June 20, 1961 E. J. D. STRATTON ET AL 2,988,969

CONTINUOUS FORM ENVELOPES WITH GUMMED FLAPS AND METHOD OF MAKING SAME

Filed April 5, 1956 3 Sheets-Sheet 1

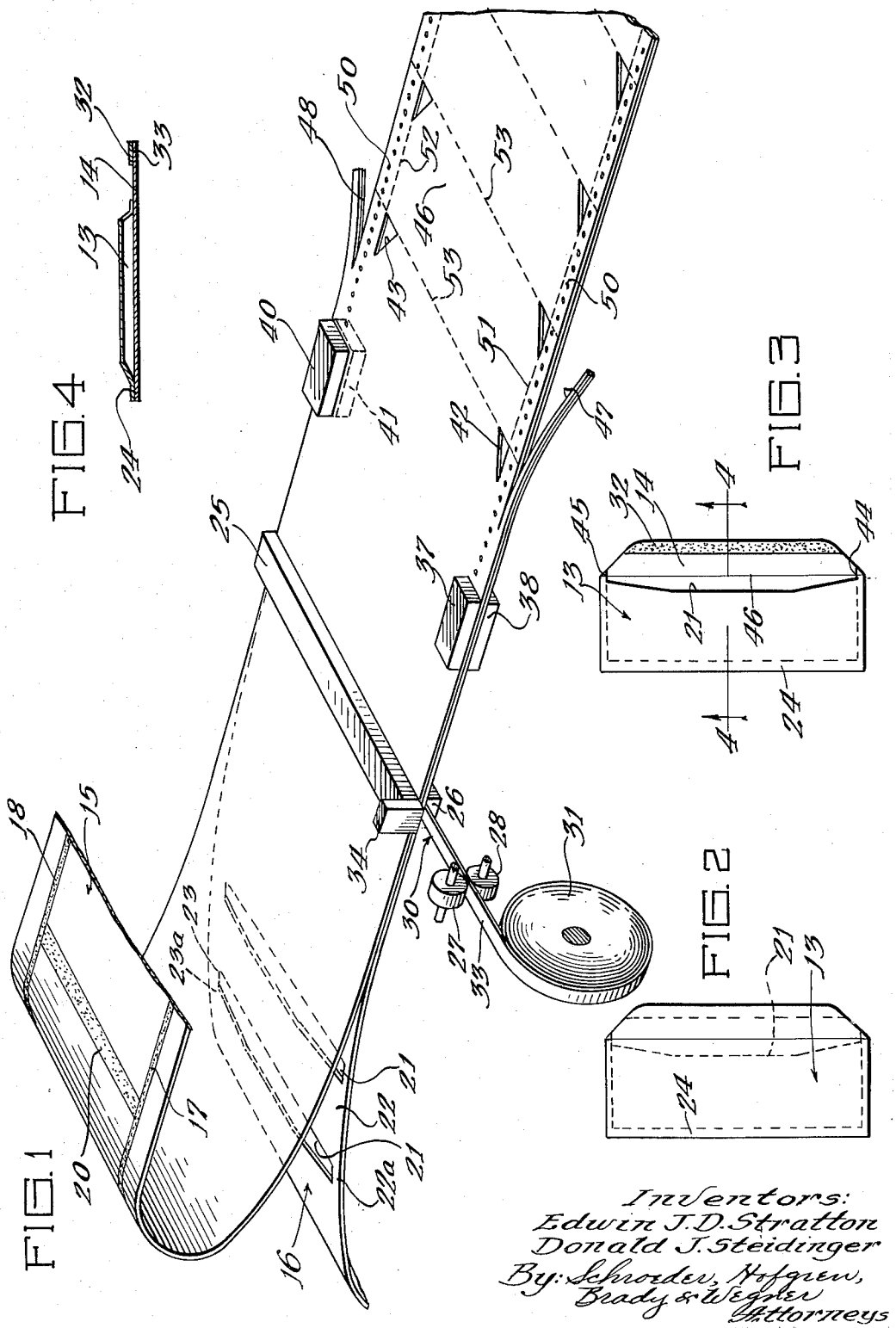


