

March 5, 1963

V. POLIDORI, JR

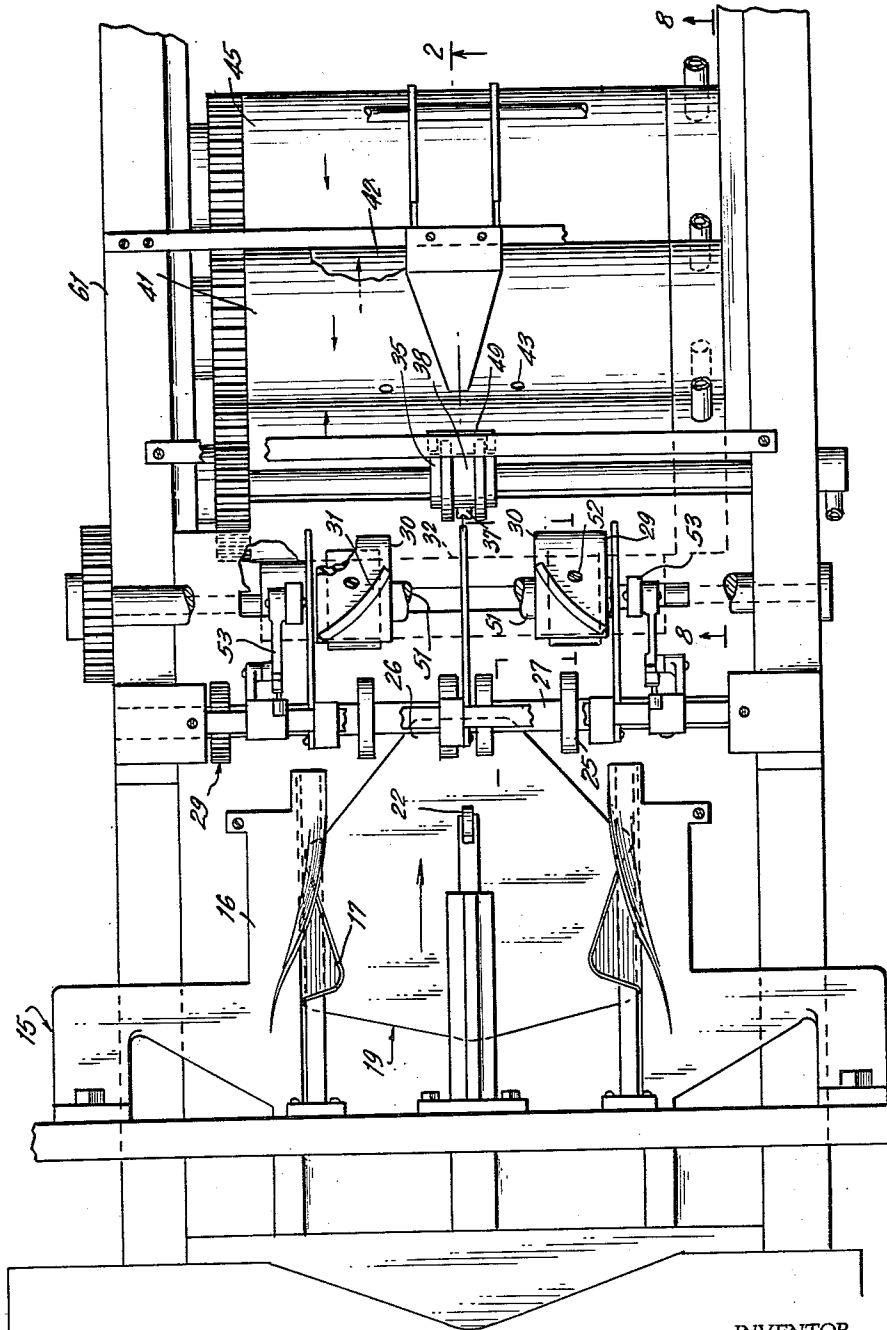
3,079,847

BLANK FOLDING AND GLUING DEVICE

Filed May 28, 1962

6 Sheets-Sheet 1

FIG. 1



2

INVENTOR.
VINCENT POLIDORI, JR.
BY *Albert F. Korman*
