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(71) Applicant (for all designated States except US): **L & P
PROPERTY MANAGEMENT COMPANY** [US/US];
4095 Firestone Boulevard, South Gate, CA 90280 (US).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **MOSSBECK, Niels,**
S. [US/US]; 1951 Wilson Road, Carthage, MO 64836 (US).

(74) Agent: **POFFENBERGER, J., Dwight, Jr.** à; Wood,
Herron & Evans, LLP, 2700 Carew Tower, Cincinnati, OH
45202 (US).

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(54) Title: POCKETED BEDDING OR SEATING PRODUCT HAVING STRINGS OF SPRINGS WITH VERTICALLY OFFSET
POCKETS

(57) Abstract: A bedding or seating product (10) is provided comprising a pocketed spring assembly (12) made up of a plurality
of parallel strings of spring's (30) joined to each other. Each string of spring's (30) comprises a row of interconnected-pocketed
spring's (34). The pockets of fabric (32) are vertically shortened with seams (50, 51, and 52) to create pockets (32) of the same
height, each containing a spring (34). The spring's (34) are vertically offset from one another due to the location of the seams (50,
51, 52). Upon an initial load, only some of the pocketed springs are compressed.



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**POCKETED BEDDING OR SEATING PRODUCT HAVING STRINGS OF
SPRINGS WITH VERTICALLY OFFSET POCKETS**

Field of the Invention

This invention relates generally to spring assemblies for mattresses, cushions and other bedding or seating products and, more particularly, to a pocketed coil spring assembly and associated method of
5 manufacturing such an assembly.

Background of the Invention

A well known type of bedding or seating product comprises a spring assembly which includes a number of discrete coil springs, each of which is enclosed in a fabric pocket in a length of folded fabric material.
10 Longitudinal axes of the coil springs are generally parallel with one another so that the top and bottom end turns of the coil springs define top and bottom faces of the spring assembly. A row of such pocketed springs is

known in the industry as a string of pocketed springs. A bedding or seating product can be fabricated from such strings of pocketed springs by binding or adhering the individual rows or strings of pocketed springs together to form a spring assembly which may be padded and encased in an upholstered covering. U.S. Patent No. 6,143,122, which is fully incorporated herein, discloses one such method of adhesively bonding strings of pocketed springs together to form a pocketed spring assembly.

This type of spring assembly is commonly referred to as a pocketed spring assembly due to the fact that each spring is contained within an individual pocket of fabric material. The construction of strings of pocketed coil springs in each pocket is well known in the art and, for example, is disclosed in U.S. Patent No. 4,439,977 which is hereby incorporated by reference in its entirety. The system disclosed in that patent includes a spring coiler which forms a coil spring which is subsequently compressed and inserted between the plies of folded pocketing fabric material. Other systems for manufacturing pocketed coil spring assemblies are disclosed in PCT Patent Application No. WO 94/18116 and U.S. Patent No. 6,101,697, each of which are expressly incorporated herein by reference.

Pocketed spring assemblies are generally recognized to have a unique and particular luxurious feel to them and mattresses manufactured of such pocketed spring assemblies provide a feeling of softness without lacking spring resilience or support. Mattresses and similar articles constructed of pocketed spring assemblies are often considered a high-end

type of product because of the added benefits and features of the pocketed coil springs. Mattresses and the like of this type can be more costly to manufacture and assemble as a result of the considerable amount of time and labor which is involved in their manufacture, together with the fact that

5 the method of fabrication and assembly of such pocketed spring assemblies can be complicated, particularly in an automated process.

One particular aspect of pocketed spring assemblies and the associated mattresses or the like is that the resulting product may have a "hard" feel due to the fact that all of the coil springs are identical and

10 compressed to the same degree in individual pockets. Usually, the firmness of such a product is uniform across the width and along the length of the product.

Additionally, while pocketed spring assemblies are desirably provide a combination of softness and support, the ability to economically

15 posturize a spring assembly or mattress of pocketed spring coils has heretofore been difficult. Posturization provides multiple zones or sections of differing firmnesses within a product such as a mattress. For example, the middle regions of the mattress, which typically support a person's torso, often require a firmer more resilient support while other areas of the

20 mattress which support the feet and head of a person require a softer feel.

One known method of posturizing a pocketed spring unit has been to incorporate springs made of different gauge wire into the strings of springs. For example, the springs incorporated into the strings of springs within certain sections or zones of the spring assembly are made of a

heavier gauge wire than the springs incorporated into the strings of springs of the other sections or zones of the spring assembly. Patent No. 6,173,464 discloses this concept, albeit with continuous bands of springs as opposed to individual springs.

5 Therefore, there is a need for a pocketed spring assembly which has an initial soft feel but the firmness necessary to support heavy loads.

 There is further a need for a posturized pocketed spring assembly and associated method of manufacture which offers the
10 advantages of posturization of the pocketed spring assembly without the higher manufacturing costs, production difficulties and inefficiencies associated with known posturized pocketed spring assemblies.

Summary of the Invention

 The invention of this application comprises a pocketed bedding
15 or seating product and associated method of manufacture. The bedding or seating product comprises a pocketed spring assembly, one or more pads and an upholstered covering surrounding the pocketed spring assembly and pads. The product is preferably two sided and may be used on either side.

 The pocketed spring assembly comprises a plurality of parallel
20 strings of springs joined together. Each of the strings of springs comprises a row of interconnected pocketed springs. Each of the pocketed springs comprises a spring surrounded with a pocket of fabric, as is conventional. Although coil springs are preferably used, other types of springs may be

used in accordance with the present invention. Each of the coil springs has an upper end turn, a lower end turn and a plurality of central convolutions between the end turns.

Preferably, each string of springs is made of one piece of fabric
5 folded to create two opposed plies which are joined together in select locations to form a plurality of pockets, each of the pockets containing a spring. The opposed plies of fabric of the string of springs may be joined together by sewing, gluing, sonic welding, as known in the art or any other means. Adjacent pockets within a string of springs are separated by
10 generally vertically oriented lines of attachment or seams of the opposed plies to each other. The height of the pocket is determined either by: 1) the distance between the bottom surface of the string of springs and one longitudinal segment of attachment or seam of the opposed plies to each other or 2) the distance between top and bottom seams of the pocket.
15 In several preferred embodiments of the present invention, each string of springs, or at least long sections of each string of springs, has pockets of the same height along its length. However, the pockets are vertically offset from one another, i.e. located at different heights, due to the location of the seams. In one preferred embodiment, every other pocket
20 of fabric is located slightly above the adjacent pockets of fabric, so that every other pocketed spring is higher than the adjacent pocketed springs in at least some strings of springs. For purposes of this document, the higher pocketed springs will be called "high" pocketed springs and the lower pocketed springs will be called "low" pocketed springs. Similarly, the

higher pockets will be called "high" pockets and the lower pockets will be called "low" pockets.

When a load is initially placed on the product from above, the "high" pocketed springs are the only pocketed springs initially compressed.

- 5 These "high" pocketed springs are initially compressed downwardly until their upper end turns are generally coplanar with the upper end turns of the "low" pocketed springs. If the load is sufficient, the "low" pocketed springs will be compressed as well as the "high" pocketed springs.