FIG. 1

FIG. 2

FIG. 3

FIG. 4

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3 Sheets-Sheet 2

FIG. 5

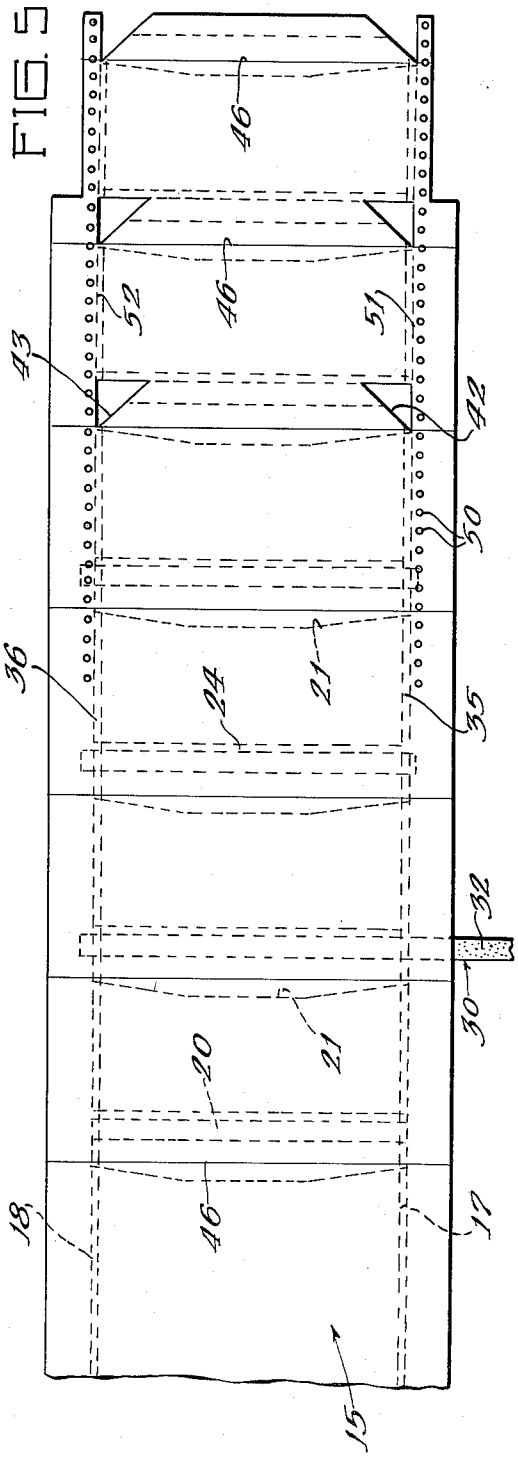
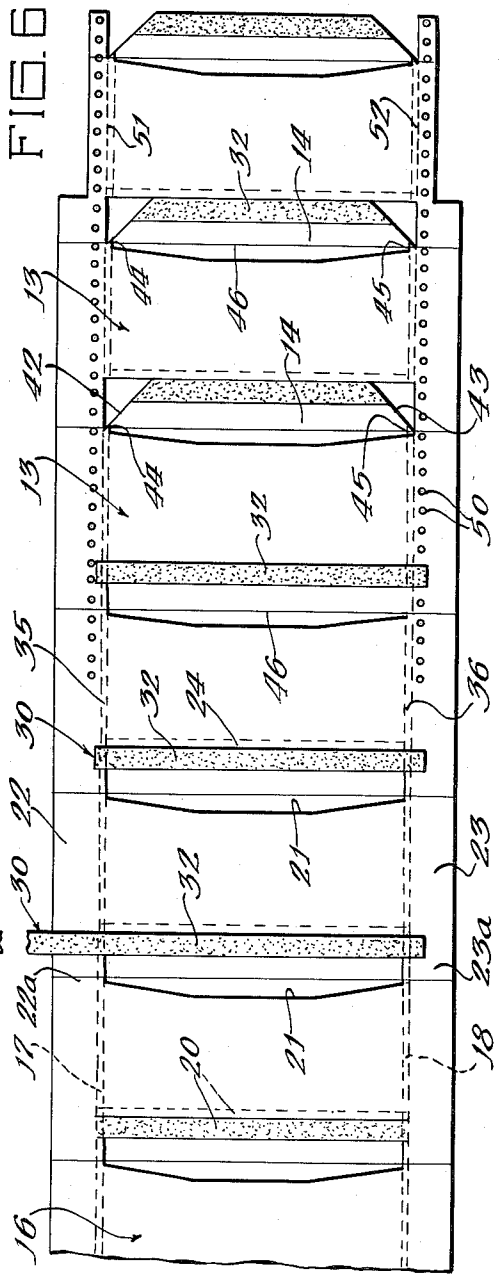