ATTORNEY

March 5, 1963

V. POLIDORI, JR

3,079,847

BLANK FOLDING AND GLUING DEVICE

Filed May 28, 1962

6 Sheets-Sheet 2

FIG. 2

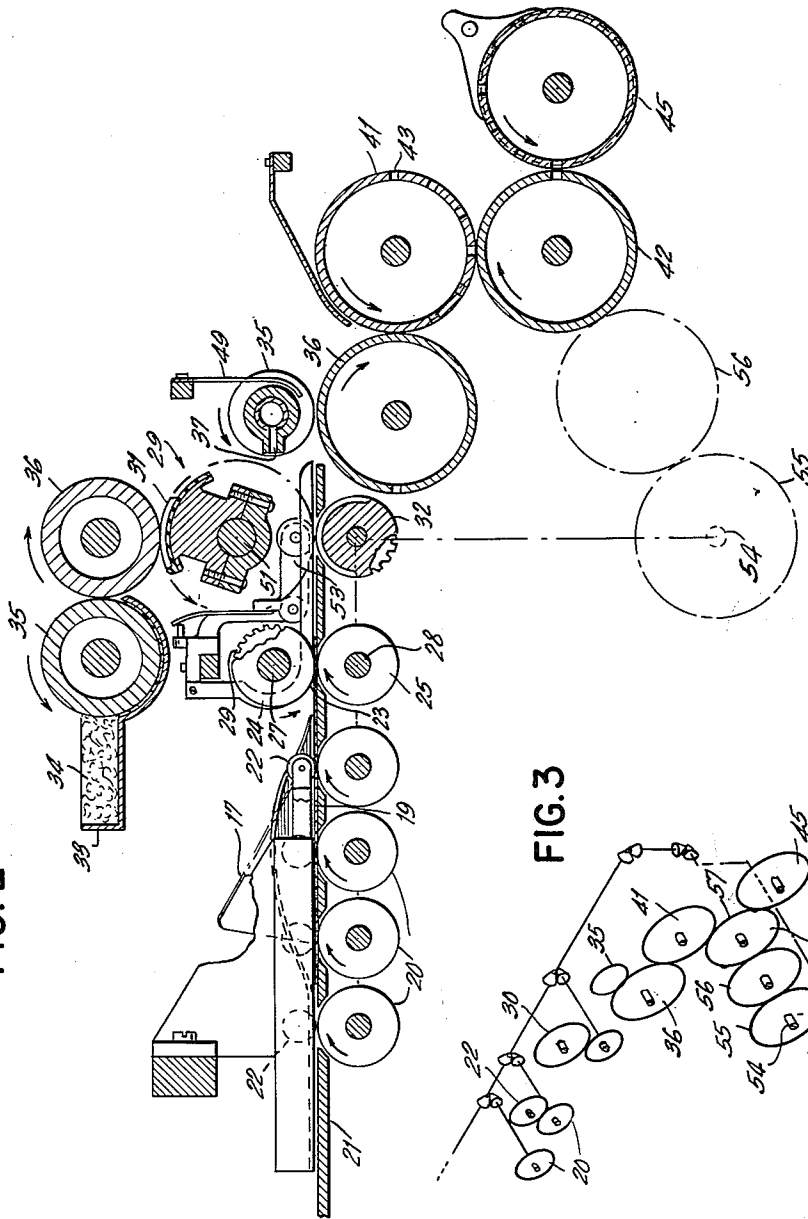
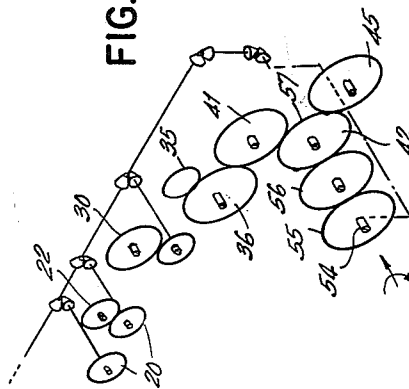


