Sept. 20, 1966 L. H. KOLTUN 3,273,524

SEWING MACHINE METHOD FOR PRODUCING AN ENVELOPE

Filed Jan. 21, 1964 2 Sheets-Sheet 1

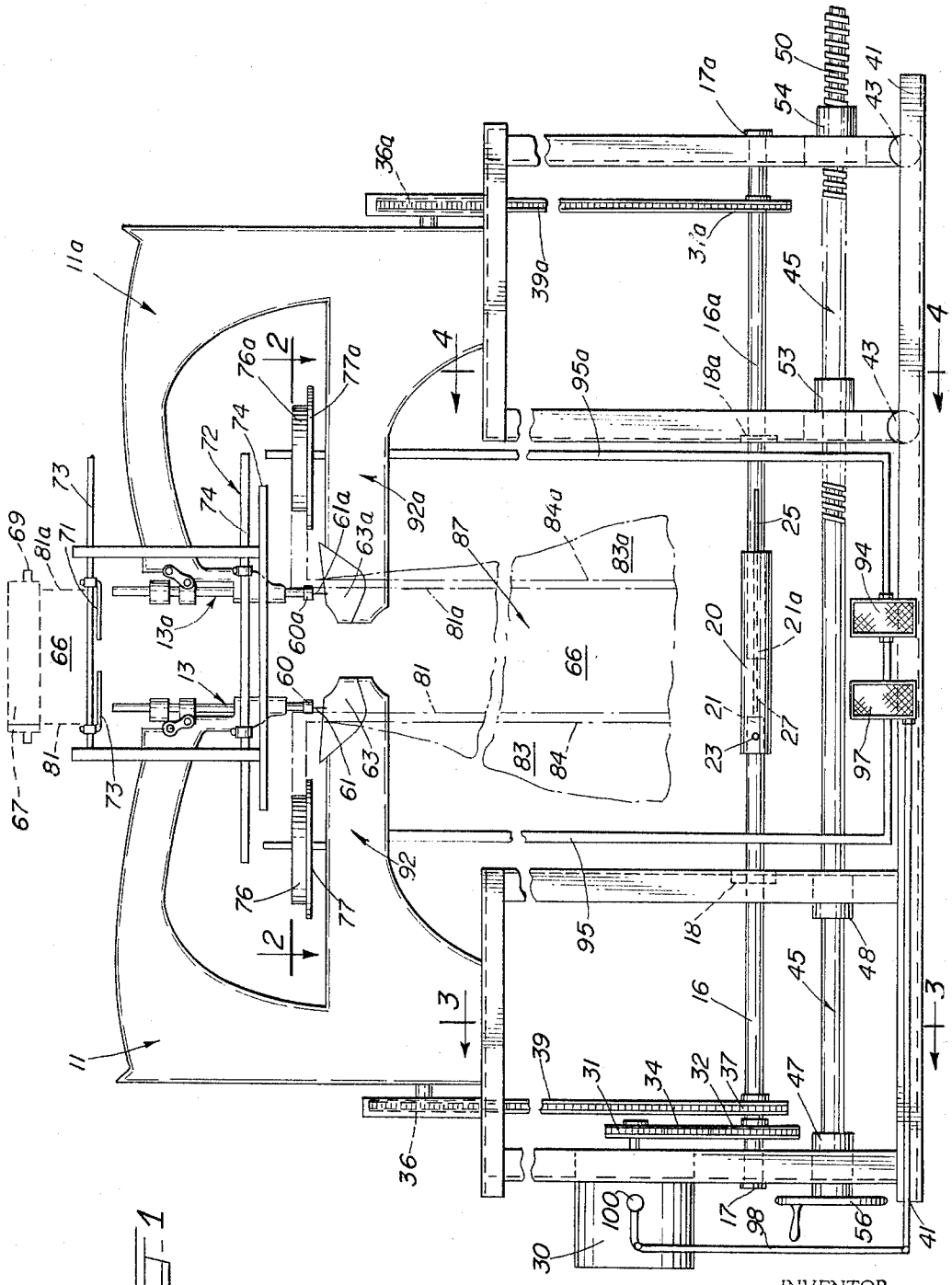


FIG. 1

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FIG. 2

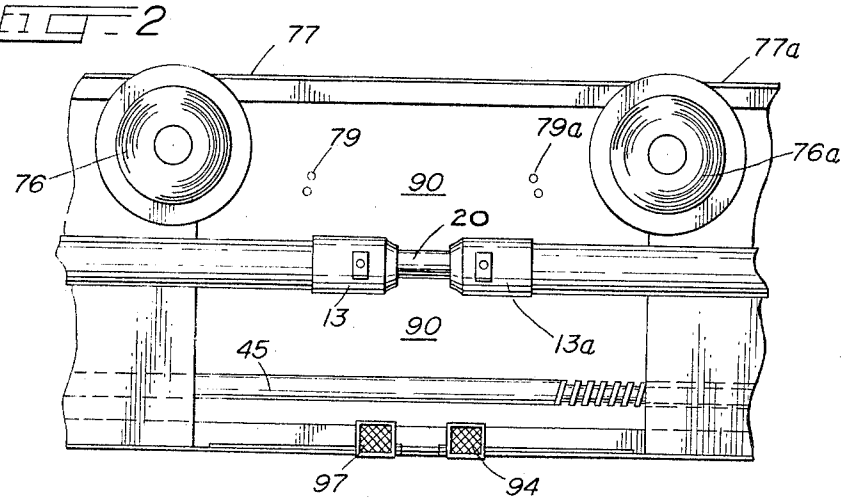


FIG. 3

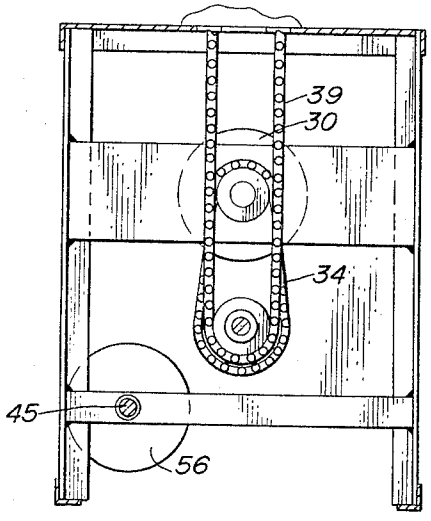


FIG. 4

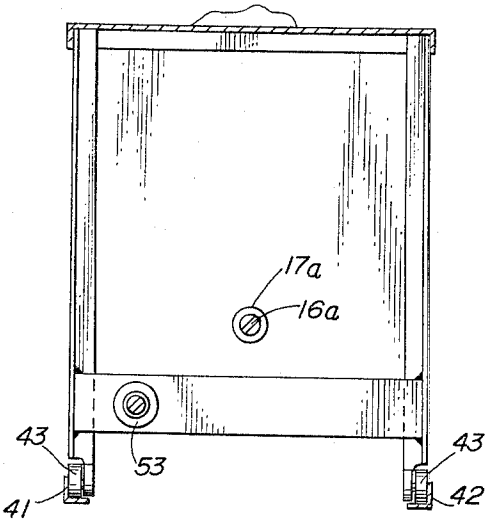


FIG. 5

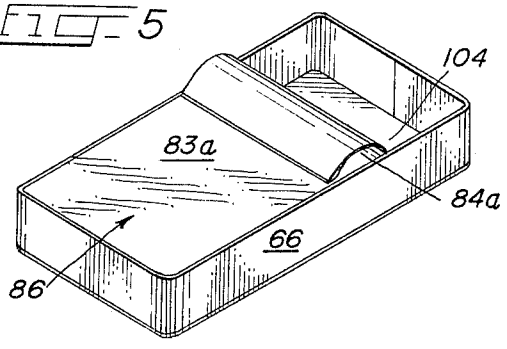
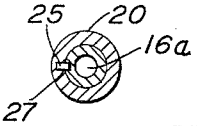


FIG. 6



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3,273,524

SEWING MACHINE METHOD FOR PRODUCING AN ENVELOPE

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8 Claims. (Cl. 112—262)

This invention relates to an apparatus for simultaneously connecting two separate panels to a third panel or gusset therebetween to provide a sheath or envelope. More particularly, the invention is directed to duplex sewing machines for sewing, at one time, two side panels to an endconnected or endless intermediate panel or gusset. The present invention is directed to a new method and apparatus by which two side panels may be simultaneously joined or connected to the opposed lateral edges of an endconnected intermediate panel.

