a plurality of jaws **293** which clampingly engage the letter sheet and contents when delivered to the then uppermost of the plates **275** or **276**. Each of the shafts **289a** and **289b** carries an arm **294** bearing a cam roller **295** held by the spring **296** (FIG. 16) against the edge of a cam **297**. This arrangement is such that when the letter sheet reaches the uppermost one of the plates **275** or **276** and is delivered thereto by the fingers **110** on slide **299**, the shaft **278** will be rotated one-half a revolution to bring the letter sheet and its contents to a lower level when fingers **298** engage the letter and contents to discharge it under the folding bar—to complete the final folding and position it under a spring pressure device shown at **301** which operates to flatten the letter sheet and contents, preparatory to the placement of the address card on top of the folded letter sheet, if such card is required. The jaws **293** are opened and closed by cam **297** at the proper times to grip and release the letter sheet and its contents.

The slide **299** is reciprocated by means of a link **303** having one end connected at **304** to the upper end of a lever **305** pivoted at **306** in a frame element **307**. Lever **305** is pivotally connected at **308** to a yoke **309** carrying a cam roller **310** engaging in a cam groove in cam **312**. The rod **115**, which has one end connected to bell crank lever **112**, has its opposite end attached at **313** to a bell crank **315**, connected at **316** to slide **314**. The bell crank **315** has its second arm connected to rod **317** attached to a yoke **318** embracing the shaft **286**. Yoke **318** carries a cam roller **319** operative in the cam groove **320** of a cam mounted on shaft **286**.

After having received the inserts 1 and 2 and having been completely folded and flattened to the condition diagrammatically shown in FIG. 21, the folded letter sheet and its contained inserts, are now moved to a position where they receive an address card, assuming that the envelope intended to receive the letter sheet and inserts is of the window type. The means for supplying the address cards **12** is shown at **11** in FIGS. 1 and 4 and since the same may be similar in construction to the insert-supply units at stations **3** and **4**, a detailed description of the address-card supply means need not be given. It is sufficient to state that the cards **12**, with their inscribed sides uppermost, are successively deposited on top of the folded letter sheets as shown in FIG. 22. Belt **51a** conveys the address cards to the point of deposit on top of the folded letter sheets, and a chain, that shown at **36** and previously herein referred to, drives shaft **34b**.

The envelopes employed for enclosing the folded letter sheets and their inserts or enclosures, are produced by being stamped out in flat blank formation by suitable mechanism not herein disclosed in detail, but contained within the housing shown at **152** in FIG. 2. The paper from which the envelope blanks are formed is supplied from a strip **150** in roll form, the strip drawn therefrom proceeding to the blanking mechanism contained in the housing **152**. By means of such mechanism, the envelope blanks are cut from the strip, and if of the window type the windows are punched out and Glassine strips applied thereover and gum applied to the required flaps of the blanks. The envelopes **14**, of the required size and shape, emerge as flat blanks fed face upwards from the envelope stamping means, and are conveyed by a travelling conveyor **153** to the envelope-folding mechanism.

The envelope producing mechanism just described is so located relatively to the previously-described parts of the apparatus that the envelopes proceeding from the stamping mechanism travel in a direction at right angles to the direction of travel of the folded letter sheet, as will be noted by the arrow at the top of FIG. 3. Each of the envelope blanks is carried by the conveyor **153** to a position below a folder **154** and above an elevator or lifting device **155**, the function of the latter being to elevate the folded letter sheet and its contents, including the address card, as well as the envelope blank, and while doing so to cause partial folding of the flaps of the envelope blank. The operation of the envelope-folding means will be clear from FIGS. 25 to 29. In FIG. 25 it will be seen how the envelope blank **14**, resting on the spaced conveyor **153** is brought to rest below the folder. Rollers shown at **153a** aid in guiding the blanks into position.

