

[54] **METHOD OF PRODUCING A SPRING CORE MATTRESS**

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Related U.S. Application Data

[63] Continuation of Ser. No. 289,565, Sept. 15, 1972, which is a continuation of Ser. No. 66,789, Aug. 25, 1970, abandoned.

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[58] Field of Search 264/45.8, 46.2, 46.7, 46.5, 264/261, 263, 221; 5/351

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[57] **ABSTRACT**

A spring core mattress and method of making the same, according to which a spring core composed of a plurality of coil springs has end portions of the end coils of said springs embedded at least partially in cover plates which are substantially parallel to each other while said coil springs are under a pre-load, cover means surrounding peripheral portions of said coil springs while said cover means and said cover plates are surrounded by foamed-out material and are held thereby in their respective relative positions.

18 Claims, 3 Drawing Figures

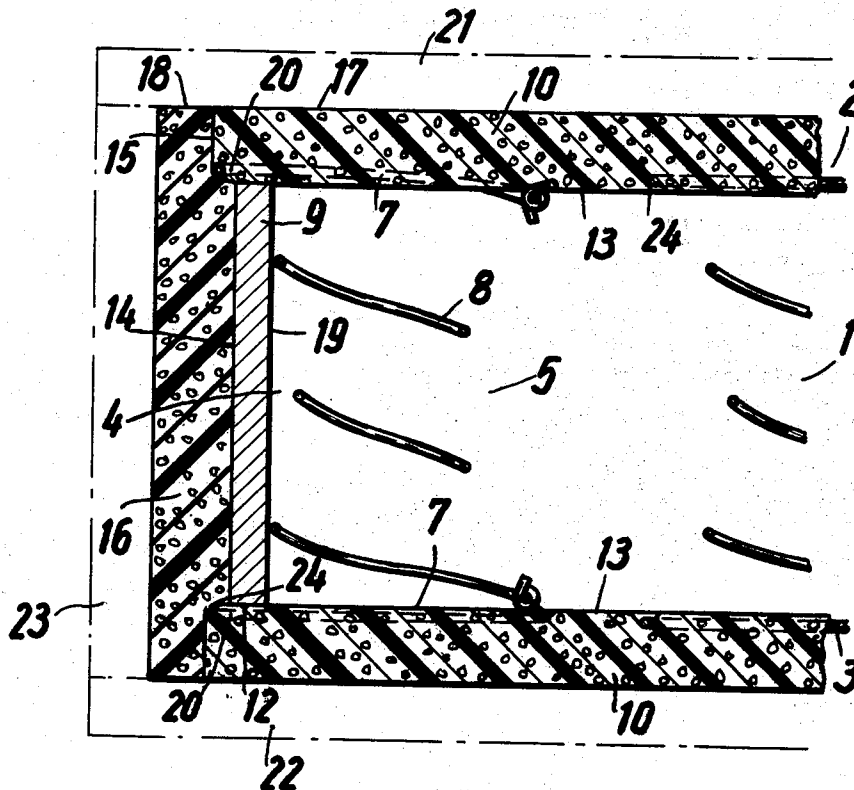


Fig. 1

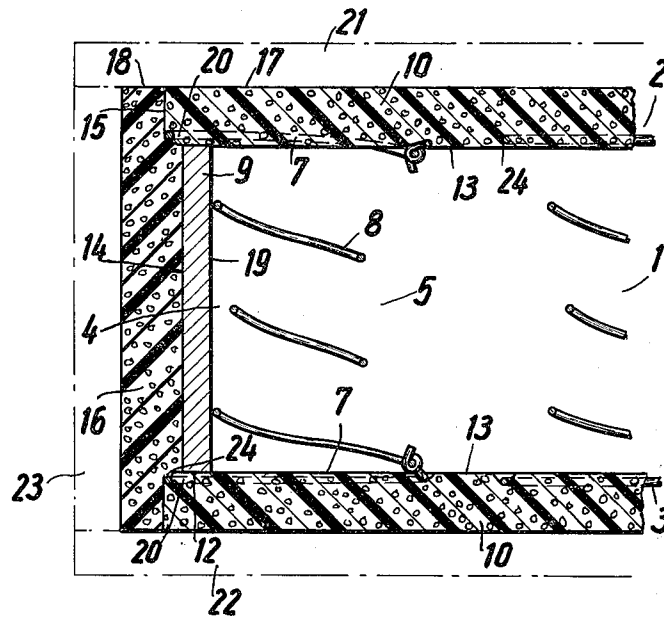


Fig. 2

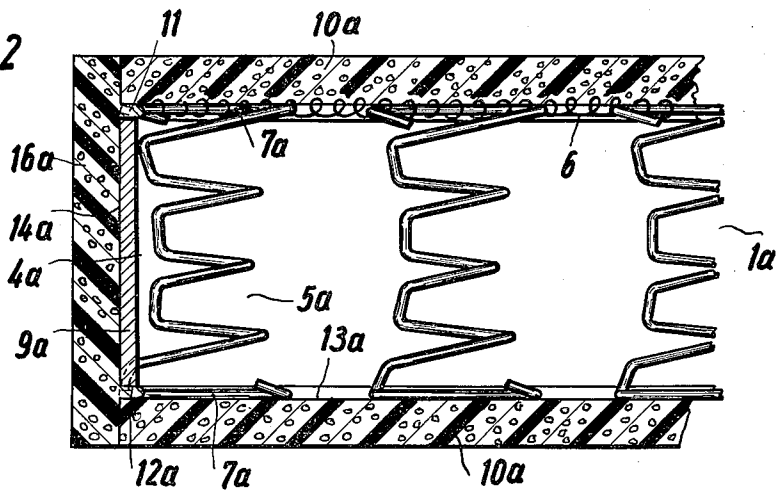
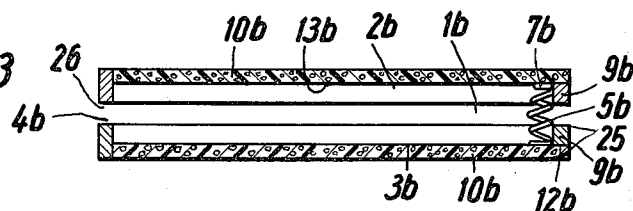


Fig. 3



METHOD OF PRODUCING A SPRING CORE MATTRESS

This is a continuation of application Ser. No. 289,565 filed Sept. 15, 1972, which is in turn a continuation of Ser. No. 66,789, filed Aug. 25, 1970 and now abandoned.

The invention concerns mattresses and, more specifically, relates to a method for covering a spring core of a mattress or the like with foamed material, the spring core being provided, at least on the upper side thereof with a covering, in particular a foamed material sheet, and the sides being covered with covering parts.

For fixing foamed material coverings to a spring core, hitherto clamps have been used. This method is very complicated and time consuming, and in addition poor edge formations result.

Therefore, it is an object of this invention to provide a method whereby in a simple manner, a secure connection of covering parts to one another and to the spring core is possible.

According to the present invention a method for covering a spring core of a mattress or the like with foamed material in which the spring core is provided, at least on its upper side, with a covering, in particular with a sheet of foamed material, while the marginal sides are covered with marginal covering parts, is characterized in that at the outer surfaces of the spring core parts of such core are embedded in the synthetic material foam formed in situ and are thereby connected to the covering.

The connection of the covering to the spring core therefore takes place by means of foamed material and thus by the same material of which also the covering consists so that a secure connection free of noise results which can be produced extremely simply and quickly.

The invention is illustrated by way of example in the accompanying drawing, in which:

FIG. 1 is a vertical cross section through a part of a mattress constructed in accordance with the invention.