FIG. 6



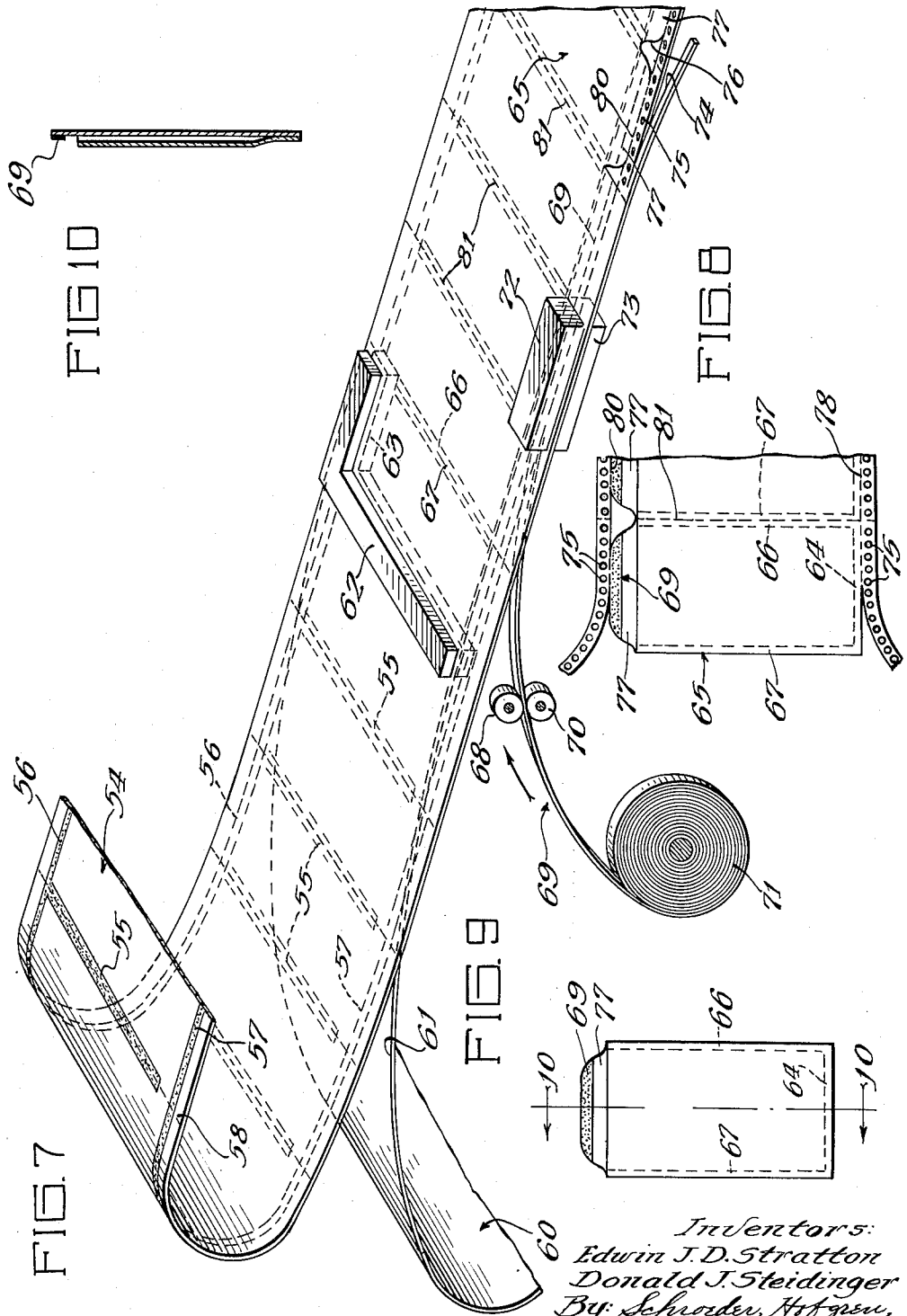
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3 Sheets-Sheet 3



