Oct. 15, 1963 L. B. LARSON 3,106,877

ATTACHMENTS FOR ENVELOPE HANDLING MACHINE

Filed Aug. 14, 1962 2 Sheets-Sheet 1

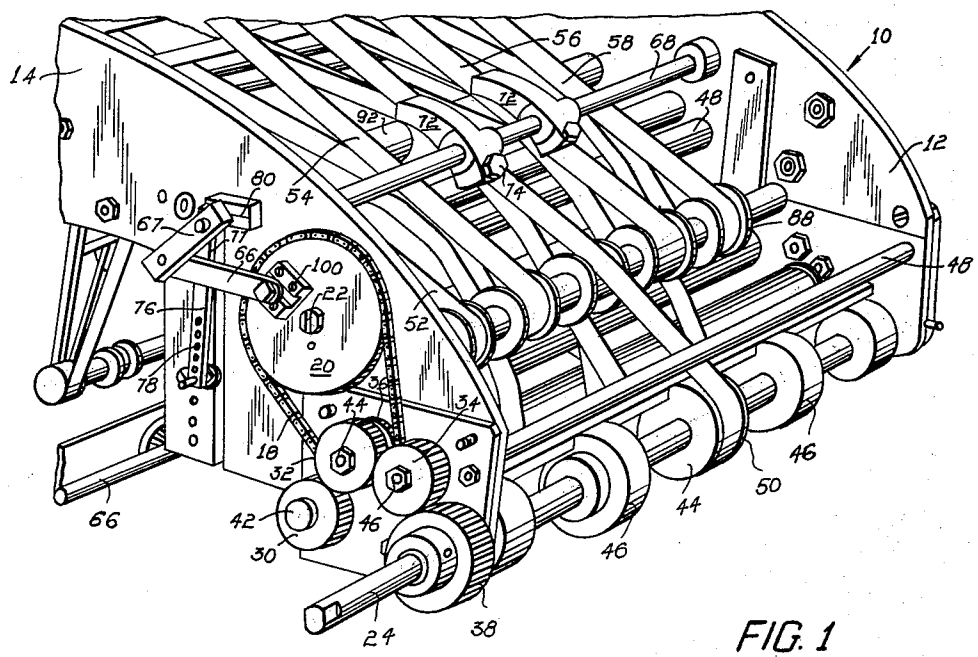


FIG. 1

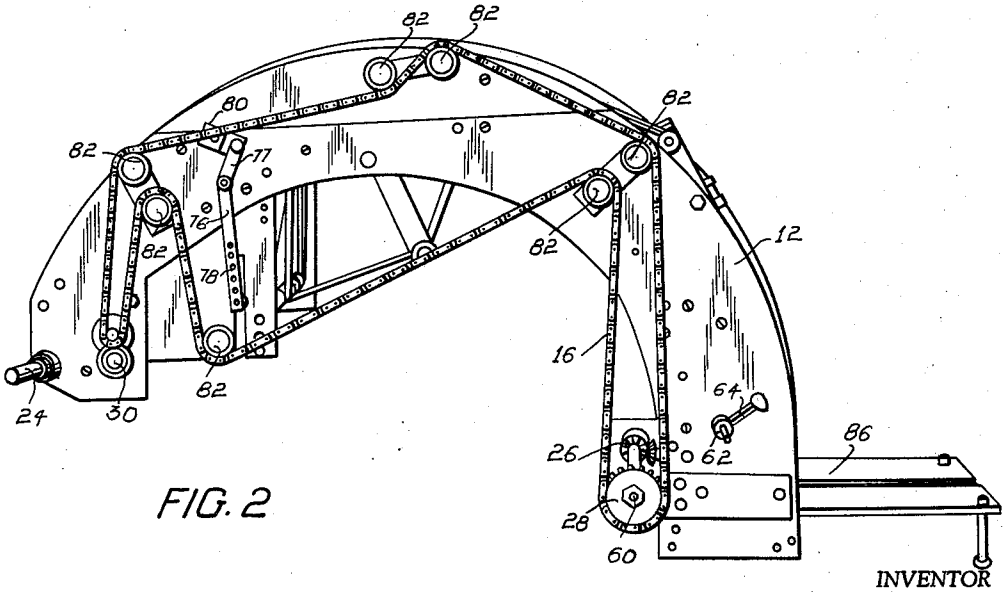


FIG. 2

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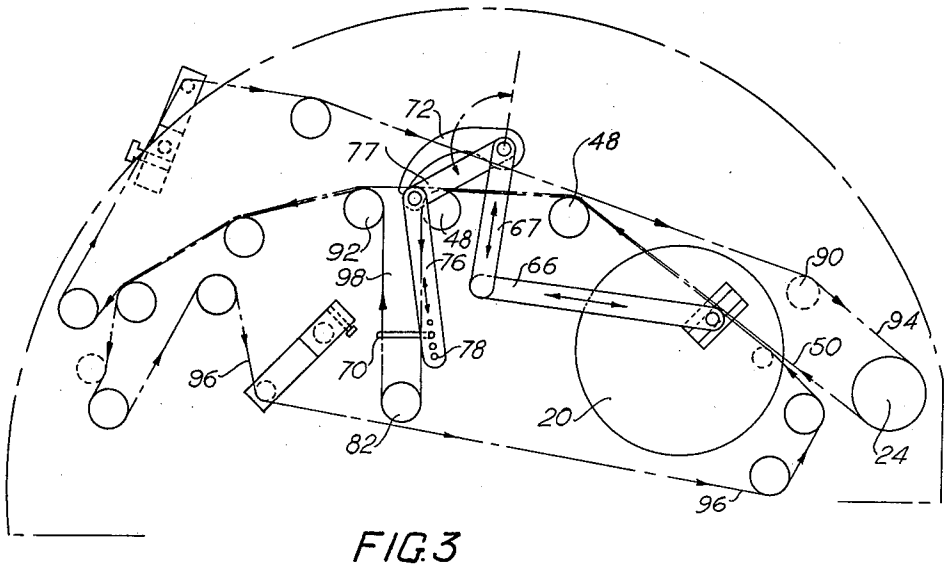


FIG. 3

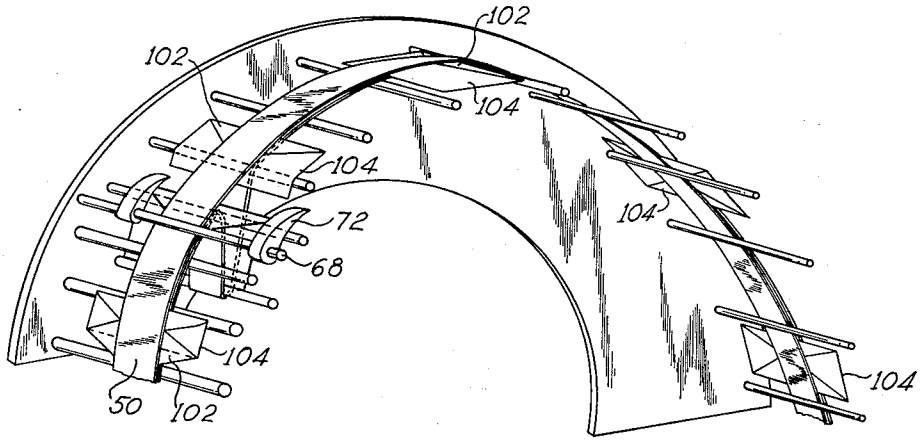


FIG. 4

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ATTACHMENTS FOR AN ENVELOPE HANDLING MACHINE

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4 Claims. (Cl. 93—62)

The present application relates to attachments for an envelope handling machine, particularly an attachment wherein the envelope is reversed in its direction of travel so as to fold the envelope flaps reversely upon the front of the envelope.

Numerous previous inventors have developed attachments for envelope handling machines wherein a plurality of folding, addressing, stamping and other manual functions may be performed automatically. Heretofore, reverse flap folding of large numbers of envelopes in order that they may be stuffed or filled has presented a particularly burdensome sequence in an envelope mailing operation. Inventor Novick (1,734,742) is typical of the art wherein a deflecting blade is utilized together with compressing rollers to fold back an envelope flap. As the envelope continues in the same direction of travel. According to the present invention, complex parts and easily damaged moving parts are eliminated and means are provided for reversing the direction of travel of the envelope in a horizontal path of conveyance while retaining its flap so that as the envelope is reversed in travel its flap is folded back on its reverse side. Top and bottom driving belts are supported conventionally in a housing upon transverse rollers so that the abutting tangential portions of the belts define a path for horizontal conveyance of the envelope. This reversal of flow or travel is performed by supporting one belt roller vertically spaced beneath the horizontal