FIG. 3



INVENTOR.
VINCENT POLIDORI, JR.
BY *Albert F. Kronman*
ATTORNEY

March 5, 1963

V. POLIDORI, JR

3,079,847

BLANK FOLDING AND GLUING DEVICE

Filed May 28, 1962

6 Sheets-Sheet 3

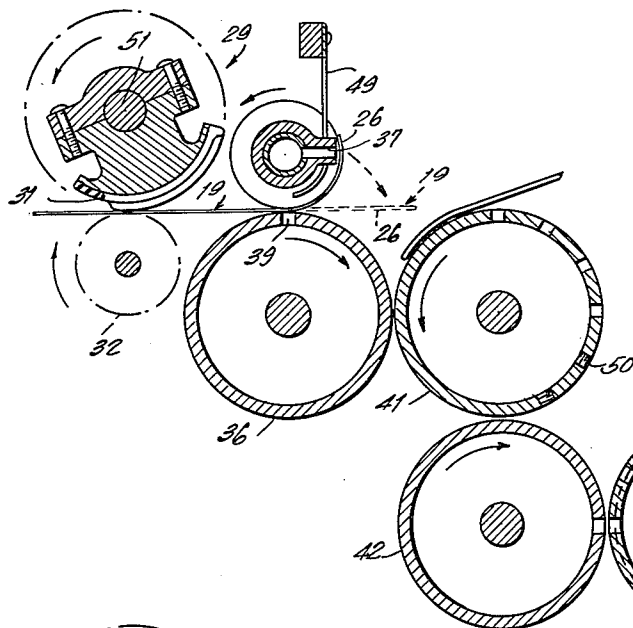


FIG. 4

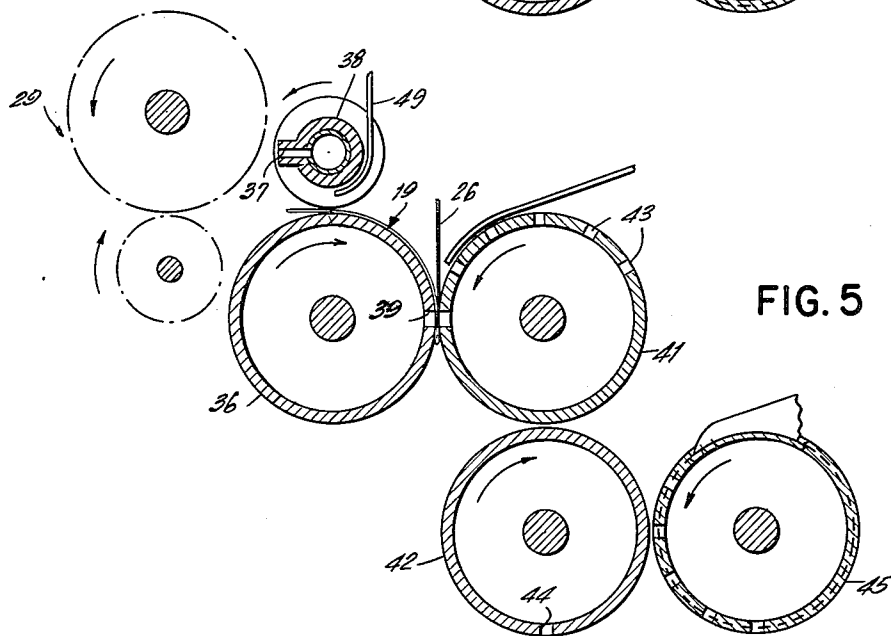


FIG. 5

INVENTOR
VINCENT POLIDORI, JR.
BY *Albert F. Korman*
ATTORNEY

March 5, 1963

V. POLIDORI, JR

3,079,847