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United States Patent Office 2,988,969
Patented June 20, 1961

2,988,969

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Filed Apr. 5, 1956, Ser. No. 576,478
8 Claims. (Cl. 93—61)

This invention relates to an assembly of series-connected envelopes, and more particularly to a method of applying adhesive to the closure flaps of such an assembly.

The primary object of the present invention is to provide a new and improved method of applying adhesive to the closure flaps of envelopes in continuous strip form. Heretofore, glue in a fluid state was deposited upon the closure flaps which necessitated a drying operation before the envelope strips were completed and ready for packaging and shipment. The present method eliminates this time consuming operation, and it simplifies and facilitates the formation of series-connected envelopes with sealing flaps.

Another object is to provide an improved method of forming top flap envelopes in continuous strip form.

A further object is to provide an improved method of forming an assembly of series-connected envelopes having sealing adhesive on their closure flaps.

Another object is to provide an envelope which has a closure flap having a strip of gummed tape heat-sealed thereon.

The preferred embodiment and the preferred method of the present invention are illustrated in the accompanying drawings, in which:

FIG. 1 is a diagrammatic perspective view illustrating the steps in the preferred method of forming an assembly of series-connected envelopes;

FIG. 2, a plan view of an envelope of the assembly showing its front portion;

FIG. 3, a plan view of the envelope of the assembly showing its back portion;

FIG. 4, a sectional view taken as indicated on line 4—4 of FIG. 3;

FIG. 5, a fragmentary plan view of the webs of envelope sheet material in juxtaposition showing the method steps in the formation of the envelope assembly;

FIG. 6, a plan view taken from the underside of FIG. 5;

FIG. 7, a diagrammatic perspective view illustrating the steps in the method of forming an assembly of side-flap, series-connected envelopes;

FIG. 8, a fragmentary plan view of a portion of the assembly of side-flap, series-connected envelopes;

FIG. 9, a plan view of a single, side-flap envelope; and

FIG. 10, a sectional view taken as indicated on line 10—10 of FIG. 9.

The assembly of envelopes formed by the method of the present invention is frequently used in modern automatic business machines, such as typewriters and addressographs, where it is desired to imprint addresses quickly and accurately upon a series of envelopes. Such envelopes in continuous strip form are economical, and their use results in great savings of time and labor, because the strip may be continuously fed through the business machine.

One of the embodiments and methods is illustrated by the diagrammatic view in FIG. 1 of an assembly of top flap envelopes in continuous form. In this assembly, a sealing adhesive is applied to the envelope flaps as the individual envelopes are being formed from a pair of juxtaposed webs of envelope sheet material. The webs are joined at appropriate places to form a series of alternately spaced, transversely extending envelope pockets **13** and envelope flaps **14**, as best seen in FIGS. 4 and 6. It is contemplated by the present invention that the assembly is contemplated by the present invention that the assembly of envelopes may be formed in some other manner, and that an adhesive be later applied to the closure flaps in accordance with the present disclosure.