path of conveyance and above the bottom belt so as to define a medial cul de sac. The retaining of the envelope flaps during vertical travel of the envelope body into and out of the cul de sac is by a plural finger means attached to a cam which is synchronized with the belt driving means. As the bottom of envelope body touches the bottom of the cul de sac, a lifting arm returns to the top of the envelope body to the horizontal path for conveyance, the retained flap being reversely folded against the envelope body as the top of the envelope body leads through the path for conveyance.

Accordingly it is an object of invention to provide an apparatus for reversely folding envelope flaps without employing complex parts.

Another object of invention is to provide an apparatus for uninterruptedly handling a volume of envelopes while reversely folding their flaps.

Another object of invention is to provide an apparatus for changing the direction of travel of an envelope during continuous conveyance.

Yet, additional objects of invention will become apparent from the ensuing specification and attached drawings wherein:

FIG. 1 is a fragmentary, enlarged perspective of the receiving end of the machine, showing flap engaging fingers **72** and envelope lifting arm **76**.

FIG. 2 is a rear elevation of the entire attachment, showing chain driving means engaging the driving rollers, and a delivery table **86** supported at the exit end;

FIG. 3 is a front schematic view showing travel of the envelope between top driving belt **94** and lower driving belt **96** defining the path of horizontal conveyance and into the cul de sac defined by rollers **82** vertically spaced from the path and engaging the top of lower driving belt **96**; and

FIG. 4 is a rear perspective with the rear plate removed, showing the travel of the envelope body bottom leading through the path of horizontal conveyance, into the cul de sac and travel body top leading out of the cul de sac and back into the path with flap **102** reversely folded.