- Preferably, the springs are identical in a string of springs, i.e.
- 10 have the same height, diameter, pitch, etc. However, the springs may be different in a string of springs, i.e. have different physical characteristics. Again, although coil springs are preferred, any type of spring may be used in accordance with the present invention.

- The concept of the present invention may also be used to
- 15 posturize a bedding or seating product, i.e., make certain regions or portions firmer than other areas or portions of the bedding or seating product. This is accomplished by grouping together multiple strings of springs of the same configuration. For example, each string of springs in a pocketed spring assembly used in a posturized product may have several "high" pocketed
- 20 coil springs next to each other in a group and a plurality of "low" pocketed coil springs in another group. The strings of springs may have any number of such groups of pocketed springs. Each group of pocketed springs is located at the same height, thereby defining one region of a bedding or seating product. The strings of springs of the other regions of the product

have pocketed coil springs at different heights so as to impart different firmnesses to the different regions.

In another preferred embodiment of the present invention, the perimeter of the product has pocketed springs which are larger than the
5 springs in an internal portion of the product. The perimeter pocketed springs provide edge support to the product. In one such preferred embodiment having longitudinally extending strings of springs, the outermost strings of springs along the sides of the product have higher pockets containing larger springs along the entire length of the string of springs. The internal strings
10 of springs therebetween have at least one larger pocketed spring at each end of the string of springs, between which may be alternating "high" and "low" pocketed springs or at least some "low" pocketed springs of a lesser height than the perimeter pocketed springs. The "high" and "low" pocketed springs of a portion of the internal strings of springs are the same height,
15 but vertically offset from one another due to the location of the seams of the pockets. The springs are preferably identical coil springs, although they may be different from one another in some regard.

The bedding or seating product typically has a longitudinal dimension and a transverse dimension, the longitudinal dimension being
20 greater than the transverse dimension. However, the longitudinal dimension and transverse dimension may be identical in a square bedding or seating product. In the invention of the present application, the strings of springs may extend longitudinally or transversely, depending upon the desired effect.

Adjacent strings of springs of the bedding or seating product are preferably glued together but may be otherwise secured to each other. At least one border wire may extend around the perimeter of the pocketed spring assembly of the bedding or seating product and be secured to select
5 outermost pocketed coil springs. A first or lower border may be secured to the lower end turns of the coil springs of the outermost strings. A second or upper border wire may be secured to the upper end turns of the coil springs of the outermost strings or, alternatively, either border wire may be secured to intermediate convolutions of the coil springs of the outermost
10 strings of springs.

Due to select coil springs being pocketed at a higher location than other pocketed coil springs in at least one section or region of the pocketed spring assembly, at least one section of the pocketed spring assembly has a "soft" feel when a load is placed thereon. Once such
15 "high" pocketed coil springs are compressed to the level of the "low" pocketed coil springs, all the pocketed coil springs of the region of the pocketed spring assembly may be compressed, if necessary to support the load.

One method of manufacturing the pocketed spring assembly of
20 the present invention comprises inserting at least one spring between opposed plies of fabric of a string of springs. The opposed plies of the string of springs are then joined in select locations with seams to create a pocket. A plurality of pocketed springs are created in this manner within each string of springs. Each pocket is the same height and contains at least one spring.

In one preferred embodiment, every other pocket within the string of springs is vertically offset from adjacent pockets such that every other pocketed coil spring is located slightly above adjacent pocketed coil springs. In such an embodiment, every other spring is located at a height less or greater than the adjacent pocketed springs in the string of springs. The strings of springs are then joined together to form the pocketed spring assembly and the pocketed spring assembly encased in an upholstered covering to create the product.

The method of manufacturing the posturized spring assembly of the present invention varies depending upon the desired posturization. However, in each of the applications of the present invention whenever pocketed springs are vertically spaced above other pocketed springs and incorporated into a portion of a string of springs, that region or section of the pocketed spring assembly has an initial "soft" feel when a load is placed thereon. This initial "soft" feel is desirable to many customers or users of the product.

In each of the embodiments of the present invention, incorporating pockets of the same height but vertically offset from one another into at least several strings of springs results in a pocketed spring assembly having an initial "soft" feel in a portion thereof. Such a product may be made in accordance with a customer's needs and desires quickly and easily.

These and other objects and advantages of the present invention will be more readily apparent from the following drawings.

Brief Description of the Drawings

FIG. 1 is a perspective view of a bedding product made in accordance with the present invention comprising a pocketed spring assembly having a plurality of longitudinally extending strings of springs
5 surrounded by generally rectangular border wires;

FIG. 1A is a perspective view of a bedding product made in accordance with the present invention, the strings of springs of the pocketed spring assembly extending transversely;

FIG. 2 is a side elevational view, partially broken away, of a
10 string of springs made in accordance with the present invention;

FIG. 3 is a side elevational view, partially cut away, of a portion of the string of springs of FIG. 2;

FIG. 4 is a side elevational view, partially broken away, of a string of springs made in accordance with the present invention;

15 FIG. 5 is a top plan view of an alternative embodiment of pocketed spring assembly made in accordance with the present invention;

FIG. 5A is a cross-sectional view taken along the line 5A-5A of FIG. 5;

FIG. 6 is a top plan view of another alternative embodiment of
20 pocketed spring assembly made in accordance with the present invention;
and

FIG. 6A is a cross-sectional view taken along the line 6A-6A of FIG. 6.

Detailed Description of the Drawings

Referring to the drawings, and particularly to FIG. 1, there is illustrated a bedding or seating product in the form of a mattress 10.

Although a mattress 10 is illustrated, the present invention may be used to
5 construct any bedding or seating product. The mattress 10 comprises a pocketed spring assembly 12 having a generally planar top surface 14 in a top plane P1 and a parallel generally planar bottom surface 16 in a bottom plane P2. Covering pads 18 (only one being shown) may be located on the top and bottom surfaces 14, 16 of the pocketed spring assembly 12. An
10 upholstered covering 20 encases the pocketed spring assembly 12 and the covering pads 18.

The mattress 10 has a height H defined as the distance between the top and bottom surfaces 14, 16 of the spring assembly 12. Similarly, the mattress 10 has a transverse dimension or width W defined
15 between opposed side surfaces 22 and a longitudinal dimension or length L defined as the distance between the opposed end surfaces 24 of the mattress 10. The longitudinal dimension is illustrated as being larger than the transverse dimension of the mattress 10, although it is within the contemplation of the present invention that the longitudinal and transverse
20 dimensions be identical, such as in a square product.

If desired, at least one border wire may be secured to the pocketed spring assembly 12 with hog rings or any other conventional fastener 13. Fig. 1 illustrates an upper border wire 26 and a lower border wire 28, both of which are generally rectangular, secured to the pocketed

spring assembly 12. However, only one border wire may be used, if desired or none at all, as shown in Fig. 1A.

The pocketed spring assembly 12 comprises a plurality of longitudinally extending strings of springs 30 joined to each other. Adjacent
5 strings of springs are preferably glued together as shown and described in U.S. Patent No. 6,143,122, but may be joined to each other using any known technology.

