

[54] **METHOD AND APPARATUS FOR
CONSTRUCTING FABRIC ENCLOSED
SPRINGS**

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53/180

[51] Int. Cl. **B65b 63/02**

[58] Field of Search **53/28, 180, 114, 46, 39;**
29/91, 91.1, 91.5

[56]

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Primary Examiner—Frank T. Yost

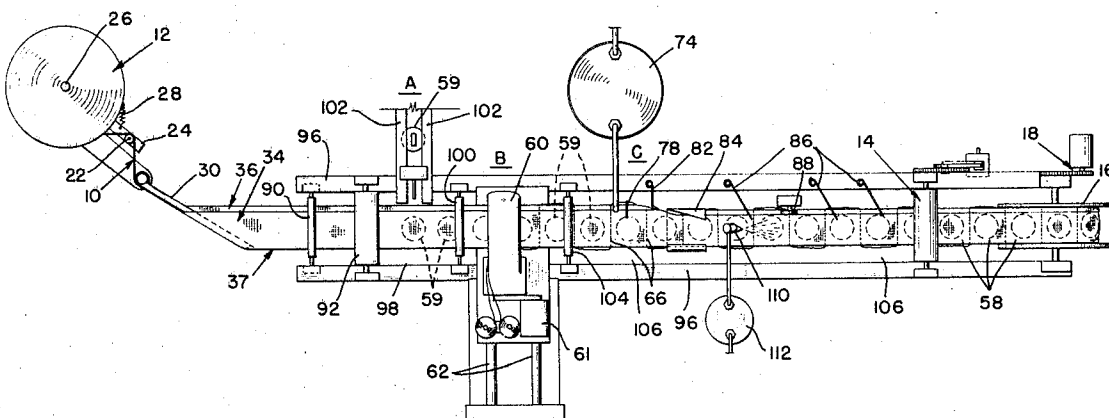
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[57]

ABSTRACT

Web material is folded to form two overlying plies integrally connected along one longitudinal edge for receiving compressed coil springs therebetween. The springs are enclosed within individual pockets formed by sewing the plies transversely between adjacent springs and by adhering longitudinally the plies along one edge portion.