BLANK FOLDING AND GLUING DEVICE

Filed May 28, 1962

6 Sheets-Sheet 4

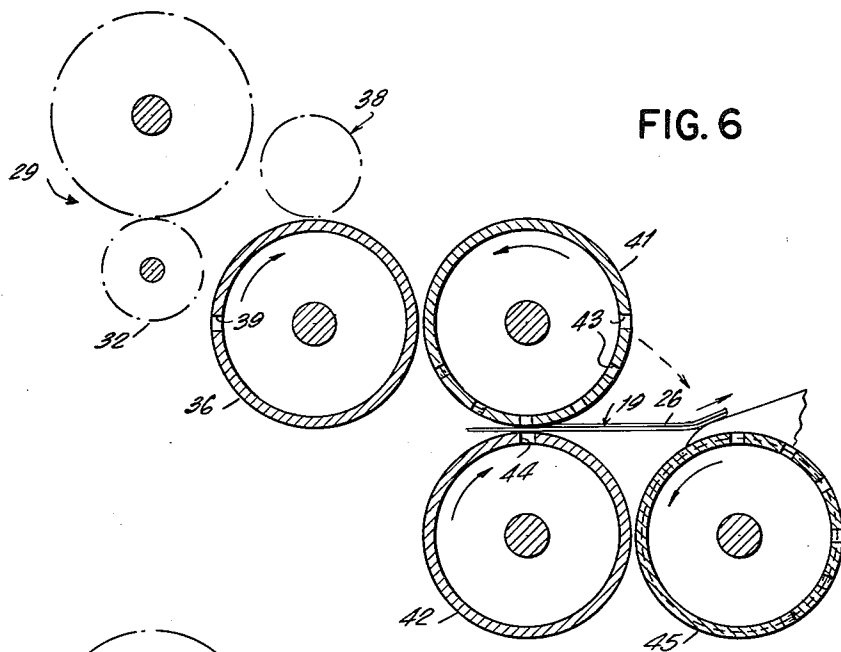


FIG. 6

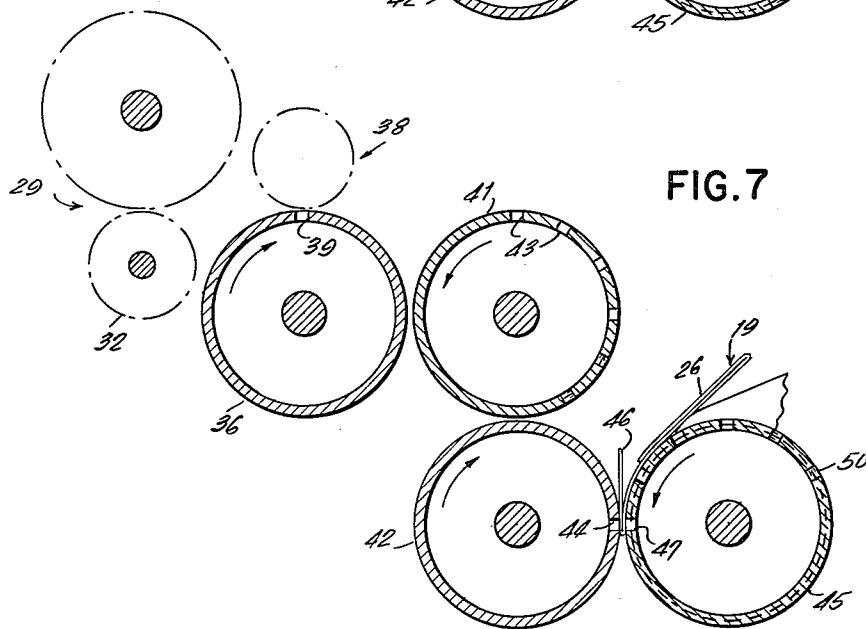


FIG. 7

INVENTOR
VINCENT POLIDORI, JR.
BY *Albert F. Korman*
ATTORNEY

March 5, 1963

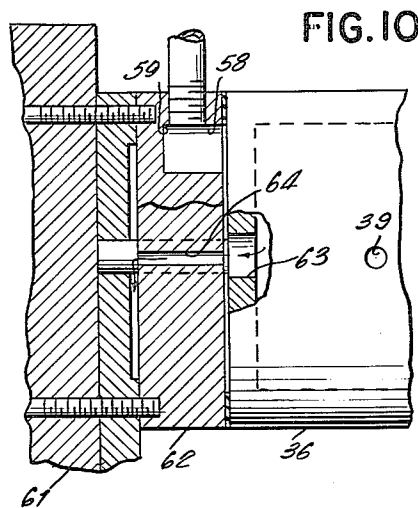
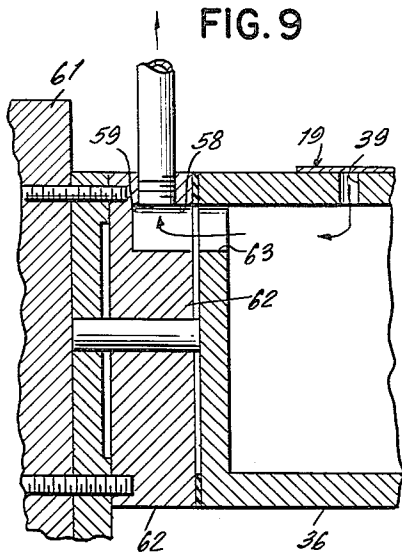
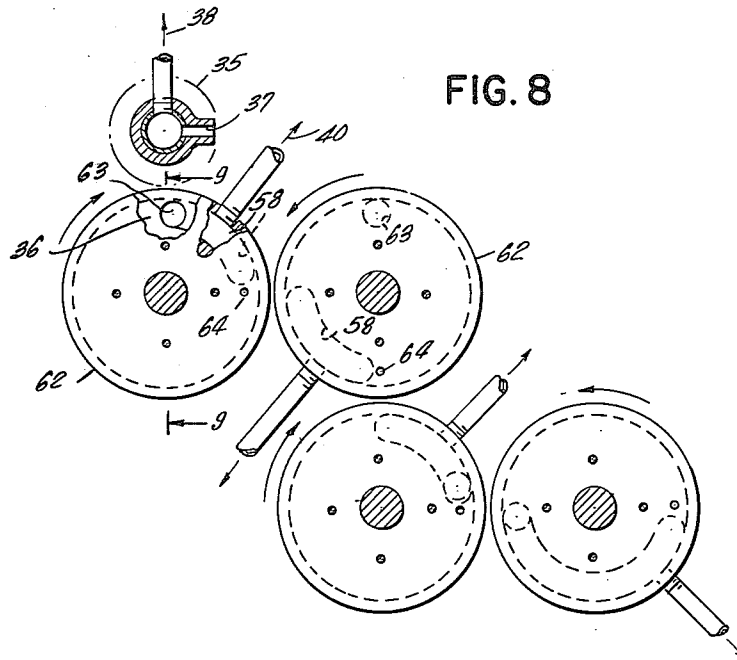
V. POLIDORI, JR