Referring to Figs. 2 and 3, each string of springs 30 has a top or upper surface 31 and a bottom or lower surface 33, the distance
10 between which defines the height H1 of the string of springs 30. Each string of springs 30 comprises a row of interconnected fabric pockets 32, each fabric pocket 32 containing a coil spring 34. As best illustrated in Fig. 3, each coil spring 34 has an upper end turn 36, a lower end turn 38 and a plurality of central convolutions 40 between the end turns 36, 38.

15 Preferably, only one piece of fabric is used to form a string of springs 30, the piece of fabric being folded over onto itself around the coil springs 34 to create a first ply 42 and a second ply 44. As illustrated in Fig. 3, the first ply 42 is behind the second ply 44. As is known in the art, opposite sides or plies of the fabric are sewn, welded or otherwise secured
20 together in order to create a pair of outermost seams 46, a plurality of internal seams 48 and a plurality of longitudinal seams 50, 51 and 52. Longitudinal seam 50 extends from one outermost seam 46 to the opposite outermost seam 46, approximately the entire length of the string of springs 30. Longitudinal seams 51, 52 are much shorter than longitudinal seam 50

and extend approximately the length of one pocket 32. Longitudinal seams 51 are located below the pockets 32 while longitudinal seams 52 are located above the pockets 32. The internal seams 48 separate adjacent pockets 32 and therefore adjacent coil springs 34. Although the seams 46, 5 48, 50, 51 and 52 are illustrated as being a plurality of spaced, linear segments 54, they may comprise continuous lines or a series of dots or other arrangement without departing from the spirit of this application.

Figs. 2 and 3 illustrate one preferred embodiment of the present invention. In this embodiment, each string of springs 30 has pockets 10 of the same height H2. However, due to the location of seams 50, 51 and 52 every other pocket 32 is located either above or below adjacent pockets 32. Referring to Figs. 2 and 3, the outermost pocket and every other pocket is a "high" pocket 32' whose height is defined by the distance between longitudinal seams or segments 50 and 51. The outermost pocket 32' is 15 defined by the longitudinal seams 50, 51 along with outermost seam 46 and an internal seam 48. As best illustrated in Fig. 3, the seam 51 is spaced a distance D from the bottom surface 33 of the string of springs 30. Coil spring 34' is located inside the "high" pocket 32' and once the pocket 32' is closed is considered a "high" pocketed coil spring 34'.

20 Immediately adjacent each "high" pocketed coil spring 34' is at least one "low" pocketed coil spring 34" secured inside a "low" pocket 32". Each "low" pocket 32" is the same height H2 as the "high" pocket 32' but is vertically offset therefrom a distance D. See Fig. 3. Each "low" pocket 34" is defined by two internal seams 48, the lower surface 33 of the

string of springs 30 and a longitudinal seam 52 spaced below the longitudinal seam 50 a distance D.

Immediately adjacent to "low" pocketed coil spring 34" is at least one "high" pocketed coil spring 34' secured inside a "high" pocket 32'. Thus, every other "high" pocketed coil spring 34' is held in a "high" pocket 32'. Similarly, every other "low" pocketed coil spring 34" is held in a "low" pocket 32". The height of each of the "high" pockets 32' is preferably substantially identical and defined by the distance between the longitudinal seams 50, 51, each seam 51 being inwardly spaced from the bottom surface 33 of the string of springs 30. The height of each of the "low" pockets 32" is preferably substantially identical and defined by the distance between the bottom surface 33 of the string of springs 30 and one of the longitudinal seams 52.

Preferably, all of the coil springs 34 within a string of springs 30 are all the same height before being compressed and inserted into the pockets 32 of the strings of springs 30. Due to the identical heights of the "high" and "low" pockets, 32', 32", the coil springs 34" located in the "low" pockets 32" are compressed or loaded the same degree as the coil springs 34' located in the tall pockets 32'. In one preferred embodiment of the present invention, the coil springs 34 in the pockets 32 are not compressed at all, but rather in a relaxed condition.

The practical result of each of the strings of springs 30 being made of alternating "high" and "low" pockets of the same height, each pocket containing a coil spring, is that the pocketed spring assembly 12 has

a checkerboard pattern. Consequently, the mattress 10 has an initial "soft" feel when a load is placed thereon due to the coil springs 34' in the "high" pockets 32' initially compressing before the coil springs 34" in the "low" pockets 32" are affected. This is true when the mattress or bedding or seating product is used on either side. For example, when a person initially lays on the mattress 10, the coil springs 34' in the "high" pockets 32' compress a first distance D to the upper end turns of the coil springs 34" in the "low" pockets 32". Then, all of the coil springs which are placed under a load regardless of whether they are in a "high" or "low" pocket.

Fig. 1A illustrates an alternative embodiment of the present invention comprising a mattress 10a. The mattress 10a comprises a pocketed spring assembly 12a having a generally planar top surface 14a in a top plane P1 and a parallel generally planar bottom surface 16a in a bottom plane P2. Covering pads 18a (only one being shown) may be located on the top and bottom surfaces 14a, 16a of the pocketed spring assembly 12a. An upholstered covering 20a encases the pocketed spring assembly 12a and the covering pads 18a.

The pocketed spring assembly 12a comprises a plurality of transversely extending strings of springs 30a joined to each other. Adjacent strings of springs 30a are preferably glued together but may be joined to each other using any known technology. The strings of springs 30a are similar to those described above with regard to the embodiment shown in Fig. 1 and made in same manner. Like the embodiment of Fig. 1, this

embodiment has a uniform composition or construction along its length and width.

The mattress 10a has a transverse dimension or width W_a defined between opposed side surfaces 22a and a longitudinal dimension or length L_a defined as the distance between the opposed end surfaces 24a of the mattress 10a. The longitudinal dimension is illustrated as being larger than the transverse dimension of the mattress 10a, although it is within the contemplation of the present invention that the longitudinal and transverse dimensions be identical, such as in a square product.

Fig. 4 illustrates an alternative embodiment of the present invention in which several identical strings of springs are grouped together in a posturized bedding or seating product having regions of differing firmness. Fig. 4 illustrates one such string of springs 30a' having an upper or top surface 31a and a lower or bottom surface 33a. In this preferred embodiment, each string of springs 30a' has extending from left to right in Fig. 4, an outermost "high" pocket 32a', three "short" pockets 32a", two "high" pockets 32a', three "low" pockets 32a", etc. Each "high" pocket 32a' has a coil spring 34a' therein and each "low" pocket 32a" has a coil spring 34a" therein. The regions of the string of springs 30a' having "high" pocketed coil springs 34a' provide an initial "soft" feeling when a load is placed thereon. Although one particular pattern of string of springs 30a' is illustrated and described, any other configurations of strings of springs may be used to create a posturized bedding or seating product in accordance with the present invention.