The diagrammatic view in FIG. 1 illustrates the preferred method of forming the assembly of series-connected, top-flap envelopes. A pair of webs, generally designated **15** and **16**, of envelope sheet material are unwound from ordinary roll stock and superposed one on the other. One of the webs may have an entire face coated with a heat-sealing adhesive, or it may have bands of heat-sealing adhesive (sometimes simply called hot melt material) placed upon it by the location hot melt method, so that when the two webs are subjected to heat and pressure in appropriate places, they will be secured together to form the envelope pockets **13**.

In FIG. 1, the heat-sealing adhesive has been applied to the lower face of the web **15** by the location hot-melt method. It is preferred that the heat-sealing adhesive be placed so as to form a hot melt pattern including a pair of longitudinally extending bands **17** and **18**, and a series of relatively wide, transversely extending bands **20** which are spaced longitudinally of the web **15**. The size and position of the bands, of course, may be varied in accordance with the type and size of envelopes which are to be formed.

Before the two webs are brought into juxtaposition, the web **16** is successively die-cut at longitudinally spaced points, and a series of die-cut slugs are removed so that a number of similar transversely extending die-cut portions or openings **21** are formed in the web **16**. The die-cut portions **21** are preferably similar to each other and equidistantly spaced longitudinally of the web **16**. After the die-cut slugs are removed, a pair of longitudinally extending marginal edge portions **22** and **23** remains at the sides of the web **16** which forms a ladder-like configuration in the web **16** before it is brought together with the web **15**. The marginal edge portions at opposite ends of each of the die-cut portions **21** are left with sufficient width so that the web **16** will still have considerable strength and resistance to tearing as it is advanced with the web **15**.

As the webs **15** and **16** are brought together, they are positioned with respect to each other so that a transversely extending segment of each of the transverse bands **20** is exposed at the forward edge of each of the die-cut portions **21**, as best seen in FIG. 6. The marginal edge portions **22** and **23** are preferably positioned so as to cover each of the longitudinally extending side bands of adhesive **17** and **18**.

After the webs **15** and **16** have been correctly positioned against each other, they are advanced by a heat-sealing station which applies heat and pressure to the regions above and below the transverse band **20** to form a bottom **24** in each successive pocket **13**. As shown in FIG. 1, this heat-sealing station may include an upper heat-seal bar **25** extending transversely of the webs **15** and **16**, and positioned over a cooperating lower heat-seal bar **26**.

In the preferred method, envelope flap adhesive is applied to each successive envelope flap **14** at the same time that the bottom of each envelope pocket is formed. To this end, a pair of feed rolls **27** and **28** are provided adjacent the heat-seal bars **25** and **26** to feed lengths of tape **30** from a supply roll **31** transversely of the advancing webs **15** and **16**. The tape is preferably provided with a moisture sensitive adhesive **32** on its exposed face, and may have a heat-seal adhesive **33** on its sealed or flap-contacting face.

Although it is contemplated by the invention that the

webs may be continuously advanced, it is preferred that an intermittent drive be provided. Both the heat-seal bars **25** and **26** and the feed rolls **27** and **28** are operated in timed relation to the drive means advancing the webs **15** and **16**. Each time that the webs **15** and **16** start their forward advance, the heat-seal bar **25** is in its upward inoperative position, and the feed rolls **27** and **28** advance a tape length **30** to a position on the top face of the lower heat-seal bar **26**. The webs **15** and **16** are then brought to a halt so as to position one of the transverse bands **20** of heat-seal material between opposed faces of the bars **25** and **26**. At this time the portion of the transverse band **20** which is exposed at the forward edge of each of the die-cut portions **21** is positioned above the length of tape **30** resting on the lower heat-seal bar **26**.

The heat-seal bars **25** and **26** are then brought together, and heat and pressure is applied to the transverse band **20** of heat-seal adhesive to form the bottom **24** of the envelope pocket **13** and to adhere the length of tape **30** to the envelope flap **14**. As the heat-sealing operation is performed, a cutting member **34**, preferably operating in timed relation with the bars **25** and **26**, severs the length of tape **30** from the supply roll **31**.