3,079,847

BLANK FOLDING AND GLUING DEVICE

Filed May 28, 1962

6 Sheets-Sheet 5



INVENTOR
VINCENT POLIDORI, JR.
BY *Albert T. Korman*

ATTORNEY

March 5, 1963

V. POLIDORI, JR

3,079,847

BLANK FOLDING AND GLUING DEVICE

Filed May 28, 1962

6 Sheets-Sheet 6

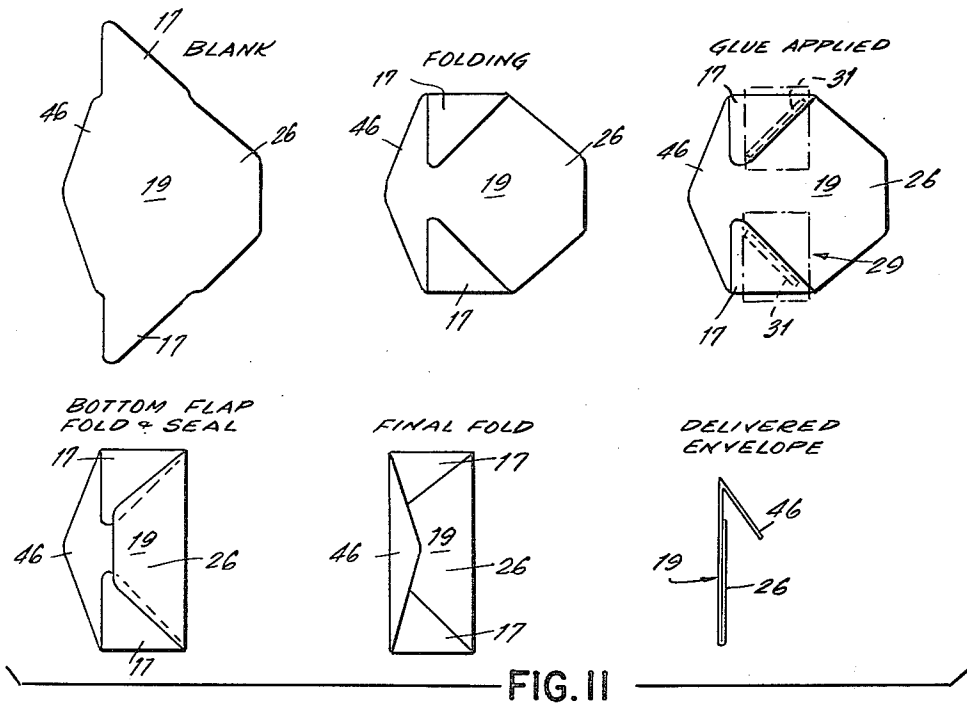


FIG. 12

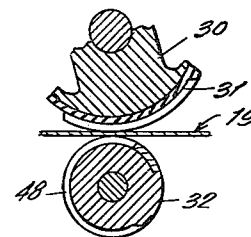
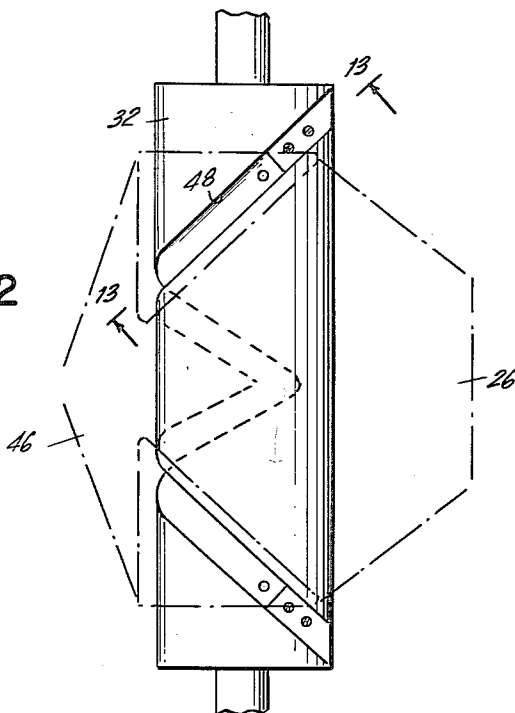


FIG. 13

INVENTOR
VINCENT POLIDORI, JR.
BY *Albert H. Korman*
ATTORNEY

1

3,079,847

BLANK FOLDING AND GLUING DEVICE

Vincent Polidori, Jr., Dumont, N.J., assignor to Commercial Envelope Mfg. Co., Inc., Bronx, N.Y., a corporation of New York

Filed May 28, 1962, Ser. No. 198,037

5 Claims. (Cl. 93-62)

This invention relates to a machine for folding and gluing blanks traveling at high speeds to form envelopes.

In the manufacture of envelopes, blanks are cut from a continuous web of paper at extremely high speeds. Thereafter, it is necessary to fold, apply glue to and seal the flaps of the blanks to form an envelope without interrupting the high speed flow of the blanks. Paper traveling at high speeds will behave in a wide variety of ways as it passes through a machine, depending upon variations in thickness, composition, humidity, etc.

Accordingly, it is an object of the present invention to form envelopes of blanks at speeds and with product dependability heretofore unknown.

Another object of the present invention is to provide a machine which is simple in structure and adapted to fit on the dispensing end of a blank cutting machine.

Another object of the present invention is to provide a machine which will operate accurately and without the need for adjustment for variations in paper conditions or characteristics.

An object of the present invention is to provide an envelope making machine which will lend itself to the manufacture of a large variety of envelope sizes.

A further object of the present invention is to provide an envelope making machine which will operate for long periods without requiring attention.