Figs. 5 and 5A illustrate an alternative embodiment of the present invention in which the mattress 10b is posturized, the mattress 10b having multiple regions of differing firmness. In this embodiment, the mattress 10b has a pocketed spring assembly 12b which is divided into multiple regions or sections as one moves longitudinally down the side of the mattress. At least one border wire 64 is secured to the pocketed spring assembly 12b. However, if desired the border wire may be omitted. Around the perimeter of the mattress 10b is an edge portion 60 surrounding an internal portion 62. The edge portion 60 comprises two longitudinally extending strings of springs 30b' on each side of the mattress 10c. Each of these strings of springs 30b' has a uniform composition along its length. Each of the pockets 66 in each string of springs 30b' is the same height, higher than the "high" and "low" pockets 70, 72, respectively, of the internal portion 62 of the product 10b. Each of the larger pockets 66 contains a larger or taller coil spring 68 than the coil springs 69 contained in the "high" and "low" pockets 70, 72, respectively, of the internal portion 62 of the product 10b. See Fig. 5A. The coil springs 69 contained in the "high" and "low" pockets 70, 72, respectively, of the internal portion 62 of the product 10b are preferably the same height.

In this preferred embodiment shown in Figs. 5 and 5A, the internal portion 62 of the pocketed spring assembly 12b comprises a plurality of longitudinally extending strings of springs 30b located between longitudinally extending strings of springs 30b'. One such longitudinally extending string of springs 30b is shown in detail in Fig. 5A. Longitudinally

extending strings of springs 30b are secured to each other in a known manner, such as by glueing for example. The two pocketed coil springs 68 at each end of each string of springs 30b are larger pocketed coil springs than the coil springs 69 contained in the "high" and "low" pockets 70, 72 therebetween. These pocketed coil springs 68 at each end of each string of springs 30b make up part of the edge portion 60 of the pocketed spring assembly 12b. The remaining pockets of each string of springs 30b between the outermost larger pockets 66 contain both "high" and "low" pockets 70, 72, respectively, containing coil springs 69 in a manner as described above.

The internal portion 62 of the pocketed spring assembly 12b has a head section 74, immediately adjacent head section 74 is an upper lumbar section 76, immediately adjacent upper lumbar section 76 is center section 78, immediately adjacent center section 78 is a lower lumbar section 80 and at the other end of the internal portion 62 of the pocketed spring assembly 12b is a foot section 82.

The practical result of this configuration of pocketed spring assembly 12b is that the head section 74, center section 78 and foot section 82 have a checkerboard pattern which results in an initial "soft" feel when a load is placed thereon; however these sections have additional support provided by the springs 69 in "low" pockets 72. The portions of each string of springs 30b in the head section 74, center section 78 and foot section 82 have alternating "high" and "low" pockets 70, 72, each containing a spring 69.

On the other hand, the portions of each string of springs 30b in the upper and lower lumbar sections 76, 80 contain only "high" pockets 70 containing springs 69. Therefore, the upper and lower lumbar sections 76, 80 have a "softer" firmness when compared to the head section 74, center
5 section 78 and foot section 82.

Although the strings of springs 30b and 30b' are illustrated as being longitudinally extending, this embodiment of the present invention may also be accomplished with transversely extending strings of springs. If the strings of springs were transversely extending, each string of springs in
10 the upper and lower lumbar sections 58, 62 would have only "high" pocketed springs and each string of springs in the head, center and foot sections 74, 78 and 82 would have alternating "low" and "high" pocketed springs, except the outermost pockets which form part of the edge portion.

Although the edge portion 60 of this preferred embodiment is
15 illustrated and described as having larger pocketed springs 66 than the pocketed springs 69 of the internal portion 62; the edge portion 60 may be made of "high" or "low" pocketed springs 69.

Figs. 6 and 6A illustrate an alternative preferred embodiment of the present invention. In this embodiment, mattress 10c has a pocketed
20 spring assembly 12c comprising longitudinally extending strings of springs 30c, 30c' joined to each other in a conventional manner. The pocketed spring assembly 12c has an edge portion 60c around the perimeter of an internal portion 62c. The edge portion 60c comprises two longitudinally extending strings of springs 30c' on each side of the mattress 10c. Each of

these strings of springs 30c' has a uniform composition along its length. Each of the pockets 75 in each string of springs 30c' is the same height, higher than the "high" and "low" pockets 76, 78, respectively, of the internal portion 62c of the product 10c. Each of the larger pockets 75
5 contains a larger or taller coil spring 80 than the coil springs 82 contained in the "high" and "low" pockets 76, 78 of the internal portion 62c of the product 10c. See Fig. 6A. The coil springs 82 contained in the "high" and "low" pockets 76, 78 of the internal portion 62c of the product 10c are preferably the same height.

10 In this preferred embodiment shown in Figs. 6 and 6A, the internal portion 62c of the pocketed spring assembly 12c comprises a plurality of longitudinally extending strings of springs 30c located between longitudinally extending strings of springs 30c'. One such longitudinally
extending string of springs 30c is shown in detail in Fig. 6A. Longitudinally
15 extending strings of springs 30c are secured to each other in a known manner, such as by glueing for example. The two pocketed coil springs 80 at each end of each string of springs 30c are larger pocketed coil springs than the coil springs 82 contained in the "high" and "low" pockets 76, 78 therebetween. These pocketed coil springs 80 at each end of each string of
20 springs 30c make up part of the edge portion 60c of the pocketed spring assembly 12c. The remaining pockets of each string of springs 30c between the outermost larger pockets 75 contain both "high" and "low" pockets 76, 78, respectively, containing coil springs 82 in a manner as described above.

Although the strings of springs 30c, 30c' are longitudinally extending, this embodiment of the present invention may also be manufactured with transversely extending strings of springs.

Although the edge portion 60c of this preferred embodiment is
5 illustrated and described as having larger pocketed springs 80 than the pocketed springs 82 of the internal portion 62c; the edge portion 60c may be made of "high" or "low" pocketed springs 82.

Although I have described several preferred embodiments of our invention, I do not intend to be limited except by the scope of the
10 following claims.

I CLAIM:

1. A bedding or seating product comprising:
 - a pocketed spring assembly comprising a plurality of parallel strings of springs, each of said strings of springs comprising a row of interconnected pocketed springs, each of said pocketed springs comprising a spring
- 5 surrounded by a pocket of fabric, wherein within some of said strings of springs some of said pockets of fabric are of an identical vertical height and vertically offset relative to one another; and
 - an upholstered covering surrounding said pocketed spring assembly.

2. A bedding or seating product comprising:
a pocketed spring assembly comprising a plurality of parallel strings of springs, each of said strings of springs comprising a row of interconnected pocketed springs, each of said pocketed springs comprising a spring
5 surrounded by a pocket of fabric, wherein within some of said strings of springs some of said pockets of fabric are of an identical vertical height and vertically offset relative to one another.
3. The product of claim 2 wherein within some of said strings of springs every other one of said pockets is above adjacent pockets.
4. The product of claim 2 wherein all of said springs are the same vertical height.
5. The product of claim 2 wherein said product has a longitudinal dimension and a transverse dimension, said longitudinal dimension being greater than said transverse dimension, said strings of springs extending longitudinally.
6. The product of claim 2 wherein said product has a longitudinal dimension and a transverse dimension, said longitudinal dimension being greater than said transverse dimension, said strings of springs extending transversely.

7. The product of claim 2 wherein at least one border wire is secured to said pocketed spring assembly.
8. The product of claim 2 wherein adjacent strings of springs are glued together.
9. The product of claim 2 wherein said springs are coil springs.