It is well known in the prior art to utilize duplex or tandem sewing machines for making two parallel lines of stitching simultaneously, as for example, for sewing at one time the two side hems of a strip of a curtain or of a sheet or sheet-like material. It is also known in the prior art to hem both edges of an elongated workpiece at a single pass. These double hemming and related operations of the prior art have been carried out using either double needle machines or two separate machines designed to feed in the same direction. The prior art machines include arrangements for producing parallel rows of stitching spaced at desired distances from each other. However, there is neither a teaching nor a suggestion in the prior art of an apparatus or method by which two separate side panels can be sewed simultaneously to the lateral longitudinal edges of an intermediate or joining gusset to produce an envelope or a sheath in the commercial fabrication of such products as mattress covers, cushion covers, and related items. It has invariably been the practice to resort to at least two separate steps. In a first step the peripheral edges of a first panel are connected or sewed to the lateral edge of the gusset. In a second step the other lateral edge of the gusset is sewed to the peripheral edge of a second panel. Thus, in accordance with the prior art practices, it is necessary to carry out at least two separate and distinct operations in order to produce a single cover or sheath for mattresses and the like.

It is a principal object of the invention to provide a method for simultaneously joining two opposed panels to an intermediate elongated strip of material to provide a cover for a mattress, a cushion, or the like.

It is a related object of the invention to provide a machine for carrying out the method of the invention.

Another object of the invention is to provide means facilitating the fabrication of covers for mattresses, cushions, pads, and the like during sewing operations effected by a single operator and in a single step, whereby great accuracy and highly economical advantages are obtained.

Generally, the object of the invention is greatly to reduce the time, labor, and handling required for the manufacture of covers of the type described.

Still another object of the invention is to provide a machine and a method by which opposed panels are joined to a gusset, boxing, or border therebetween and by which the joined edges defining the envelope, sheath, or cover, are bound or otherwise finished, all in a single operation or passthrough. The completed cover is ready for stuffing, filling or inflation.

Additional objects and aims of the invention include the following:

To provide means for controlling the operation of two laterally spaced sewing machines whereby the machines operate precisely, in unison; and to provide mechanical

means embodying two separate fastening devices mounted in a manner facilitating adjustment of the spacing therebetween.

More specifically, the present invention provides a means of adjusting the stitching heads of two aligned sewing machines in face-to-face relation to each other so that the workpiece may be manipulated or turned in a vertically extending zone between the two heads to permit unimpeded feed of the workpiece during the finishing operation or sewing operation in which two opposed panels are joined simultaneously, to a connecting gusset.

Other and further objects and advantages of the invention will become apparent from a reading of the following specification taken in conjunction with the drawings in which:

FIGURE 1 is a front elevational view of the machine looking from the front or feeding side thereof;

FIGURE 2 is a top cross-sectional view taken on the line 2—2 of FIGURE 1;

FIGURE 3 is a cross-sectional view taken on the line 3—3 of FIGURE 1;

FIGURE 4 is a cross-sectional view taken on the line 4—4 of FIGURE 1;

FIGURE 5 is a perspective view of a sheath or envelope produced in accordance with the practice of the invention; and

FIGURE 6 is a cross-sectional view taken on the line 6—6 of FIGURE 1.

For purposes of disclosure, the invention is shown embodied as two reversely arranged sewing machines, their heads opposed to each other and spaced apart to provide a work manipulation zone through which the composite workpiece is maneuvered and rotated during the stitching, fastening or binding, or other joining operation.

Referring now to the drawings in which like reference symbols indicate the same parts throughout the various views, FIGURE 1 shows duplex cylinder type sewing machines **11** and **11***a* reversely arranged with their stitching heads **13** and **13***a* opposed to and facing each other. The machines **11** and **11***a* are supported on respective supports or tables **15** and **15***a*. One or both of the machines are relatively movable to vary the spacing between them. Alternatively, the tables may be fixed and the machines movable. In the particular arrangement depicted in FIGURE 1 the machine **11** and its supporting table **15** are stationary while the opposing machine **11***a* and its supporting table **15***a* are movable laterally to and away from the first sewing machine **11** to vary the width or spacing between the stitching heads **13** and **13***a* of the machines.