The elevator **155** includes a surrounding rim or wall **156** which encloses the folded letter sheet 7 and its contents. The elevator is provided with a stem **157** by which it is raised and lowered at the proper times, by means of a cam **158** on shaft **38** engaging roller **159**, the shaft **38** being driven by a chain engaging sprocket **161** and extending from a suitable power source. A linkage **162** is coupled to shaft **157** and the cam roller **159** is attached thereto, resulting in the required timed vertical reciprocating movements of the elevator.

Included in the elevating means is a supplemental elevating member or plunger **163**, having a stem **164**. A lever **165**, pivoted at **166** in a fixed bracket **167** carries the cam roller **167a** engaging with the cam groove **168** and a cam **169** on shaft **38**. Said lever **165** has an end con-

nected at **170** to one end of a link **171** pivoted at its opposite end as shown at **172** to the stem **164**. This arrangement, which is similar to the mechanism employed for raising and lowering the body **155** of the elevator, serves to raise and lower the supplemental plunger **163** when required. The stems **157** and **164** are guided in their reciprocating movements by the bracket **190** through which they are vertically slidable.

Referring to FIG. 26, it will be therein seen that the elevator **155** has raised the folded letter sheets and the envelope blank to an extent to bring the envelope blank against the bed plate **173**, or actually against the spring pressure-plate **174** carried thereby. The flaps on the blank are initially folded on the way up to the bed plate. The folding means **154** includes parts **175** and **176** which fold the end flaps of the envelope blank to a ninety degree position relative to the center panel of the blank. The parts **177** and **178** fold down the end flaps, the folding of all of the flaps occurring by the elevating of the blank.

The bed plate **173** is supported by a frame **180**, pivoted at one end on a rod **181** and attached to the bed plate by studs **182**, **183**. In its lowered or operative position, as shown in FIGS. 18 and 19, the frame is held down by a locking member **184** having a notch **185** into which a cross rod **186** on the end of the frame **180** fits. The frame **180** and the bed plate and pressure plate attached thereto can be swung upwardly when required for clearing or replacement of the parts. Creasing elements **187** are provided in the bed plate.

When the envelope and the letter sheet, inserts and address card are elevated as shown in FIG. 26, the next step consists in the infolding of the larger or side flaps. Gum is applied to the required flaps prior to the blank reaching the folding means, or during travel of the blank, so that when the flaps are folded down to overlapping relationship, they will adhere to one another.

The tuckers which perform the side flap folding include the slidable plate **188** which is reciprocated by cam means, including a link **189** attached at one end to a block **191** secured to a plate **188** slidable in a guide groove **192**. The opposite end of the link **189** is pivotally attached to the upper end of a link **192a** pivoted at **193** to a slotted arm **194**, the slot **195** thereof being adjustably engaged by the upper end of a rod **196** having its lower end pivotally attached at **197** to one of the arms of a bell-crank lever **198**. The bell-crank lever **198** is pivoted at **199** and has its other arm **200** carrying a cam roller **201** engaging a cam slot **202** provided on a cam **203** on rotative shaft **286**. The second tucker for the side flaps consists of member **204** which folds down the second side flap as the same is pushed against it.

An ejector plate **205** is attached to a slide **206** reciprocable in a guideway **207**. Slide **206** is connected to one end of a link **208** having its other end attached at **209** to the upper end of lever **210** pivotally attached at **211** to one end of a rod **212** provided at its opposite end with a yoke **213** embracing shaft **286**. The yoke carries a cam roller **214** engaging in the cam groove **202** on shaft **286**.

The tuckers for the smaller or end flaps of the envelope are indicated at **215** and **216**. That shown at **216** is secured to a sliding block **217** slidable in a guideway **218**. Pin **218a** attaches the block **217** to the end of a lever **225** connected to a link **219** having its opposite end connected to the upper end of a lever **220**, pivoted for rocking movement at **221**, and provided with a cam roller **222** operative in a cam groove in a cam **223**, fixed on shaft **38**.