10. A bedding or seating product comprising:
- a pocketed spring assembly comprising a plurality of parallel strings of springs joined to each other, each of said strings of springs comprising a row of interconnected pocketed springs, each of said pocketed springs
- 5 comprising a spring surrounded by a pocket of fabric,
- wherein said pocketed spring assembly has multiple regions of differing firmness, at least one of said regions having pockets of an identical height vertically offset from one another.
11. The product of claim 10 wherein springs are identical.
12. The product of claim 10 wherein said strings of springs extend longitudinally.
13. The product of claim 10 wherein said strings of springs extend transversely.
14. The product of claim 10 further comprising at least one border wire surrounding said pocketed spring assembly.

15. A bedding or seating product comprising:
- a pocketed spring assembly comprising a plurality of parallel strings of springs, each of said strings of springs comprising a piece of fabric wrapped around a row of aligned springs and secured along a longitudinal line of attachment, opposed plies of said piece of fabric being on opposite sides of the springs, said opposed plies of fabric being joined together between springs to create a plurality of pocketed springs of the same height, wherein said opposed plies of fabric are joined together in select locations to vertically offset some of the pocketed springs from other pocketed springs.
- 10 16. The product of claim 15 wherein said strings of springs extend longitudinally.
17. The product of claim 15 wherein said strings of springs extend transversely.
18. The product of claim 15 wherein each of said springs is identical.

19. A string of springs for inclusion in a bedding or seating product, said string of springs comprising a row of interconnected pocketed springs, each of said pocketed springs comprising a spring surrounded with a pocket of fabric, adjacent pocketed springs being the same height and vertically
5 offset from one another in a portion of said string of springs.

20. The string of springs of claim 19 wherein each of said springs is identical.

21. The string of springs of claim 19 wherein said string of springs is joined to other similar strings of springs by gluing strings of springs together to create a pocketed spring assembly.

22. A string of springs for inclusion in a bedding or seating product, said string of springs comprising a piece of fabric wrapped around a row of aligned springs and secured along a seam, opposed plies of said piece of fabric being on opposite sides of the springs, said opposed plies of fabric being joined together between springs to create a plurality of pocketed springs of the same height, ^{and vertically offset from each other} wherein said opposed plies of fabric are joined together in select locations to vary the location of the pocketed springs.
- 5 23. The string of springs of claim 22 wherein each of said springs is identical.
24. The string of springs of claim 22 wherein each of said springs is a coil spring.

25. A method of manufacturing a pocketed spring assembly for use in a bedding or seating product, said method comprising:

inserting a spring between opposed plies of fabric of a string of springs,

5 joining said opposed plies of said fabric with seams to form a plurality of pockets, each of said pockets being the same height and encasing at least one spring, some of said springs being vertically offset from other springs in said string of springs due to the location of said seams, and

10 joining said string of springs to adjacent strings of springs to form the pocketed spring assembly.

26. The method of claim 25 wherein joining opposed plies of said fabric comprises welding said plies together.

27. A method of manufacturing a pocketed spring assembly for use in a bedding or seating product, said pocketed spring assembly made of a plurality of strings of springs joined to each other, each of said string of springs comprising a piece of fabric folded such that said piece of fabric has
5 opposed plies on opposite sides of a row of springs, said opposed plies being joined together between adjacent springs in said string of springs, said method comprising:

inserting at least one spring between said opposed plies of fabric of a string of springs,
10 joining said opposed plies in said string of springs in select locations to create a plurality of pockets of the same height such that said fabric encases said at least one spring in each of said pockets, wherein every other pocket within said string of springs is vertically offset from adjacent pockets, and
15 joining said string of springs to adjacent strings of springs to form the pocketed spring assembly.

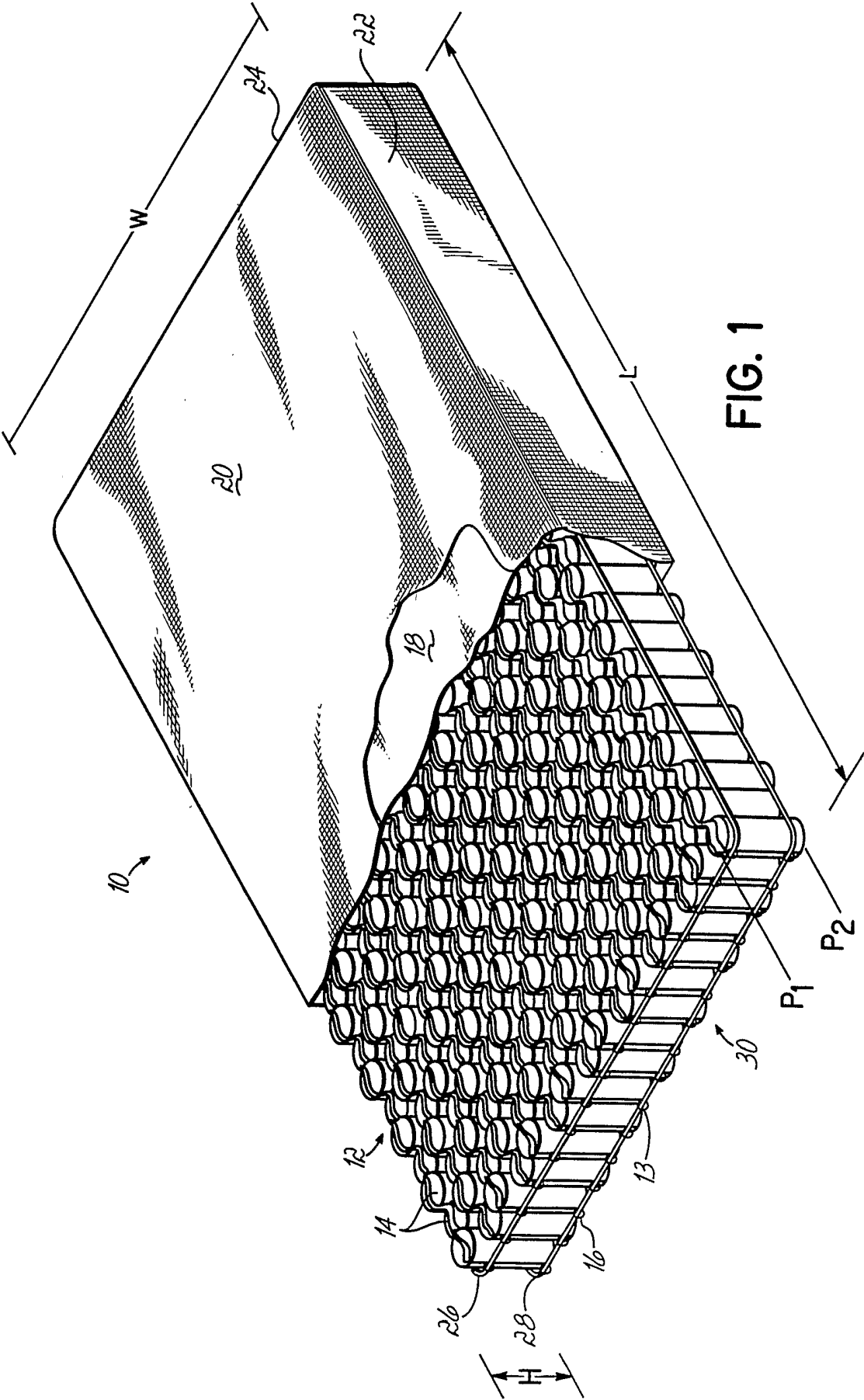
28. The method of claim 27 wherein closing said pockets of said string of springs comprising welding said fabric.