10 Claims, 11 Drawing Figures



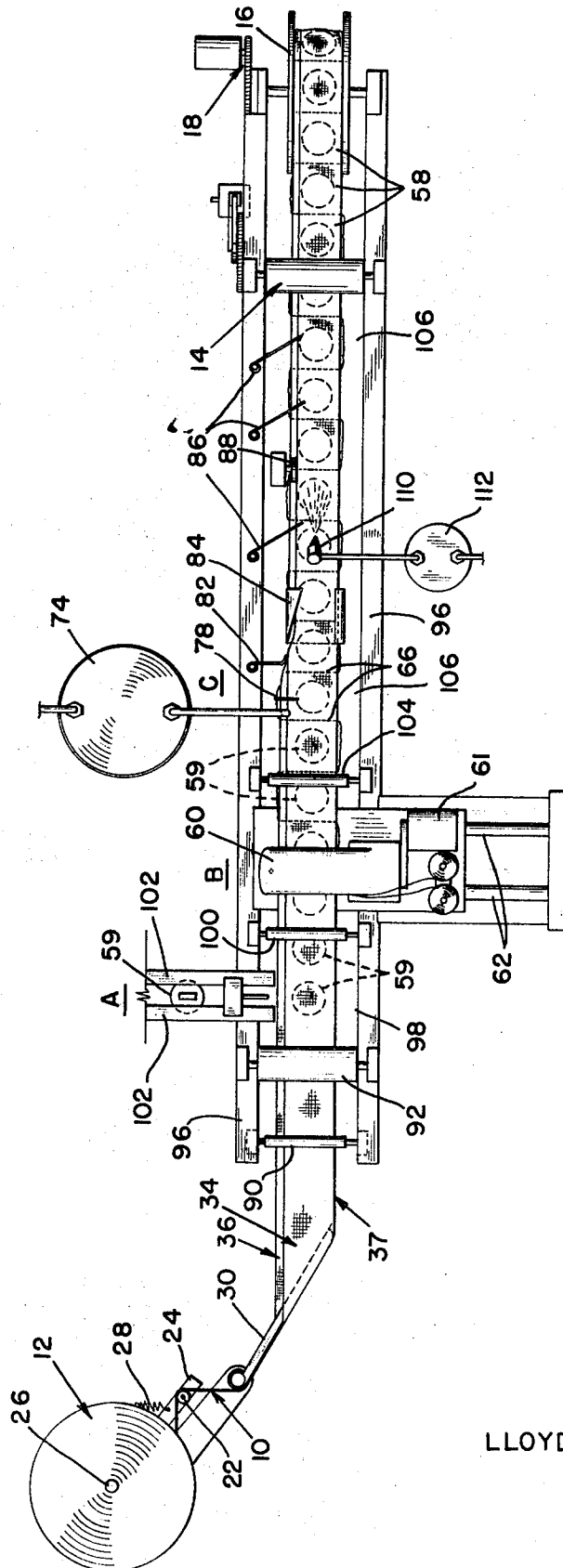


FIG. 1

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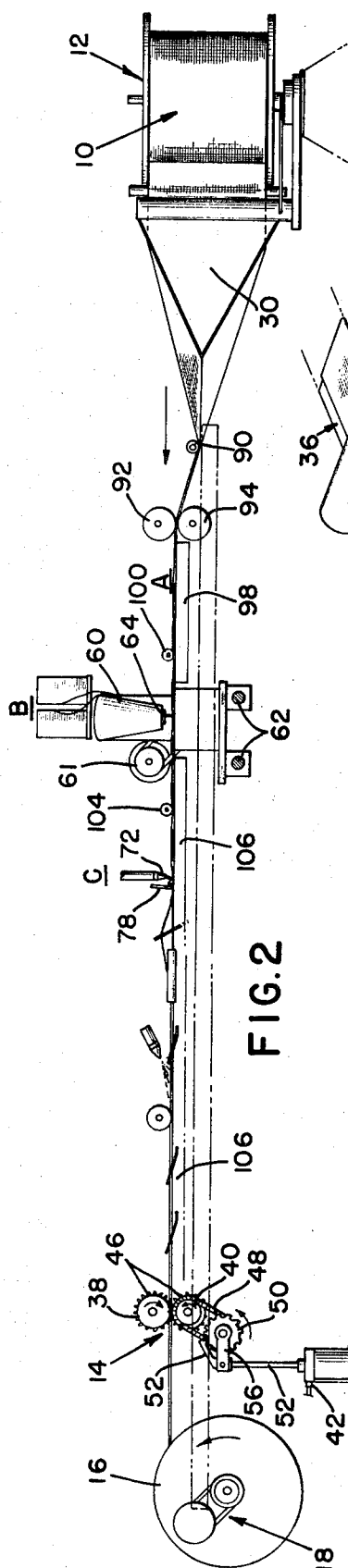