The tucker **215** is attached to a sliding block **224**, movable in a guide slot **233** and connected to one end of a lever **226** having its opposite end pivotally attached at **227** to an arm **228** provided at its end with a segmental gear **229** in mesh with a similar gear **230** provided on the end of an arm **231** pivotally connected at **232** to a substantially midway point on the lever **225**. The above described arrangement is such that when the tucker **216** is moved in a direction toward one of the end flaps of the envelope the tucker **215** will also be moved toward the opposite end flap.

As will be noted in FIG. 27, when the folding of the first of the side flaps takes place, the elevator **155** will have been lowered while the supplemental plunger **163** will have been raised and it remains raised at this time to hold the letter sheet and its contents and the address card positioned against the under side of the envelope blank and is held against pressure plate **174**.

When the tuckers **215** and **216** are moved toward one another, the same will fold down the end flaps while the supplemental plunger **163** is lowered. The envelope and its contents is then moved toward the right, as viewed in FIG. 18 by the sliding movement of the ejector plate **205** to push the envelope against and over member **204** and then cause it to be engaged between belt **240** and roller **241** and moved to point of egress of the apparatus. The drum **360** over which an upper feed belt **242** extends is driven from a shaft **38** (FIG. 4) by chain **271** extending to a sprocket on a short shaft **351**, carrying bevel gear **352** meshing with bevel gear **353**. Bevel gear **353** is on the shaft of drum **270** and said shaft also carries a gear **354** meshing with a gear **355** on the shaft of drum **360**.

The operation of the described apparatus is briefly as follows:

If inserts or enclosures are to be included in the contents of the envelope, the inserts are successively removed from the bottom of one or more of the magazines 3 and 4 and are deposited on the carrier operative below them. If the envelope is to contain only a letter sheet, then the portion of the apparatus which delivers the inserts or enclosures can remain inoperative. If enclosures or inserts are to be used the same, after leaving their respective magazines, are transported to the letter sheet folding station where they are inserted between portions of the partly-folded letter sheet, the letter sheet is then completely folded around the inserts, and then the resultant packet, consisting of the folded letter sheets with the inserts between its overlying parts, is carried to the address-card delivery station. If pre-addressed envelopes are used rather than window envelopes, the address-card delivery station may remain inoperative. If it is used, the mechanism thereat will deliver an addressed card or sheet to a position on top of the folded letter sheet to be transported thereby to the enveloping station.

The envelope blanks are delivered to the enveloping station and there the folded letter sheet and its contents, and the address card as well as the envelope blank are elevated and are moved through a folder to initially fold the flaps of the envelope. Tuckers then operate to fold down the several flaps of the envelope blank to complete the mailing piece and the filled and sealed envelope is then discharged from the apparatus.

It will be understood that various controls may be used in connection with this apparatus to thereby insure proper feeding; to signal any defective operation, such as feeding a double rather than a single sheet, or missing an enclosure etc. and such controls, as well as adjustment means for adapting the apparatus for various sizes of sheets, envelopes and inserts have been omitted to more clearly disclose the features to which the present invention relates.

Having thus decribed an embodiment of the invention, it is obvious that the same is not to be restricted thereto, but is broad enough to cover all structures coming within the scope of the annexed claims.

What we claim is:

1. In an apparatus for preparing mailing material, a plurality of magazines for holding inserts, means for successively removing inserts from the bottoms of the magazine and depositing the inserts so removed in superposed relation on a carrier, letter sheet supply and folding means to which the inserts are transported by the carrier, means for causing the inserts to be deposited between parts of one of the partly folded letter sheets,

means for completing the folding of the letter sheet around the inserts, a magazine for holding address cards, means for successively removing cards therefrom and depositing each card so removed on top of the folded letter sheets, envelope supporting means on which an envelope blank is rested with its inside face disposed downwardly, means for moving the folded letter sheet and its contents and the address card to bring the same into contact with the downwardly-directed inside face of the envelope blank, a two-part support for bringing the folded letter sheet and its contents against the under side of the envelope blank and folding means for folding down the one of the flaps of the envelope blank around the letter sheet, inserts and address card while the same are supported by one of the parts of the support, and means for shifting said part to permit of the folding of a second flap.