29. A method of manufacturing a pocketed spring assembly for use in a bedding or seating product, said pocketed spring assembly made of a plurality of strings of springs joined to each other, each of said string of springs comprising a piece of fabric folded such that said piece of fabric has
5 opposed plies on opposite sides of a row of springs, said opposed plies being joined together between adjacent springs in said string of springs, said method comprising:

 inserting at least one spring between said opposed plies of fabric of a string of springs,

10 joining said opposed plies in said string of springs in select locations to create a plurality of pockets such that said fabric encases said at least one spring in each of said pockets, wherein every pocket within a portion of said string of springs is of the same vertical height and every other pocket within said portion of said string of springs is vertically offset from adjacent
15 pockets, and

 joining said string of springs to adjacent strings of springs to form the pocketed spring assembly.



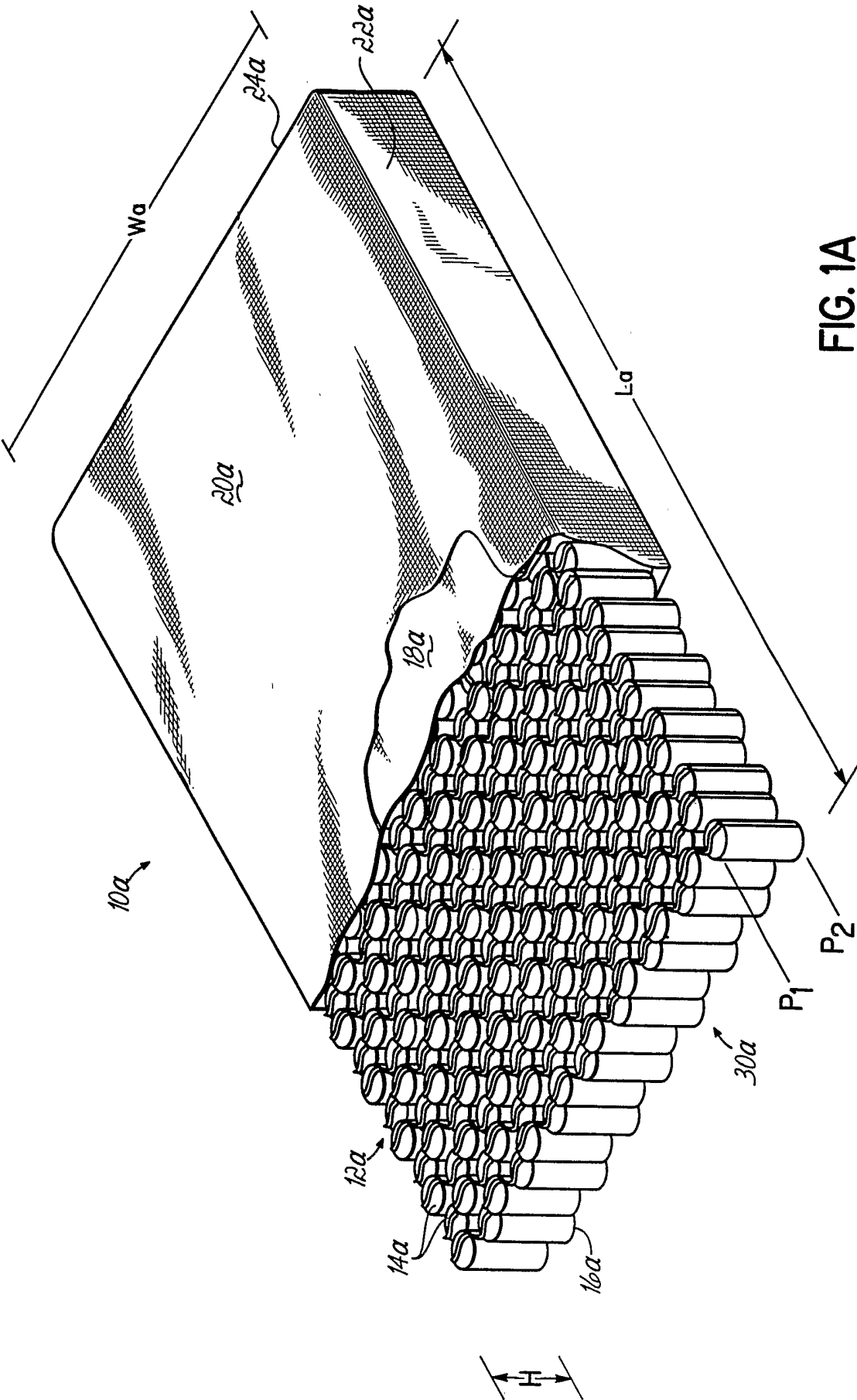
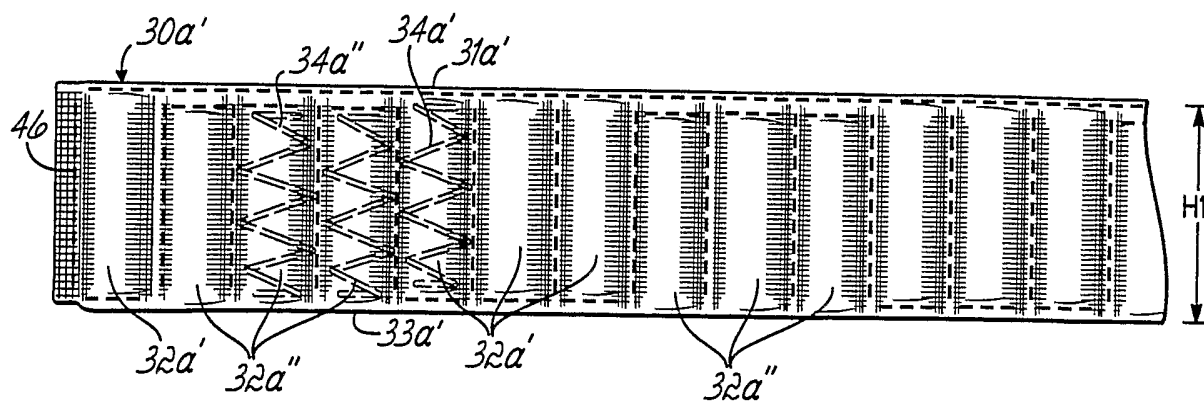
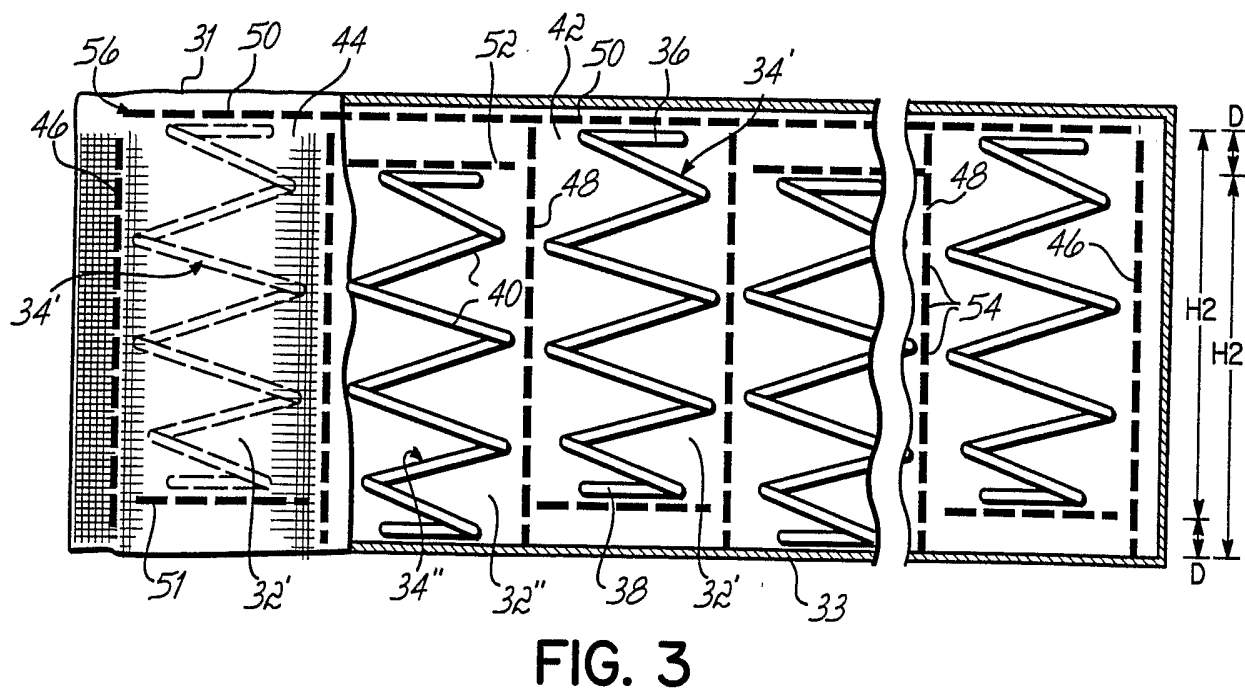
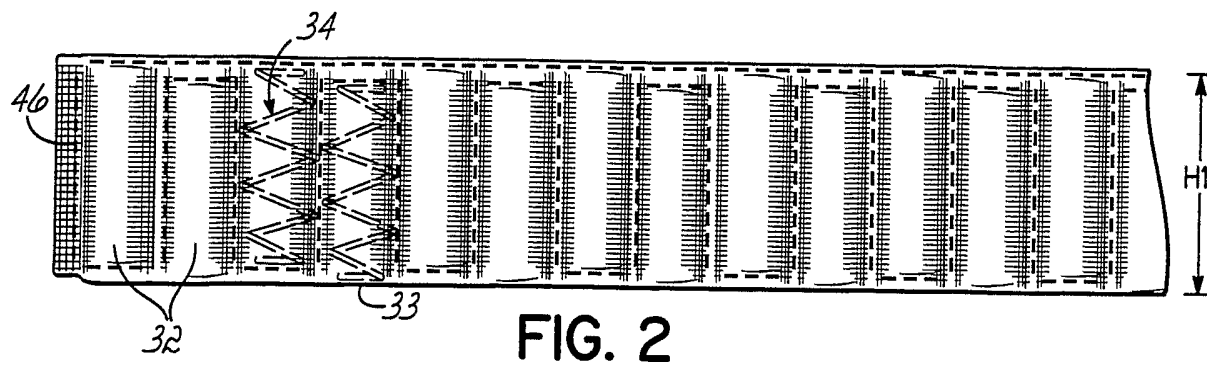