At the same time that the bottom **24** of the envelope pocket **13** is being formed, additional heating elements may be provided to close sides **35** and **36** of that envelope pocket. This sealing operation is preferably performed by two pairs of heat-seal bars **37**, **38** and **40**, **41**, each pair of which is oppositely disposed above and below the side bands of adhesive **17** and **18**, respectively, in the marginal edge portions **22** and **23** of the envelope assembly, as best seen in FIG. 1. Preferably, the heat-seal bars **37**, **38** and **40**, **41** are spaced forwardly from the bars **25** and **26**, one envelope length in the envelope assembly. All three pairs of heat-seal bars, **25**, **26**, **37**, **38** and **40**, **41**, operate together and in timed relation to the intermittent advancement of the envelope assembly. Thus the continuous envelope assembly is advanced a predetermined distance, depending upon the size of the envelope being formed, the assembly is then stopped, and the cooperating heat-seal bars are pressed together to seal appropriate portions of the advancing webs, and successively form pockets **13**. Each pair of cooperating heat-seal bars is then moved apart, and the intermittent drive advances the envelope assembly another envelope length so that the process can again be repeated.

It is next preferred that the opposite ends of the envelope flaps **14** be die-cut as at **42** and **43** to give the desired shape to each flap. As best seen in FIG. 6, the die-cutting operation preferably produces a triangular opening and removes end portions of the flap **14** and tape **30** and small inner segments from the marginal edge portions **22** and **23**. The die-cut areas are preferably located so that a pair of projections **44** and **45** remain in the marginal edge portions **22** and **23** and extend across a line of fold **46** which is later impressed in each envelope of the assembly. In the completed envelope, as illustrated in FIGS. 2, 3 and 4, the projections **44** and **45** strengthen each individual envelope at the extremities of its line of fold **46**.

The ladder-like web **16** is most apt to be torn or broken prior to the time that it is joined to the web **15**. The web **16** generally tears at **22***a* or **23***a* in its marginal edge portions **22** and **23** at opposite ends of the die-cut portion **21**. For this reason it is desirable to maintain these marginal edge portions at **22***a* and **23***a* as wide as possible to lend added strength to the web **16**. The present method is particularly well adapted to assure this important feature since the die-cuts at **42** and **43** later remove inner segments of the edge portions **22** and **23** and form projections **44** and **45** in each envelope of the completed assembly. It should also be noted that by retaining the width of web **16** at **22***a* and **23***a* during heat-sealing operations, the bands **17** and **18** of heat-seal adhesive are completely covered, and the lower heat-seal bar **25** cannot adhere to the advancing webs of sheet material and cause them to break or tear.

The marginal edge portions **22** and **23** are next preferably trimmed as indicated at **47** and **48**, and each marginal edge portion is provided with a series of equally spaced apertures **50** which form a feed track so that the completed envelope assembly can be conveniently advanced by the pinwheel feed of a writing machine.

Suitable means are then provided for detaching the marginal edge portions of the envelope assembly from the successively connected envelopes, and suitable means are also provided for detachably connecting each envelope from the envelopes adjacent it. As herein shown, lines of weakening **51** and **52** are provided to separate the envelope assembly from each of the marginal edge portions **22** and **23**, and lines of weakening **53** are provided between each of the envelope flaps **14** and each bottom **24** of the next adjacent envelope so that they may be conveniently separated when desired.

FIG. 7 is a diagrammatic illustration of the method of applying gummed tape to the closure flaps of an assembly of series-connected, side-flap envelopes. An upper web **54** of envelope sheet material is preferably provided with an appropriate pattern of heat-sealing adhesive by the location hot-melt printing method. As herein shown, a series of equally spaced transversely extending bands of adhesive **55** may be applied to the under-face of the upper web **54** and be joined at one end to a longitudinally extending band of heat-sealing adhesive **56**, as best seen in FIG. 7. A second longitudinally extending band of heat-sealing adhesive **57** is preferably provided in a marginal edge portion **58** of the upper web **54**, and is spaced from each of the adjacent ends of the transverse bands **55**.