A feature of the present invention is its use of a series of rollers having suction gripping means for handling the envelope blank in its passage through the machine.

Another feature of the present invention is its use of rollers for folding the bottom flaps and seal flaps of the envelope blank in a continuous high speed operation.

Still another feature of the present invention is its use of rollers and suction means whereby the blank is always held in positive relationship as it passes through the machine.

The invention consists of the construction, combination and arrangements of parts, as herein illustrated, described and claimed.

In the accompanying drawings, forming a part hereof is illustrated one form of embodiment of the invention, in which drawings similar reference characters designate corresponding parts, and in which:

FIGURE 1 is a top plan view of a blank folding and gluing machine according to the present invention.

FIGURE 2 is a longitudinal section taken on line 2-2 in FIGURE 1.

FIGURE 3 is a somewhat diagrammatic view of the drive mechanism of the machine shown in FIGURES 1 and 2.

FIGURE 4 is a fragmentary longitudinal section of the blank gluing and feeding rollers showing the beginning of the bottom flap folding operation.

FIGURE 5 is a view similar to FIGURE 4 showing the completion of the bottom flap folding operation.

FIGURE 6 is a view similar to FIGURES 4 and 5, showing the start of the seal flap folding operation.

FIGURE 7 is a view similar to FIGURE 6 showing the completion of the sealed flap folding operation.

FIGURE 8 is a view taken on line 8-8 in FIGURE 1 showing the suction valve ports in dashed lines.

FIGURE 9 is a cross-sectional view taken on line 9-9 in FIGURE 8.

FIG. 10 is a view similar to FIGURE 9, showing the

2

roller with the vacuum port connected to atmospheric pressure.

FIGURE 11 illustrates the steps in the folding and gluing of an envelope from an envelope blank.

FIGURE 12 is a top plan view of the flap gluing pressure roller.

FIGURE 13 is a section taken on line 13-13 in FIGURE 12.

Referring to the drawings and specifically to FIGURES 1 and 2, 15 indicates the dispensing end of an envelope blank cutting machine such as is well known in the art. The blank cutting machine also includes a section for applying glue to the seal flap of the envelope blank and drying it before it is fed out of the machine. A folding throat 16 is secured at the dispensing end 15 of the blank cutting machine and serves to fold the side flaps 17 of the blank 19 inwardly so as to overlie the body portion 18 of the blank as shown at "folding" in FIGURE 11.

A plurality of feed rollers 20 disposed beneath the table 21 of the dispensing end of the blank cutting machine (best shown in FIGURE 2) together with pressure rollers 22 carried above the table 21, serve to drive the envelope blanks 19 into the bite 23 of a pair of gripping rollers 24, 25. The gripping rollers 24, 25, seize the leading end of the bottom flap 26 of the envelope blank 19 as it leaves the dispensing end 15 of the blank cutting machine. The gripping rollers 24, 25, are secured to shafts 27, 28, respectively. The shafts 27, 28, are in turn rotated by spur gears 29, connected to a source of power (not shown).

The gripping rollers 24, 25, drive the envelope blanks 19 into a gluing station 29. The gluing station 29 applies a metered amount of glue to the inclined surface of the side flap 17 along an area spaced from the slanted margin thereof. The glue applying operation is clearly shown in FIGURE 11 at "glue applied." Spaced glue applying rollers 30 within the gluing station 29 are provided with suitably shaped pads 31 to conform to the margins of the side flaps 17. Glue is transferred to the pads 31 from a reservoir 33, best shown in FIGURE 2, which may consist of a sponge or other glue retaining member 34. Glue transfer rollers 35, 36, serve to take a desired amount of glue from the sponge 34 and carry it to the pads 31 on the glue applying roller 30. Since the pads 31 occupy only a portion of the periphery of the glue applying roller 30, only the side flaps 17 requiring glue will be supplied with it during each rotation of the rollers 30. The remainder of the blank 19 will be driven through the gluing station 29 and into the first set of envelope folding rollers 35, 36.

A backup roller 32, best shown in FIGURES 12 and 13, is disposed beneath the glue applying roller 30, and supports the side flaps as the pads 29 are brought into contact with them. The backup roller 32 is cut away as indicated at 43.

The top first folding roller 35 is provided with a ported nozzle 37 disposed within a reduced portion 38 of the top roller 35. The ported nozzle 37 is connected to a source of vacuum as indicated by the arrow 38 in FIGURE 8.