FIG. 1A



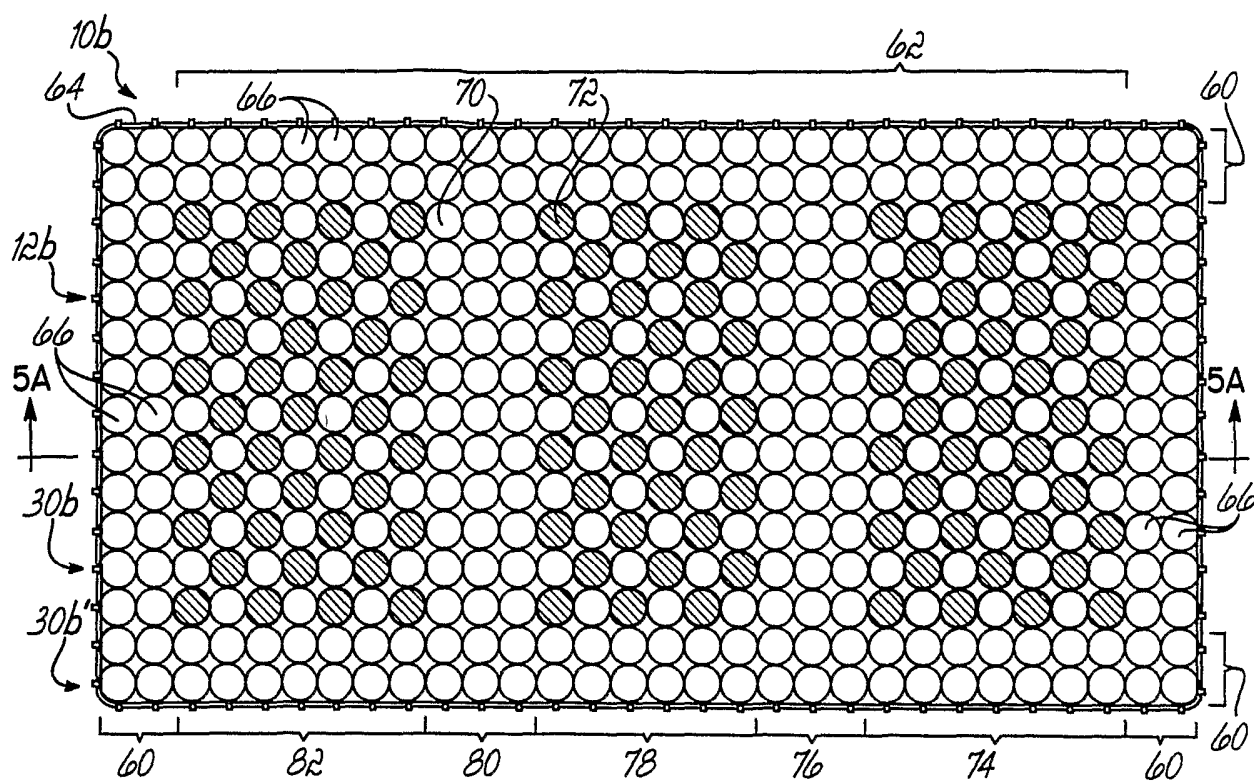


FIG. 5

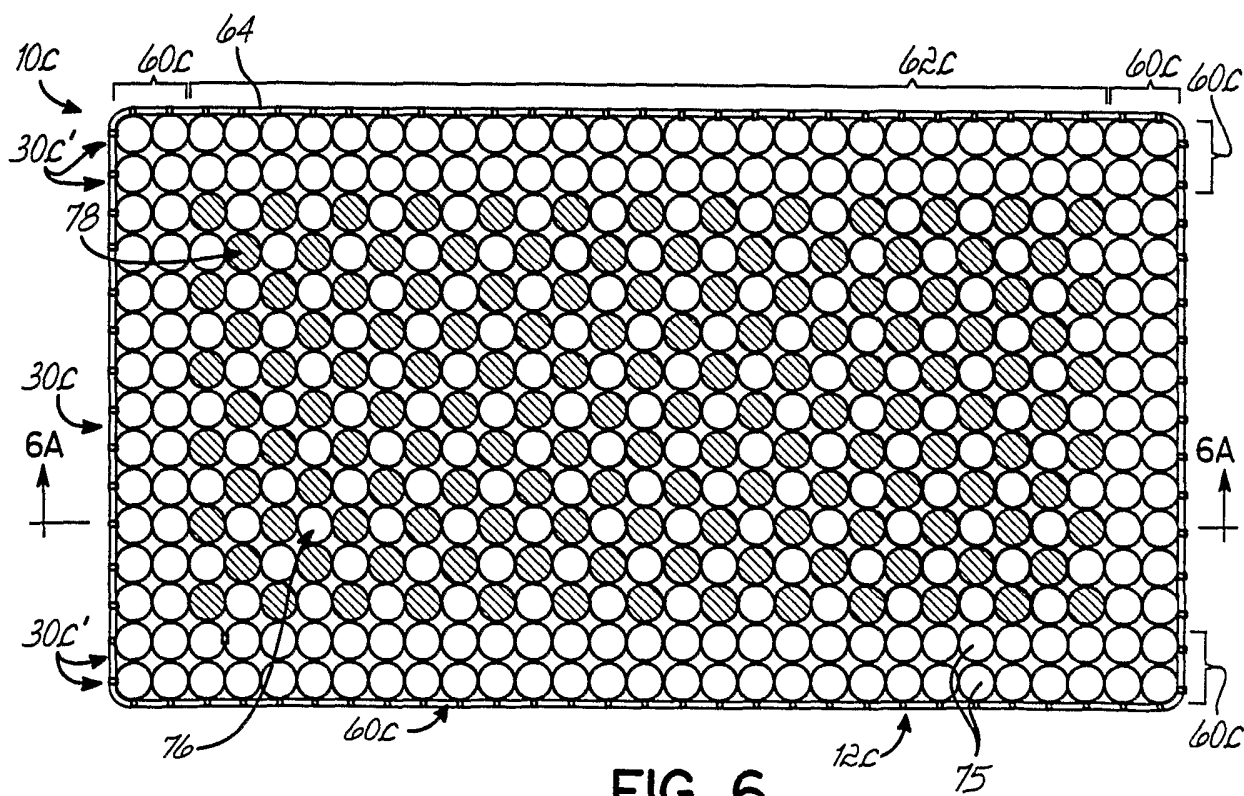
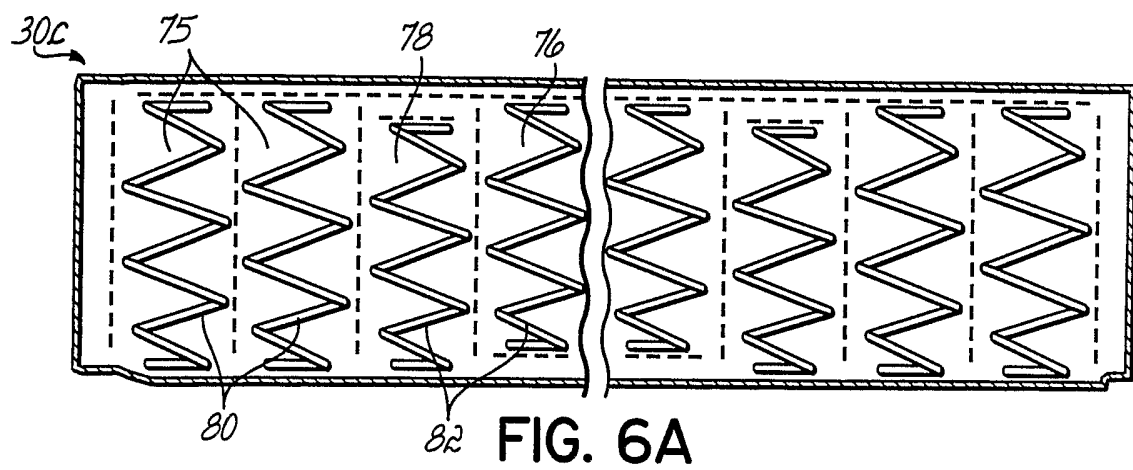
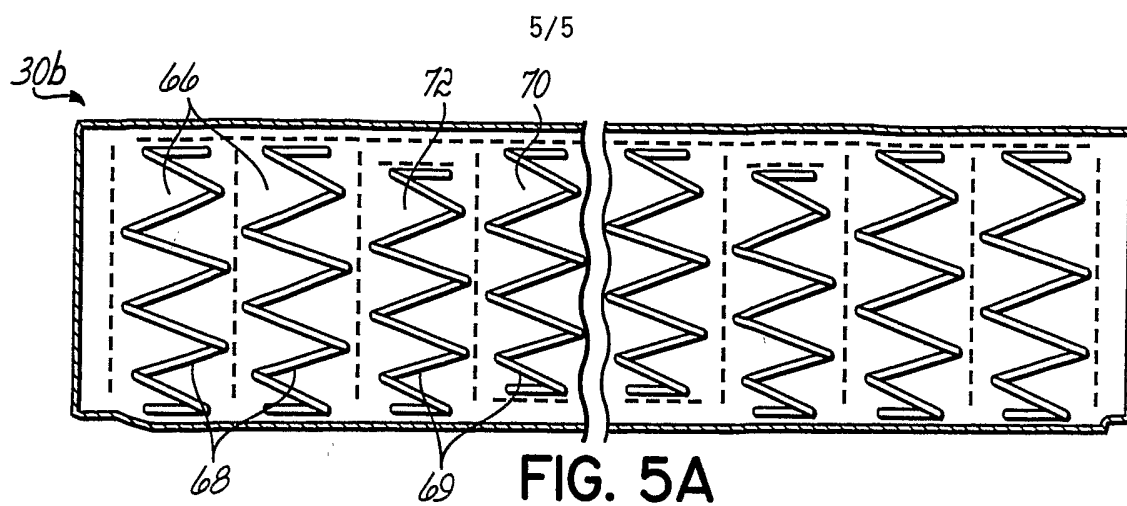


FIG. 6



INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/24777

A. CLASSIFICATION OF SUBJECT MATTER IPC(7) : A47C 16/00 US CL : 005/655.800 According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) U.S. : 005/655.8, 716, 720, 727 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 1,852,943 A (SWANSON) 05 April 1932 (05.04.1932)	
A	US 4,679,266 A (KRAFT) 14 July 1987 (14.07.1987)	
A	US 2,236,007 (OLDHAM) 25 March 1941 (25.03.1941)	
☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 08 September 2004 (08.09.2004)		Date of mailing of the international search report 28 SEP 2004
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 305-3230		Authorized officer for Randolph Reese <i>RBrown</i> Telephone No. 703-308-1113