A lower web **60**, which is slightly narrower than the upper web **54**, is next brought into juxtaposition with the upper web **54** so that the marginal edge portions adjacent the longitudinal band **56** are substantially in alignment. Thus, the marginal edge portion **58** projects outwardly beyond a marginal edge **61** of the lower web **60**.

The two webs in juxtaposition are then advanced between a pair of opposed cooperating heat-seal bars **62** and **63**. The webs may either be intermittently advanced or continuously advanced, but as herein shown, it is preferred that their advance be intermittent. The heat-seal bars **62** and **63** operate in timed relation to the intermittent advance of the two webs **54** and **60**. When the bars **62** and **63** are pressed together, a sealing pattern is effected which closes a bottom edge **64** of a side-flap envelope, generally designated **65**, and a pair of side edges **66** and **67** of an adjacent pair of side-flap envelopes **65**. When the next envelope is advanced beneath the bars **62** and **63**, its bottom and its remaining side edge is sealed, and in addition, a side edge of the envelope next to be advanced beneath the bars has one of its side edges sealed.

A pair of feed rolls **68** and **70** are diagrammatically illustrated in FIG. 7, and these wheels are driven in timed relation to the intermittent advance of the assembly of envelopes. The end of a supply roll **71** of gummed tape **69**, similar to the gummed tape described above, is threaded through the feed rolls **68** and **70** and deposited in a continuous strip upon the longitudinal band of heat-sealing adhesive **57** on the marginal edge portions **58**. The gummed tape is intermittently fed to a position between a pair of opposed heat-seal bars **72** and **73** which, by heat and pressure, activates the adhesive in the longitudinal band **57** so as to adhere the gummed tape to the marginal edge **58** of the assembly. The marginal edge portions **58** and the opposite joined marginal edge portions may then be trimmed at **74**, as described above, and a series of equally spaced apertures **75** may be provided in the marginal edges of the assembly to form a feed-track for conveniently advancing the assembly through the pinwheel feed of a writing machine.

The marginal edge portion **58** may then be die-cut, as at **76**, to form successive side flaps **77** for each envelope

in the assembly. Suitable means are also provided in the form of lines of weakening 78, 80 and 81 to permit detachment of the feed-tracks and to permit the individual envelopes to be separated from each other when desired. FIGS. 9 and 10 illustrate the side-flap envelope as it appears after separation from the assembly.

The strip of series-connected, side-flap envelopes is then ready to be placed in the desired automatic business machine, and the successive envelopes may be addressed by merely advancing the strip through the machine.

The foregoing detailed description has been given for clearness of understanding only and no unnecessary limitations should be understood therefrom, for some modifications will be obvious to those skilled in the art.

We claim:

1. The method of forming an assembly of series-connected detachable envelopes, comprising the steps of: die cutting a first web of envelope material to provide said first web with a series of longitudinally spaced transversely extending cut-out portions; advancing said first web in timed relation into juxtaposition with an advancing second web of envelope material to form the fronts and backs respectively of series-connected envelopes with the fronts having a series of transversely extending exposed flaps; adhering adjacent fronts and backs together successively along narrow peripheral bands to form a series of transversely opening envelope pockets; feeding strips of moisture-sensitive gummed tape one onto each flap in timed relation to the advance of the webs, each of said strips being fed so as to have a moisture-sensitive gummed side exposed; and heat sealing each of said strips to its respective flap in timed relation to the advance of the webs to adapt the individual envelopes for sealing when separated from the assembly.

2. The method of forming an assembly of series-connected detachable envelopes, comprising the steps of: applying heat-sealing adhesive to a first web of envelope material in a U-shaped, three-sided pattern corresponding to the normally closed edges of an envelope pocket, the medial side of the pattern extending transversely of said first web, said pattern being successively applied to the web at longitudinally spaced points; die-cutting a second web of envelope material to provide a series of longitudinally spaced, transversely extending cut-out portions; advancing said pair of webs in timed relation into juxtaposition to form the fronts and backs respectively of series-connected envelopes with the fronts having a series of flaps exposed by the cut-out portions, said cut-out portions also exposing heat-sealing adhesive of the medial side of said pattern; feeding strips of moisture-sensitive gummed tape one onto the exposed adhesive of the medial side of each of said patterns in timed relation to the advance of said webs, each of said strips being fed so as to have a moisture-sensitive side exposed; and applying heat and pressure successively to each of said three-sided patterns of adhesive in timed relation to the advance of the webs to adhere each of the strips of tape to its respective flap and to form a series of envelope pockets having transversely extending openings.