As the bottom flap 26 is driven through the rollers 35, 36, the nozzle 37 is brought into contact with the bottom flap 26, and, as the roller 35 rotates, lifts the bottom flap 26 as shown in FIGURE 4. Flap stripping arms 49 are carried by the folding machine on each side of the nozzle 37 as shown in FIGURES 1, 2, 4 and 5. The bottom first folding roller 36 is also provided with a port 39, which is connected to a source of vacuum indicated by the arrow 40 in FIGURE 8. As the nozzle 37 raises the bottom flap 26 to the position shown in FIGURE 4, the port 39 grasps the body of the envelope blank 19 and carries it downwardly in the direction of the arrows shown

in FIGURES 4 and 5, into the bite between the rollers 36 and 41. The suction of the vacuum 38 applied to the port 37 is broken by the arms 49 shortly after the envelope blank is grasped by the port 39. The bottom flap will then swing into the position shown in dashed lines in FIGURE 4. As the blank 19 is carried down between the rollers 36, 41, the bottom flap 26 will be folded back upon the side flaps 17 in the manner shown at "bottom flap fold and seal" in FIGURE 11, and the bottom flap 26 will be glued to the side flap 17.

The roller 41 constitutes the top roller of a second pair of folding rollers 41, 42. The roller 41 is provided with a series of ports 43 which are internally threaded to receive plugs 50. In this manner any one or more of the ports 43 can be brought into contact with the envelope blank 19 as they move past the bites of the rollers 36, 41, to adapt the machine to a variety of envelope sizes. The ports 43 are connected to a suitable source of vacuum so that the envelope blank 19 is securely held by the roller 41 as it is driven into the next folding operation. After the port 39 leaves the bite between the rollers 36, 41, the vacuum source to the port 39 is cut off and the envelope blank 19 is under the positive control of the roller 41.

The roller 41 carries the blank 19 between the rollers 41 and 42, as shown in FIGURE 6. The roller 42 is provided with a port 44, which is connected to a suitable source of vacuum as shown in FIGURE 8. When the port 44 reaches the bite between the rollers 41, 42, the vacuum source to the ports 43 is cut off and the control of the envelope blank 19 is taken over by the port 44. It will be seen from an examination of FIGURE 6 that the port 44 reaches the bite of the rollers 41, 42, at a time when the trailing end of the envelope blank 19 is between the rollers 41, 42. The port 44 carries the trailing end of the envelope blank 19 downwardly and between the rollers 42, 45, to perform the final folding operation of doubling the top seal member 46 back upon the body portion 18 of the envelope blank 19. The roller 45 is provided with a series of threaded ports 47 which are connected to a suitable source of vacuum as indicated at FIGURE 8. The ports 47 may be closed by plugs 50 to accommodate different envelope sizes. The ports 47 come into contact with the folded envelope blank 19 at the bite between the rollers 42 and 45. Thereupon, the vacuum in port 44 is cut off and the control of the envelope is taken over by the ports 47 which carry the envelope downwardly into some suitable receptacle (not shown). It will be noted that throughout the folding operation the envelope blank at no time is free from positive control by one or more of the folding rollers. The envelope blank therefore is positively carried through the folding operation and must remain in position despite variations in thickness, nature of the paper, or such factors as humidity, temperature etc.

The envelope folding and gluing machine is capable of adjustment to receive a wire variety and number of envelope sizes. As shown in FIGURE 1, the glue applying rollers 30 may be worked laterally upon the shaft 51 by loosening screws 52 until the rollers 30 can slide on the shaft 51. The shaft is carried upon the supports 61 forming the frame of the machine. The pads 31 can thus be aligned so as to bring them into registration with the side flaps 17. The guide rollers 53 on each side of the glue applying roller 30 can also be adjusted as required.

The manner in which the machine is driven from a power source (not shown) is best illustrated in FIGURES 1 and 3. The rotary power supplied by a motor or a suitable power source is applied to a shaft 54 which is connected by suitable gearing to drive the feed rollers 20, the pressure rollers 22, and the glue applying roller 30. The glue applying roller gear 55 is shown in FIGURE 1 at the top thereof. The shaft 54 also delivers power through a gear train indicated at 55, 56 and 57, to the folding roller 42, the folding roller 45 and the folding

roller 41. In this manner all of the operations of the machine are kept in synchronous relationship.

The manner in which the vacuum to the ports of the folding rollers is controlled is illustrated in FIGURE 8 from which it will be seen that the hollow rollers are held against the blocks 62 provided with arcuate recesses 58 at the ends thereof which communicate with openings 59 connected to a source of vacuum (not shown). A bore 63 in the end of the rollers rotates past the recesses 58. As the bores 63 turn past the recesses 58 they operate as valves and the vacuum is applied or cut off from the ports in the rollers. In addition to cutting off the vacuum the bores 63 are also brought into register with opening 64 (best shown in FIGURE 10) which passes through the block 62 and communicates with atmospheric pressure to abruptly terminate the vacuum within the rollers.

From the foregoing it will be seen that there has been provided a highly efficient, versatile, simplified mechanism for applying glue and folding envelope blanks to form complete envelopes. The device is easy to adjust and maintain in repair for long periods of operation. The envelope blanks by reason of the simplicity of the folding structure are able to travel therethrough at extremely high speeds. Since the blank is always under the control of one or more suction ports as it traverses the machine it never moves out of the desired alignment and orientation.