In FIG. 1 envelope handling machine attachment **10** is illustrated as comprising a rear plate **12** and front plate **14** which define a semi circular housing. A rear chain drive means **16** is shown as engaging driving sprockets **82** which are attached in turn to a plurality of horizontal shafts upon which flanged pulleys **88** are attached for engaging the top and bottom driving belts. As illustrated in FIGS. 3 and 4 an envelope **104** is presented between top driving belt **94** and lower driving belt **96** at point **50** and is thence conveyed by driving belts **52**, **54**, **56** and **58** through the path of horizontal conveyance in the housing. A cul de sac generally designated as **98** is provided medially of the horizonal path by the positioning of roller **82** vertically spaced beneath the general path of conveyance and engaging the top of belt **96**.

Power is supplied by driving shaft **24** which has attached thereto flanged pulleys **44** and **46**. Spur gear **38** attached to shaft **24** drives corresponding spur gears **30**, **32** and **34** secured respectively to horizontal shafts **42**, **44** and **46**. Also attached to shaft **44** is sprocket **36** about which is encompassed chain **18** in turn driving cam **20** which is secured to shaft **22**.

At the exit end of the housing sprocket **28** attached to shaft **60** is driven also by chain **16** and drives mitre gears **26** to which may be attached envelope receiving machinery, for example a counter or the like. Also, one or more envelope guide wires **62** may be supported transversely at the end of the housing for actuation by lever **64**. Cam adjusting piece **100** is eccentrically positioned upon cam **20** by means of screws or the like and is connected to shaft **68** by means of drive links **66** and **67**. Attached medially of shaft **68** by means of machine bolts **74** are the flap engaging fingers **72**.

As illustrated in FIG. 2 a cam **80** is secured at the end of shaft **68**, lifting arm **76** being connected to cam **80** by means of intermediate links **77**. At the bottom of lifting arm **76** a plurality of apertures **78** are provided for vertical positioning of limit pieces **70** which are thus adjustable to the width of the envelope being handled.

A plurality of feeder and guide bars **48** may be transversely positioned throughout the apparatus.

During operation as cam **20** is caused to rotate, cam fingers **72** are reciprocally pivoted into and out of contact with roller **48** at the entry of cul de sac **98**. Also, a sequential and vertical reciprocating movement is imparted to lifting arm **76**.

As envelope **104** is conveyed body bottom leading to the entry edge of cul de sac **98** the envelope is urged by fingers **72** downwardly into cul de sac **98** body bottom leading. Simultaneously, fingers **72** press and retain trailing envelope flap **102** against roller **48** as envelope **104** body bottom touches limit pieces **70**, lifting arm **76** is raised while fingers **72** still retain flap **102**. Then, envelope **104** body leading top is urged back into the path of conveyance over roller **92** as fingers **72** release the flap **102** which is folded reversely between the driving belts. Thus, the direction of travel of envelope **104** is effectively reversed while flap **102** is folded backwardly of the envelope. Manifestly, depending upon the side which the envelope is presented to the apparatus, the flap may be folded either reversely, or conventionally on the back of the envelope. Envelope **104** continues to travel through the path of conveyance and into delivery table **86** where conventional spirals may be employed for receiving of the envelope in a convenient upstanding posi-

tion. A counter (not illustrated) may be operated by a finger which engages the moving envelope and in turn moves a toothed sprocket operating the counting device.

As will be apparent, invention basically comprises means for reversing the direction of travel of the envelope while retaining the envelope flap so that the envelope flap trails the envelope and is folded reversely thereof. Manifestly, various changes in driving members, positioning of belts and the like, may be employed without departing from the spirit and scope of invention as defined in the subjoined claims.

I claim:

1. An envelope handling machine comprising:

(*a*) a housing;

(*b*) a plurality of rollers transversely supported in said housing;

(*c*) at least two belts supported on several of said rollers one above the other so that an abutting portion of the path of rotation defines a path for horizontal conveyance of envelopes;

(*d*) means driving said rollers;

(*e*) a lower roller vertically spaced beneath said path for horizontal conveyance and engaging the top of the lower of said belts so as to define a cul de sac in said path for horizontal conveyance;

(*f*) cam finger means reciprocable into and out of said path against the roller nearest the entrance of said cul de sac, so as to retain an envelope flap against said roller as the envelope descends vertically into said cul de sac; and

(*g*) a lifting arm linked to said cam and supported transversely of said housing at the bottom of said cul de sac, said lifting arm reciprocating vertically with said cam so as to lift said envelope back into said path for said horizontal conveyance.

2. An envelope machine as in claim 1, said lifting arm being vertically adjustable to the width of said envelope.

3. An envelope handling machine as in claim 2, including means synchronizing said cam finger means and said lifting arm so that lifting of said envelope occurs sequentially of retaining of said flap by said cam finger means.

4. An envelope handling machine as in claim 3 including a delivery table supported at the exit of said path for horizontal conveyance.

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