2. In an apparatus for preparing mailing material, means for producing envelopes from a paper strip, envelope-folding means to which the envelope blanks so produced are delivered with their inside faces directed downwardly, said folding means including a bed plate on which each of the blanks is rested with its face directed downwardly, a pair of side-by-side elevators for raising a folded letter sheet to bring it against the inside face of one of the envelope blanks, means for causing a lowering of one of the elevators, a flap tucker operative to infold one of the flaps of the envelope blank while the blank and the letter sheet are supported by the other elevator, means carried by the tucker for laterally moving the blank and its contents while the second elevator is being lowered, and pressing rollers between which the blank and its contents are being moved, for causing a folding down of a second flap on the blank.

3. In an apparatus for preparing mailing material, a plurality of magazines for holding mail enclosures, means for successively removing enclosures from said magazines and piling them one upon another on a conveyor, a magazine for letter sheets, means for successively extracting letter sheets from the latter magazine and partly folding the same and positioning them in the path of travel of the inserts previously removed from the other magazines whereby said inserts will become positioned between folded parts of the letter sheets, means for completing folding of the letter sheets to cause the same to embrace the inserts placed within them, means for producing envelope blanks from a paper strip, envelope means to which the envelope blanks so produced are delivered, means for supporting each of the blanks with its inside face directed downwardly, means for bringing the folded letter sheets to a position below the downwardly-directed blank, means for elevating the letter sheets, envelope folding means and means for retracting the elevating means out of the path of said folding means.

4. In an apparatus for preparing mailing material as provided for in claim **3**, including means for supplying an address card and depositing the same on top of the folded letter sheet whereby the ascent of the folded letter sheet and its inserts with the card on top will bring the address card against the downwardly-directed inside face of the envelope blank.

5. In an apparatus for preparing mailing material, means for depositing an insert on a conveyor, means for depositing a second insert on top of the first insert, a letter sheet supply, means for forming a pair of spaced creases across a letter sheet fed from the letter sheet supply, folding means to which the letter sheet is guided to fold the letter sheet on one of the creases, means for inserting both of the inserts between parts of the partly folded letter sheet, means for folding the letter sheet on its second crease to thereby bring parts of the letter sheet in overlying relation to the inserts confined between folded parts of the letter sheet, means for depositing an address card on top of the overlying parts of the letter sheet, an envelope folding bed, an elevator, means for depositing the letter sheet and its contents on the elevator with the address card directed upwardly and toward the inner face of the envelope blank, means for raising the elevator to bring the letter sheet and its contents and the uppermost address card against the envelope blank, and means for folding the envelope blank about the letter sheet and its contents and the address card.

6. In an apparatus for preparing mailing material, at least one magazine for holding inserts, means for removing at least one insert from the bottom of said magazine and depositing said insert on a carrier, envelope supporting means on which an envelope blank is rested with its inside face disposed downwardly, means for moving said insert to bring the same into contact with the downwardly-directed inside face of said envelope blank, a two-part support for bringing the insert against the under side of the envelope blank and folding means for folding down one of the flaps of the envelope blank around the insert while the insert is supported by one of the parts of said support, and means for shifting said part to permit folding of a second flap.

7. In an apparatus according to claim 6, said envelope blank being provided with a window adapted to expose an address to view when said blank has been formed into a completed envelope.

8. In an apparatus for preparing mailing material at least two magazines for holding a plurality of inserts, means for successively removing said inserts from the bottoms of said magazines and depositing the inserts so removed in a superposed relation on a carrier, envelope supporting means on which an envelope blank is rested with its inside face disposed downwardly, means for moving the inserts to bring same into contact with the downwardly directed inside face of the envelope blank, a two part support for bringing the inserts against the under side of the envelope blank and folding means for folding down one of the flaps of the envelope blank around the inserts while the same are supported by one of the parts of the support, and means for shifting said part to permit the folding of a second flap to form a finished envelope.

9. In an apparatus according to claim 8, the improvement which comprises the provision of a printing means whereby addresses are automatically printed on the outside of said finished envelope.

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