3. The method of claim 2, including the steps of advancing the juxtaposed webs intermittently, feeding the strips of gummed tape in timed relation to the intermittent advance of the juxtaposed webs, and applying heat and pressure in timed relation to the intermittent advance of said webs to form the envelope pockets and adhere each strip of the gummed tape to its respective flap.

4. The method of forming an assembly of series-connected detachable envelopes, comprising the steps of: applying heat-sealing adhesive to one face of a first web of envelope material; die-cutting a second web of envelope material to provide a series of longitudinally spaced, transversely extending cut-out portions; advancing said pair of webs in timed relation into juxtaposition to form the fronts and backs respectively of series-connected envelopes with the fronts having a series of flaps exposed by the cut-out portions including portions of said one face; feeding strips of moisture-sensitive gummed tape one onto each of said flaps in timed relation to the advance of the webs, each of said strips being fed so as to have the moisture-sensitive side exposed on said portions of the one face; and applying heat and pressure successively to said webs in appropriate places to seal said gummed tape to each flap closure and to form a series of envelope pockets, each pocket extending transversely of the assembly.

5. The method of applying moisture-sensitive adhesive to the exposed flaps of a strip of envelopes in continuous form, comprising the steps of: advancing the strip of envelopes past a feeding station; feeding strips of moisture-sensitive gummed tape one onto each exposed flap in timed relation to the advance of the strip of envelopes, each of said strips being fed so as to have a moisture-sensitive gummed side exposed; and heat sealing each of the strips to its respective flap to adapt the individual envelopes for sealing when separated from the assembly.

6. The method of applying moisture-sensitive adhesive to the exposed flaps of a strip of envelopes in continuous form, comprising the steps of: intermittently advancing the strip of envelopes past a feeding station; feeding strips of moisture-sensitive gummed tape transversely of the path of advance of said strip of envelopes in timed relation thereto, one strip of tape being fed onto each exposed envelope flap so as to have a tape-face provided with heat sensitive adhesive adjacent the flap and a tape-face with moisture sensitive adhesive exposed; applying heat and pressure to each strip of gummed tape and the adjacent flap portions each time the strip of envelopes is stopped during its intermittent advance to adhere each of the strips of gummed tape to its respective flap; and trimming the ends of each of the strips of gummed tape in timed relation to the advance of the strip of envelopes to conform each strip of tape to the contour of its flap.

7. The method of applying moisture-sensitive adhesive to the exposed flaps of a strip of envelopes in continuous form, comprising the steps of: advancing the strip of envelopes past a feeding station; applying heat-sealing adhesive across the outer marginal edge of each of the exposed flaps of the strip of envelopes; feeding strips of moisture-sensitive gummed tape one onto each exposed flap in timed relation to the advance of the strip of envelopes so that each of the strips of gummed tape is in juxtaposition with the heat-sealing adhesive and has a moisture-sensitive gummed side exposed; and heat-sealing each of the strips of gummed tape to its respective flap to adapt the individual envelopes for sealing when separated from the assembly.

8. The method of applying moisture-sensitive adhesive to the closure flaps of a continuous form envelope assembly having envelopes with transverse envelope pocket openings and transverse closure flaps for the envelope pocket openings, comprising the steps of: advancing the envelope assembly past a feeding station; positioning strips of moisture-sensitive gummed tape transversely of the envelope assembly, one onto each closure flap with a moisture-sensitive gummed side of each strip of gummed tape exposed; and heat-sealing each of the strips of gummed tape to its respective closure flap to adapt the individual envelopes for sealing when separated from the assembly.

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