The two machines are driven in unison in the same direction from shafts **16** and **16***a* mounted in suitable bearings **17** and **18** and **17***a* and **18***a* in the underpart of the respective tables **15** and **15***a*. The shafts **16** and **16***a* are joined to one another through a longitudinally extending coaxial coupling **20** in which the ends **21** and **21***a* are received. In the particular arrangement depicted in FIGURE 1, the shaft **16** driving the first sewing machine is keyed at its end **21** to the coupling **20** by means of a suitable pin **23** or other means which precludes both annular and axial movement of the coupling **20** with respect to the shaft **16**. The end **21***a* of the other shaft **16***a* is slidably received within the coupling **20** to permit axial movement of the shaft **16***a* with respect to the coupling **20**. However, the shaft **16***a* and the coupling **20** are keyed to preclude relative annular motion. Any suitable keying mechanism may be relied upon, and in the particular arrangement depicted the shaft **16***a* is provided with a longitudinally extending rib or key **25** extending along and outwardly of the peripheral surface of the shaft proper and received in a cooperating groove, slot, or keyway **27** formed internally of the coupling **20** and extend-

ing longitudinally therealong. Thus, no matter how far the tables may be extended, within the limits of the machine, the shaft **16** will continue to drive both machines.

The drive shaft **16** is driven by a motor **30** through pulleys **31** and **32** and a belt **34** connecting the pulleys. The sewing machines **11** and **11***a* are driven by the shafts **16** and **16***a* through any suitable means, as for example sprockets **36** and **37** and sprockets **36***a* and **37***a* and chains **39** and **39***a*.

It will be readily apparent from a consideration of the above description that positive means have been provided for driving the two sewing machines at the same speed at all times regardless of whether the tables **15** and **15***a* (and the sewing machine heads **13** and **13***a*) are positioned close to each other or relatively farther apart. No additional mechanisms or special adjustments are necessary to insure completely parallel operation of the two machines. Whereas the pulleys **31** and **32** and the belt **34** may comprise a friction pulley assembly, in which case the belt **34** may be an ordinary belt as is customary in driving sewing machines, it is important that all parts of the driving mechanism between the common power source, drive shaft **16**, and between the two machines **11** and **11***a* be interconnected positively by meshing members to cause the two machines to operate at exactly the same speeds.

In the arrangement depicted in FIGURE 1 the two tables **15** and **15***a* carrying their respective sewing machines **11** and **11***a* are mounted on supporting tracks or trackways **41** and **42** whereby the movement of the tables to and away from each other is facilitated. While both tables may be movable, if preferred, in the particular arrangement illustrated one table **15** is fixed in position in the trackways **41** and **42** while the other table **15***a* is mounted for lateral movement in the trackways. The movable table **15***a* is supported on rollers or casters **43** to minimize frictional forces as the table **15***a* is moved. A shaft **45**, rotatably mounted in bearings **47** and **48** is secured to the stationary table **15**. The shaft **45** is provided with an elongated screw-threaded portion **50** which extends in functional disposition through drilled and tapped sleeves **53** and **54** fastened to the movable table **15***a*. A hand wheel or crank **56** is connected to the end of the shaft **45** so that rotation of the shaft **45** will drive the movable sewing machine **11***a* along the trackways **41** and **42** in one direction or the other, depending upon the direction in which the hand wheel is turned. As the table **15***a* is moved, the shaft **16***a* is free to slide laterally through the coupler **20** while at all times maintaining a positive driving connection therewith. The positive drive compels the two machines to operate in exact unison.

The stitching heads **13** and **13***a* of each of the machines are each provided with a clamping foot or presser foot **60** and **60***a* and needles **61** and **61***a*. For particular applications of the machine, binding, hemming, piping, beading, or hemstitching attachments **63** and **63***a* are also provided. These attachments may be of any suitable or known form or construction adapted in the usual manner to form the folds or hems at the edges of fabric, plastic, laminated or composite material preparatory to the stitching of the same. The presser feet **60** and **60***a* and the binding, hemistitching, or other attachments **63** and **63***a* have not been illustrated in detail, but merely schematically since the invention is not confined to any special form or construction of such elements. The feeding mechanisms of the sewing machines **11** and **11***a* are arranged to feed in the same direction. The feeding mechanisms themselves are not shown since several satisfactory methods of achieving this type of operation are known in the prior art, and the present invention is not confined to any particular means of achieving this feed.