FIG. 2

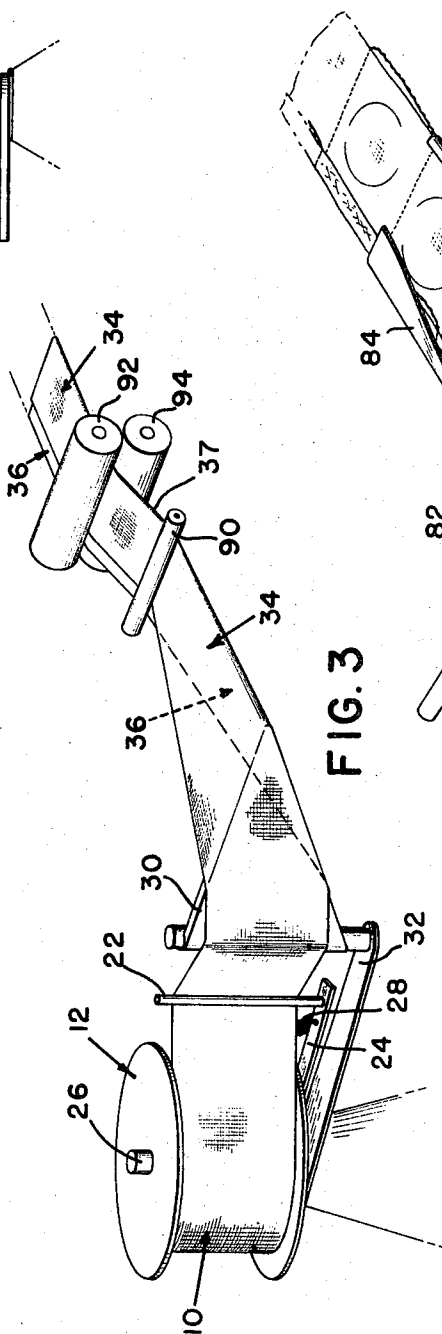


FIG. 3

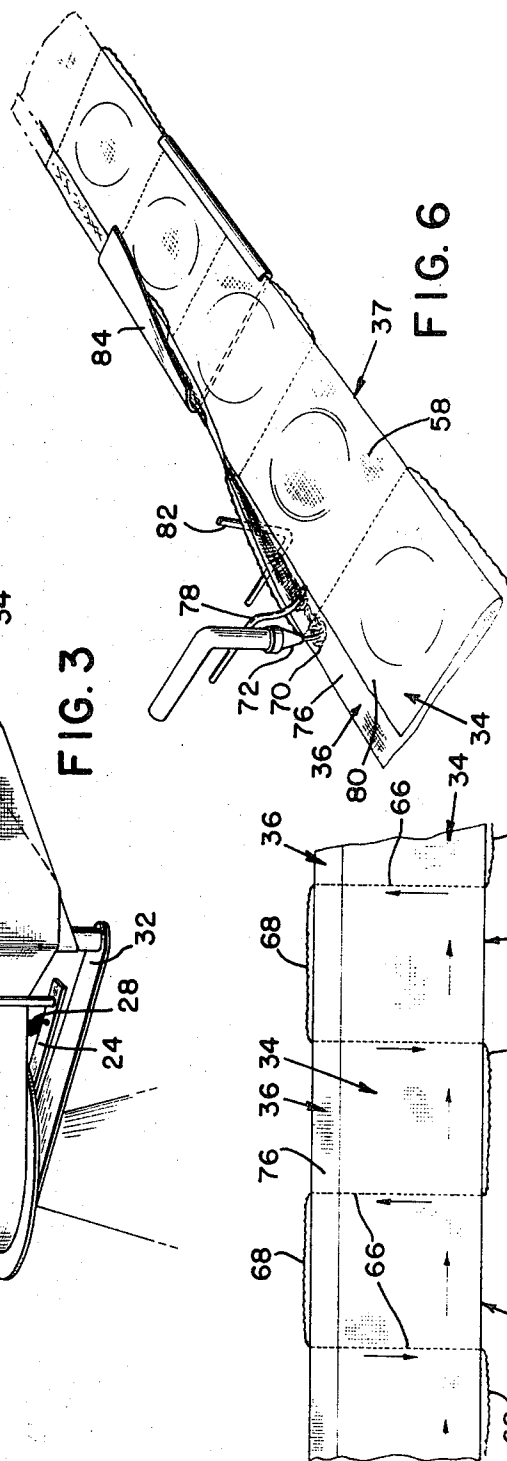


FIG. 4

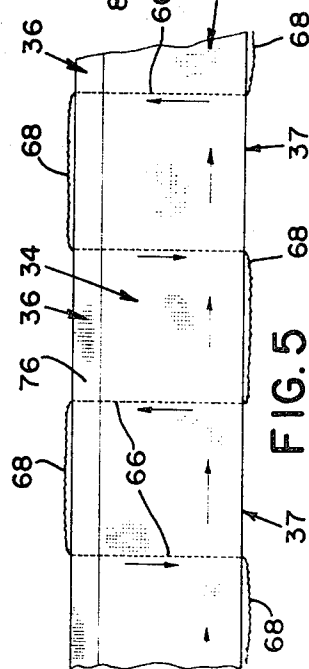


FIG. 5

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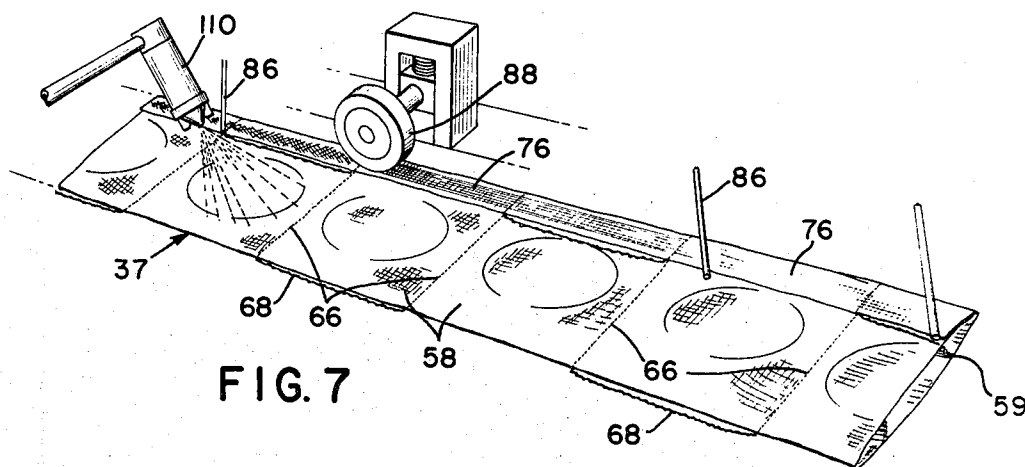


FIG. 7

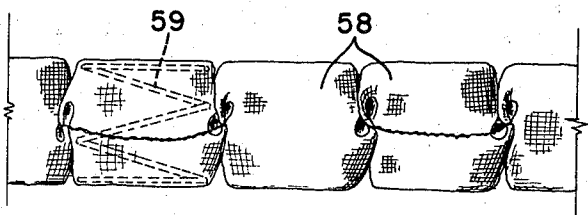


FIG. 8

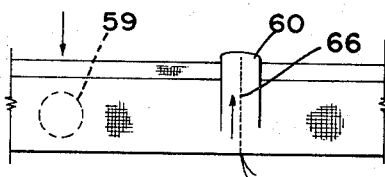


FIG. 4a

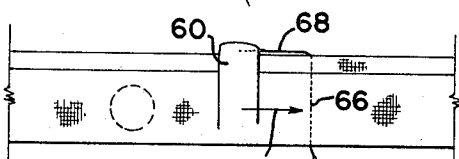


FIG. 4b

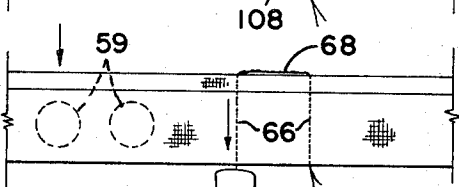


FIG. 4c

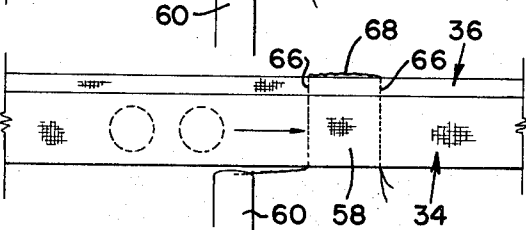


FIG. 4d

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METHOD AND APPARATUS FOR CONSTRUCTING FABRIC ENCLOSED SPRINGS

BACKGROUND, BRIEF SUMMARY AND OBJECTS OF THE INVENTION

This invention relates generally to the forming of compartments of pockets, having coil springs therein, from web material and more particularly to an improved apparatus and method for closing the spring pockets.