Having thus fully described the invention, what is claimed as new and desired to be secured by Letters Patent of the United States, is:

1. A machine for folding and gluing envelope blanks coming from a constant feed source having a throat for interfolding the side flaps of the envelope blank and delivering the blanks with the bottom flap as the leading portion thereof comprising a support, spaced glue applying rollers carried by the support to receive the blank, backing rollers beneath the glue applying rollers, a first pair of folding rollers comprising a top roller and a bottom roller to receive the blank from the gluing rollers, a source of vacuum connected to the top roller, a port in said top roller in communication with the vacuum source to grasp the bottom flap, a source of vacuum connected to the bottom roller, a port in said bottom roller in communication with the vacuum source, valve means to apply the vacuum in the bottom roller to the said port at a predetermined portion of the blank at a distance from the end thereof and while the bottom flap is still grasped by the top roller port, a second pair of folding rollers adjacent the first folding rollers comprising a second top roller and a second bottom roller, said second top roller being disposed with respect to the first bottom roller so as to fold the blank bottom flap therebetween as it is carried downwardly by the travel of the first bottom roller, a source of vacuum connected to the second top roller, at least one port in the second top roller connected to the vacuum source, valve means to apply the vacuum in the second top roller to the said port as the port reaches the bite between the first bottom roller and the second top roller to grasp the folded portion of the blank and carry it between the second top roller and second bottom roller, a source of vacuum connected to the second bottom roller, a port in said second bottom roller connected to the vacuum source, said port being disposed within the second bottom roller to engage the sealing flap of the envelope blank as it passes through the bite of the second pair of folding rollers, a third folding roller adjacent the second bottom roller, a source of vacuum connected to the third roller, at least one port in the third roller connected to the vacuum source, valve means to continue the vacuum in the second bottom roller until it reaches the bite between the said second bottom roller and the third roller, valve means to apply the vacuum in the third roller to the port to grasp the envelope as it passes through the bite and is folded therein and means to drive the

gluing and folding rollers and operate the valves to provide a continuous gluing and folding operation.

2. A machine for folding and gluing envelope blanks coming from a constant feed source having a throat for interfolding the side flaps of the envelope blank and delivering the blanks with the bottom flap as the leading portion thereof comprising a support, spaced glue applying rollers carried by the support to receive the blank, glue dispensing pads on the said rollers, backing rollers beneath the glue applying rollers, a first pair of folding rollers comprising a top roller and a bottom roller to receive the blank from the gluing rollers, a source of vacuum connected to the top roller, a port in said top roller in communication with the vacuum source to grasp the bottom flap, a source of vacuum connected to the bottom roller, a port in said bottom roller in communication with the vacuum source, valve means to apply the vacuum in the bottom roller to the said port at a predetermined portion of the blank at a distance from the end thereof and while the bottom flap is still grasped by the top roller port, means to release the bottom flap from the top roller port, a second pair of folding rollers adjacent the first folding rollers comprising a second top roller and a second bottom roller, said second top roller being disposed with respect to the first bottom roller so as to fold the blank bottom flap therebetween as it is carried downwardly by the travel of the first bottom roller, a source of vacuum connected to the second top roller, at least one port in the second top roller connected to the vacuum source, valve means to apply the vacuum in the second top roller to the said port as the port reaches the bite between the first bottom roller and the second top roller to grasp the folded portion of the blank and carry it between the second top roller and second bottom roller, a source of vacuum connected to the second bottom roller, a port in said second bottom roller connected to the vacuum source, said port being

disposed within the second bottom roller to engage the sealing flap of the envelope blank as it passes through the bite of the second pair of folding rollers, a third folding roller adjacent the second bottom roller, a source of vacuum connected to the third roller, at least one port in the third roller connected to the vacuum source, valve means to continue the vacuum in the second bottom roller until it reaches the bite between the said second bottom roller and the third roller, valve means to apply the vacuum in the third roller to the port to grasp the envelope as it passes through the bite and is folded therein and means to drive the gluing and folding rollers and operate the valves to provide a continuous gluing and folding operation.

3. A machine according to claim 2 in which the first top folding roller is provided with a nozzle carried within a recessed portion of the roller and the release means comprise at least one arm adjacent the nozzle.

4. A machine according to claim 1 in which the valve means to control the vacuum to the rollers comprises a valve block secured to the support, a source of vacuum connected to the valve block, an arcuate vacuum receiving recess in the valve block extending for a portion of the distance around the face thereof and a bore in each of the rollers adjacent the recesses to permit the roller to be evacuated therethrough.

5. A machine according to claim 2 in which the backing rollers are cut away along their outer faces beneath the path of the glue dispensing pads.

References Cited in the file of this patent

UNITED STATES PATENTS

1,580,441	Parks	Apr. 13, 1926
1,713,243	Swab	May 14, 1929
2,746,364	Welsh	May 22, 1956
2,791,161	Doetsch	May 7, 1957