In the preferred method of using the machine of the invention, a mattress cover or cushion cover, etc., is fabricated by stitching two separate precut panels simultaneously to the opposed lateral edges of a gusset, boxing or border joinder panel. In a refinement of this basic technique, tapes or binding strips are applied in the binding or hemming operation to provide a final product of improved general appearance and construction, yet effectuating important economics in production.

Referring now to FIGURE 1, the gusset, boxing or joinder panel **66** is illustrated as wound upon a cylinder **67** or wound in the form of a cylinder disposed upon a shaft **69** supported (support not shown) horizontally above the machines. The gusset material **66** passes downwardly through guide assemblies **71** and **72** which, in the particular embodiment or arrangement illustrated, comprise a plurality of horizontally disposed rods **73** and **74** through which the panel **66** is threaded or guided. Upon passing through the guide assemblies **71** and **72**, the panel **66** passes rearwardly with its lateral edges received in and feeding into the binder, hemmer or other attachments **63** and **63***a*. Edge binding tapes **76** and **76***a* retained on suitable supports **77** and **77***a* are fed through guideways **79** and **79***a* to the opposed sewing machines **11** and **11***a* and through the appropriate attachments **63** and **63***a* connected to the respective machines. During the operation of the machines, the gusset material **66** and the tapes **76** and **76***a* are pulled or fed automatically from their rolls to pass beneath needle bars or needles of the stitching heads **13** and **13***a*.

The feeding movement of the sewing machines will be sufficient to draw the gusset edges **81** and **81***a* and the tapes **76** and **76***a* into and through the attachments. Precut individual side panels **83** and **83***a* are joined at their marginal edges **84** and **84***a* to the lateral edges **81** and **81***a* of the gusset, boxing, or side panels **66**. The joinder is achieved by feeding the marginal or peripheral edges **84** and **84***a* of the panels **83** and **83***a* into respective joining, binding, beading, piping or hemming attachments **63** and **63***a* of the opposed machines along with the gusset edges **81** and **81***a* and the tapes **76** and **76***a*.

As the panels are fed forwardly into the sewing heads and are attached to the gusset or boxing **66**, a sheath or envelope **86** (FIGURE 5) which comprises the product or workpiece **87** of the overall operation, is produced. During the sewing or stitching, or assembly of the panels **83** and **83***a* they are drawn or fed inwardly or rearwardly of the sewing heads **13** and **13***a*, and as the sewing operation proceeds the workpiece **87** describes a rotational path or movement as the ultimate sheath or envelope **86** is produced. The workpiece **87** is supported adjacent the presser feet **60** and **60***a* and the assembly attachment **63** and **63***a*. During the joining operation and as the sewing proceeds, the workpiece extends into and occupies a vertically extending space or zone **90** provided between and below the stitching or sewing heads **13** and **13***a* of the machines and their associated and cooperating cylinder arms **92** and **92***a*. That is, in accordance with the practice of the present invention there is no continuous table or equivalent structure extending laterally between the sewing heads of the facing machines. In order to carry out the simultaneous joinder of the two panels to their connecting gusset, it is necessary to provide a workpiece manipulation zone, as described.

It is believed that, from the foregoing detailed description, the operation of the machines will be readily apparent to those skilled in the art. Initial preparatory steps may include moving the machines **11** and **11***a* to or from each other, as the case may be, by means of the crank **56** until the proper spacing between the stitching heads **13** and **13***a* is obtained, as dictated by the width of the gusset and by related considerations. The sewing machines are then adjusted in the usual manner and the conventional clamping feet or presser feet **60** and **60***a* are lowered to engage the various elements to be united in the sewing operation. In the particular arrangement illustrated in FIGURE 1 the positioning of the presser

feet is controlled through a foot pedal **94** and associated mechanical linkage **95** and **95***a* extending between the foot pedal **94** and the presser feet **60** and **60***a*. Another foot pedal **97** is connected through suitable linkage **98** to a motor control **100** for starting and stopping the sewing machines. The connections are indicated schematically. It is obvious that many other appropriate or preferred mechanical means may be utilized in carrying out these particular operations and the other conventional operations previously described.