The spring pockets are formed in a continuous length by inserting compressed web springs into the open side of a web folded to form two overlying plies and subsequently securing the plies together around the springs to define the pockets. Such fabric enclosed springs are arranged in rows or columns to define a unit of a "Marshall" type utilized in forming cushions or mattresses.

Prior art machines have employed a sewing head for displacement longitudinally of the fabric for sealing the pockets formed around the springs. In the present invention the fabric plies are secured together longitudinally by means of an adhesive to seal the pockets or compartments.

Briefly, the pockets having springs positioned therein are constructed by folding a web to form overlying plies and intermittently feeding the plies past various stations where the springs are compressed and inserted between the plies; the plies are sewn transversely on opposite sides of the springs to define the sides of the pockets; and adhesive is applied for bonding the plies together along a longitudinal edge portion. A transversely displaceable sewing head, the apparatus for inserting springs between the plies, and the feed rollers for advancing the plies intermittently are operated in timed relation such that the springs are inserted sequentially between the plies and the sewing machine displaced transversely thereof when the web is at rest.

One of the primary objects of the invention is the provision of a new and improved system for closing the ends of pockets longitudinally.

Another object of the invention is the provision of simple and durable means for adhesively bonding overlying plies together thereby permitting an increase in web speed.

An important feature of the invention is the provision of a means for bonding the plies longitudinally in overlapped relation thereby reducing the width of the material required for enclosing the springs.

Other objects and advantages of the invention will become apparent during the course of the following detailed description.

BRIEF DESCRIPTION OF THE FIGURES

FIG. 1 is a schematic, top plan view of an apparatus for making lengths of fabric enclosed coil springs embodying the features of the present invention;

FIG. 2 is a schematic side elevational view of the apparatus of FIG. 1;

FIG. 3 is a schematic perspective view of the mechanism for supplying and folding web perspective to form overlying plies prior to the insertion of springs therebetween;

FIGS. 4a-4d illustrate schematically the displacements of the sewing head relative to the intermittently advanced folded web material for forming the sides of the spring pockets;

FIG. 5 is a top plan view of a portion of the overlying plies of web material after being sewn transversely to form the sides of the pockets;

FIG. 6 is a fragmentary perspective view of the mechanism for distributing adhesive and folding the edge portion of one ply over the other ply longitudinally to seal the pockets;

FIG. 7 is a perspective view of a section of fabric pockets, each pocket having a spring enclosed therein, and illustrating means for applying pressure to the longitudinal edges of the fabric having adhesive applied thereto; and

FIG. 8 is a side elevational view of a length of fabric formed into pockets having coiled springs enclosed therein, one spring being shown in broken line configuration.

DETAILED DESCRIPTION OF THE INVENTION

Referring to FIG. 1, web material 10, wound upon a supply roll 12 is advanced intermittently by a feed mechanism 14 beyond work stations A, B, C before being wound upon take-up roll 16 which has a torque applied thereto continuously through suitable drive means 18.

The web 10 being unwound from roll 12 has suitable tension applied thereto by means of a rod 22 fixed to a lever 24 pivotally mounted about supply roll shaft 26 and biased by spring 28. A generally vertically disposed triangular shaped plate 30, mounted upon support 32, is provided to fold the web 10 into horizontally disposed overlying plies 34 and 36 integrally connected along longitudinal edge portion 37. The web 10 may be folded, as shown on the drawing, wherein one ply 36 is slightly wider than ply 34 or, alternatively, the plies 34 and 36 may be of equal widths.