For many applications to which the present machine and method are directed, it is desirable to fabricate the mattress cover or cushion cover, etc., with an opening **104** through which the mattress or other packing material is inserted. In accordance with the practice of the present invention, a preferred procedure is to provide this opening by pulling the edge **84***a* of one panel **83***a* out from sewing engagement with its associated sewing head **13***a* at a predetermined stage or point in the sewing operation. The marginal or peripheral edge **84** of the other panel will remain disposed in its sewing position with respect to the sewing head **13** of the other machine, and in its final form the workpiece will be an envelope and will have a slot or opening **104** where the marginal edge **84***a* of the "dropped" panel has not been sewn to the gusset **66**. After inserting the mattress or other packing material into the envelope or mattress cover **86**, the opening **104** is closed by means of an edge sewing or edge stitching machine or tape stitching machine or other suitable device.

For many other applications it will be unnecessary to "drop" a panel in the manner outlined above. For example, the gusset or boxing may itself be provided with a slot or zipper or other suitable opening and closure means. Filling may be introduced into the completed envelope through such an aperture. Where this or similar techniques are employed, the joinder operation whereby the opposed panels are connected to the gusset may be completed without regard to providing a special open portion.

While the present invention has for the purpose of illustrative disclosure, been described with reference to a particular preferred embodiment, it is apparent that the specific illustrated arrangement of the invention shown in the drawings and described above is merely illustrative of one of the many forms which the invention may take in practice. It is within the inventive concept of the invention, and it is contemplated, that the method of the invention is applicable and useful not only in stitching, stapling, and related operations, but is equally applicable to and useful in any other technique or application in which two separate side panels are joined to an interconnecting gusset, boxing, paneling, or joinder panel. For example, in fabricating envelopes, sheaths, bags, and related structures from plastic and plasticized materials, from laminates and from other sheet compositions, obvious simple modifications may be made in the machines used, as for example, substituting heat sealing machines for the stitching machines. Accordingly, the words "stitching" or "sewing" as used herein are intended to include any and all means of "joining" separate components. It is also readily apparent that for particular preferred applications, the method of the invention may be used to produce completely sealed or enclosed structures without an opening for the insertion of additional packing or material. Particularly in plastic fabricated products, other types of "packing" such as gas inflation may be used.

While disclosures of preferred embodiments of the method and of the apparatus of the invention have been provided, it will be apparent that numerous modifications and variations thereof may be made without departing from underlying principles of the invention. It is, therefore, desired by the following claims to include within the scope of the invention all such variations and modifications by which substantially the results of this invention may be obtained through the use of substantially the same or equivalent means.

What is claimed is:

1. A method of producing an envelope in which each marginal side edge of an elongated strip of material is securely attached to the periphery of separate parallel opposed panels which extend transversely of said strip to form said envelope, said method comprising the steps of:

placing respective peripheral edges of said separate opposed panels to operatively engage respective fastening heads of laterally spaced fastening means of tandem machines adapted to feed in unison in the same direction;

placing remaining portions of said panels in a vertically extending workpiece receiving and manipulating zone below and between said spaced apart machines;

positioning said elongated strip under said fastening heads with each said marginal side edge thereof in alignment with said respective peripheral edges of corresponding said separate opposed panels;

concurrently progressively advancing said peripheral edges of said panels and each said marginal side edge of said elongated strip and simultaneously joining opposed side edges of said strip to corresponding said peripheral edges of said panels along substantially the entire perimeter of said panels to complete a circuit path and produce said envelope.

2. A method of producing an envelope in which each marginal side edge of an elongated strip of material is securely attached to the periphery of separate parallel opposed panels which extend transversely of said strip to form said envelope, comprising the steps of:

placing respective peripheral edges of said separate panels under needle carrying stitching heads of spaced apart tandem sewing machines adapted to feed in unison in the same direction;

placing the remaining portions of said panels in a vertically extending workpiece receiving and manipulating zone below and between said spaced apart machines;

positioning said elongated strip under said stitching heads with each marginal side edge thereof in superposed relation and in alignment with said respective peripheral panel edges;

concurrently progressively advancing said peripheral edges with said marginal side edges and simultaneously stitching said superposed edges together along substantially the entire peripheral extent of said panels to complete a circuit path and produce said envelope.

3. The method of joining, in a single operation, opposite side edges of an elongated sidewall-forming gusset to a pair of spaced parallel panels at corresponding bounding edges thereof to form a workpiece in which said panels extend transversely of said gusset to form an envelope, said method comprising the steps of:

supporting a pair of tandem sewing machines adapted to feed in the same direction in unison, said machines having neeedle carrying stitching heads in face-to-face relation and spaced apart to correspond with the width of said gusset;

placing respective said bounding edges of respective said panels under said needle carrying stitching heads of said sewing machines;

positioning said gusset under said stitching heads with each side edge thereof in alignment with respective said bounding edges of corresponding said panels;

feeding said side edges of said gusset together with said bounding edges of said panels beneath said spaced stitching heads for stitching simultaneously each of said panels to said gusset in a single sewing operation;

placing remaining portions of said panels in a vertically extending workpiece receiving and manipulating zone below and between said spaced apart machine; and

stitching said panels to said gusset in a single operation to constitute said workpiece an envelope adapted to receive a filler material therein.

4. The method of applying a pair of spaced parallelly extending panels simultaneously to each of opposed lateral edges of a transversely disposed elongated gusset to join said panels to said gusset therebetween to form an envelope adapted for receiving a filler material therein, said method comprising the steps of:

placing said gusset between spaced apart tandem sewing machines having needle carrying stitching heads in face-to-face relation and adapted to feed in the same direction in unison;

orienting said gusset to extend transversely of a line connecting opposed said stitching heads of said sewing machines;

placing respective peripheral edges of respective said panels under said needle carrying stitching heads of said sewing machines;

placing remaining portions of said panels in a vertically extending workpiece receiving and manipulating zone below and between said spaced apart machines;

positioning said gusset under said stitching head with each said opposed lateral edges thereof in alignment with respective said peripheral edges of corresponding said panels;

concurrently progressively advancing said lateral edges of said gusset and said peripheral edges of said panels beneath said spaced stitching heads and stitching simultaneously each of said panels to a corresponding one of said lateral edges of said gusset in a single operation; and

continuing said stitching of said lateral edges of said gusset to said peripheral edges of said panels to complete a circuit path about one of said panels to provide said envelope.

5. A method of producing an envelope in which each marginal side edge of an elongated strip of material is securely attached to the periphery of separate parallel opposed panels which extend transversely of said strip to form said envelope, said method comprising the steps of:

placing respective peripheral edges of said separate opposed panels to operatively engage respective fastening heads of laterally spaced fastening means of tandem machines adapted to feed in unison in the same direction;

placing remaining portions of said panels in a vertically extending workpiece-receiving and manipulating zone below and between said spaced apart machines;

positioning said elongated strip under said fastening heads with each said marginal side edge thereof in alignment with said respective peripheral edges of corresponding said separate opposed panels;

concurrently progressively advancing said peripheral edges of said panels and each said marginal side edge of said elongated strip and simultaneously joining opposed side edges of said strip to corresponding said peripheral edges of said panels along a circumferential path defined thereby; and,

prior to completing a full circuit path about said panels, withdrawing a peripheral edge of one of said panels from engagement with its respective fastening head to drop said panel to preclude full attachment thereof to said elongated strip and

to provide of an envelope having an opening adapted to receive packing material therethrough for filling of said envelope in a subsequent operation.

6. The method of claim 2 and further comprising the steps of dropping one of said panels from engagement with its corresponding stitching head and a corresponding marginal side edge of said strip prior to completion of said circuit path to provide thereby an envelope having a packing receiving opening.

7. The method of claim 5 and further comprising the steps of introducing a filler substance into said envelope and thereafter closing said opening to retain said filler substance within said envelope.

8. The method of claim 6 and further comprising the steps of introducing a filler substance into said envelope and thereafter closing said opening to retain said filler substance within said envelope.

References Cited by the Examiner

UNITED STATES PATENTS

743,971	11/1903	Arakelian	112—155 X
1,042,641	10/1912	Brink	112—3 X
1,314,408	8/1919	Lewis	112—417
1,883,177	10/1932	Weis	112—155 X
1,884,032	10/1932	Maier	112—10
2,279,628	4/1942	Marsack	112—155 X
2,773,266	12/1956	Blumenkrantz	112—417
3,040,473	6/1962	Wetzler	5—345
3,163,139	12/1964	Hedegaard	112—260 X

FOREIGN PATENTS

1,158,101	1/1958	France.
14,577	of 1885	Great Britain.

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