The overlying plies 34 and 36 are advanced intermittently by means of feed rollers 38, 40 which receive their drive from an upright double acting power cylinder assembly 41 adapted to have fluid admitted alternately into one of the lines 42, 44 and exhausted from the other line as disclosed in U.S. Pat. No. 2,983,236. The rollers 38, 40 may be coupled together through gears 46 one of which receives its drive through a flexible connector 48 from a ratchet mechanism 50. The ratchet 50 is intermittently actuated by a pawl 52 connected to piston rod 54 through linkage 56 to rotate feed rolls 38, 40 a prescribed degree.

A sewing machine 60 provides transverse stitching 66 across the plies 34, 36 to form the sides of the pockets 58 having coil springs 59 therein. The sewing machine 60 is of a conventional form and driven continuously by a motor 61. The machine is mounted for reciprocation upon horizontal guide rails 62 in timed relation with advancing plies 34, 36 in a manner as described in U.S. Pat. No. 2,983,236. This timing is such that the sewing machine head 64 crosses the plies transversely during the time the intermittently advancing plies are at rest to form straight and parallel lines of stitching 66. Since the machine 60 operates during intermittent advancement of the plies by the feed rollers 38, 40, the parallel lines of stitching are connected by stitching 68 on opposite sides of the plies, as shown by FIG. 5.

The longitudinal edges of the plies opposite the edge 37 are secured together by adhesive material 70 supplied under pressure through a nozzle 72 from a container 74. The adhesive, which may be dispensed continuously or intermittently, as desired, is of a fast set type as manufactured, for example, by Para-Chem Southern, Incorporated. As shown on the drawing, the adhesive is deposited on the longitudinal edge 76 of the lowermost ply 36 which is slightly wider than ply 34. A rod member 78 is provided to spread and smooth the adhesive 70 over a substantial portion of edge 76. A series of guide members are arranged for turning the edge 76 having the adhesive applied thereto approximately 180° as shown by FIG. 6 to overlap the upper longitudinal edge 80 of ply 34. The guides include a first wire or rod member 82 adapted to turn edge 76 approximately 90 degrees and a curved plate 84 for urging the adhesive side of edge 76 into engagement with ply 34. Guide rods 86 and a spring biased pressure roller 88 maintain the longitudinal edges of plies 34 and 36 in engagement during advancement by the feed rollers 38, 40 thereby permitting the adhesive to bond the plies together to seal the pockets 58.

In operation of the apparatus, the web 10 is folded into overlying plies 34, 36 and directed beneath guide roll 90 and between pressure rollers 92, 94, mounted upon frame 96, to station A where compressed coil springs 59 are delivered and inserted between the plies 34 and 36. The axially compressed springs 59 are directed between the plies, which are supported upon a table 98 between rolls 92, 94 and roll 100, by guide fingers 102 extending from a conventional apparatus, not shown, which produces individual coil springs 59 from a coil of wire as disclosed in the aforementioned U.S. Pat. No. 2,983,236. The coil spring producing apparatus and the feed mechanism 14 operate in timed relation to insert laterally a compressed

spring 59 between the plies 34, 36 at station A each time the intermittently advancing plies 34, 36 are at rest. The plies are directed to the stitching station B with the coil springs 59 retained in a collapsed condition due to the cooperation of rollers 100 and 104 with plates 98 and 106, respectively, and the tension applied to the web when withdrawn from the supply 12 by the feed mechanism 14. As shown in FIG. 4a-4d the sewing head 64 of the machine 60 reciprocates transversely each time the web 10 comes to rest thereby producing parallel lines of stitching 66 across plies 34, 36 to form the side walls of the pockets 58.

FIG. 4a shows the sewing head in the fully advanced position after forming stitch lines 66 across the plies 34, 36. The head 64 remains in this position and operates during advancement of the plies in the direction of arrow 108 thus forming stitching 68. Note that the sewing head 64 does not engage but remains in the advanced position during movement of the plies. FIG. 4c illustrates the head moving transversely of the plies to form another line of stitching 66 during dwell of the fabric.

The open pockets 58 formed by stitching 66 and the integral longitudinal edge 37 of plies 34, 36 are displaced intermittently to station C where adhesive is applied as shown in FIG. 6. The adhesive 70 is spread upon the edge 76 of lower ply 36 by member 78 and folded over onto the upper ply 34 by guides 82 and 84. Wire guides 86 and roller 88 apply pressure to the longitudinal edges of the plies having adhesive therebetween thus causing them to adhere to each other to seal the pockets before being wound upon reel 16.

The various roller, guides, support plates, etc., of the apparatus are conventionally supported upon the frame 96. The frame may be conveniently secured to vertically disposed posts as disclosed in U.S. Pat. No. 2,983,236.

A deodorant may be applied to the web, preferably burlap, to remove the odor therefrom prior to being wound upon reel 16. The reodorant may be sprayed through nozzle 110 connected to a supply container 112.

While the plies preferably are bonded together by folding one edge portion over the other, as shown by FIG. 6, plies of equal width could be bonded equally well by applying adhesive intermediate longitudinal edge portions of the plies and applying pressure thereto.

Alternatively, non-tacky adhesive, in tape form, could be directed between the plies along longitudinal edge portions for welding or sealing the plies together upon subsequent application of energy to the edges of the plies having the tape therebetween. Energy could be applied through heated pressure rollers or plates, or by various high frequency means.

I claim:

1. Apparatus for producing a series of pockets, having coil springs positioned therein, from web material folded to form two overlying plies integrally connected along one longitudinal edge comprising; a frame, means for advancing said overlying plies, having a series of spaced coil springs posi-

tioned therein, longitudinally of said frame, means displaceable transversely of said overlying plies for forming transverse stitch lines between the coil springs for securing said plies together to define sides of the pockets, and means located adjacent the longitudinal edges of the plies opposite to the integrally connected edge for adhering the plies longitudinally for closing the ends of the pockets.

2. Apparatus as defined in claim 1, wherein the web material is folded such that one ply is wider than the other, said means for adhering the plies longitudinally to close the pockets including means for turning the wider ply to overlap the other ply.

3. Apparatus as defined in claim 2, said means for adhering the plies further including means for continuously supplying adhesive material to secure the plies longitudinally.

4. Apparatus as defined in claim 1, wherein said means for advancing the plies includes intermittently actuated feed rolls and wherein said means displaceable transversely of the plies includes a continuously driven sewing head for forming the lines of stitches between the coil springs positioned intermediate the plies.

5. Apparatus as defined in claim 1, said means for adhering the plies longitudinally including means for supplying adhesive material to the plies along a longitudinal edge portion, and means for applying pressure to the adhesive material and the plies.

6. Apparatus as defined in claim 1, said means for adhering the plies longitudinally comprising means for dispensing adhesive on one edge on one of said plies, means for turning said edge having adhesive thereon approximately 180 degrees into engagement with the edge of the other of said plies and means for applying pressure to the edges of said plies having adhesive therebetween.

7. Apparatus as defined in claim 6, wherein said adhesive is applied continuously, and further including means for spreading the adhesive deposited on said one ply.

8. The method of producing a series of pockets having coil springs therein comprising the steps of: advancing a web in a prescribed path of travel, folding the advancing web to form overlying plies of material, inserting successive coil springs between the plies in longitudinally spaced relation, intermittently stitching the plies transversely of the prescribed path of travel and intermediate adjacent spaced springs to form pockets for the springs, and adhesively bonding the plies along longitudinal edge portions to close the pockets.

9. The method as defined in claim 8, said plies being adhesively bonded by continuously applying adhesive to at least one of the plies subsequent to the transverse stitching of the plies.

10. The method as defined in claim 8, wherein the web is folded such that the overlying plies are of different widths, and wherein the plies are adhesively bonded by dispensing adhesive on the wider ply and folding the edge of the wider ply to overlap the other ply.

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