FIG. 2 is a section similar to that of FIG. 1 and illustrates a mattress made according to a modified method of the present invention.

FIG. 3 is a vertical cross section through still another modified mattress made according to the present invention.

Referring now to the drawing in detail, and to FIG. 1 thereof in particular, a mattress constructed in accordance with the invention includes a generally rectangular spring core 1 having top and bottom surfaces 2, 3 and sides 4. The core comprises a plurality of springs 5, such springs being arranged in side-by-side rows and, if desired, being connected together by wires extending longitudinally and transversely of the spring core. Such wires may e.g., be parallel to the said top and bottom surfaces of the core. The said turns of the individual springs of the spring core lie in planes parallel to the top and bottom surfaces of the core, and indeed define such surfaces. The end turns 7 of the individual springs may be circular, rectangular, or otherwise. The spring windings 8 located between the end windings 7 may have a vertical projection which is smaller than that of the end windings 7 so that the springs 5 will have a double conical form.

A belt 9, for instance of textile material, is provided about the sides 4 of the core 1 and while extending wholly about the core is symmetrical with regard to the

central plane of spring core 1. The width of the belt 9 is approximately equal to the thickness of the spring core of the finished mattress.

A sheet 10 of foamed material is applied to each of the top surface 2 and bottom surface 3 of the core, such sheet being of a shape corresponding to the shape of the core as defined by the end turns 7 of the individual springs thereof. In the arrangement shown, the outer face 14 of the cover belt 9 projects less beyond the spring core than do the edges 15 of the foamed material sheet 10, so that parts 20 of the end turns 7 of the spring 5 lie outwardly of the edges of the belt 9 and project beyond its outer face 14.

After the belt 9 and the sheets 10 of foamed material have been applied to the spring core, the whole is clamped in a mould, for example, by plates 21, 22, 23 shown in dot and dash lines, plates 21, 22 being disposed parallel to the top and bottom surfaces of the spring core and plates 23 being arranged perpendicular thereto. The separation of plates 21, 22 is slightly less than the relaxed thickness of the core and the applied material sheets 10 in order that the end turns 7 of the springs 5 are pre-loaded and pressed into the inner face 13 of the foamed material sheet 10 in which they form groove-like recesses 24 so that the end turns 7 are partially embedded in the foamed material sheets 10. Simultaneously, the springs 5 are compressed in their axial direction. The pre-loading of spring core 1 due to the clamping action of the mould plates on the spring core causes the edges 12 of the cover belt 9 to be pressed into the groove-like recesses 24 so that the end turns 7 of the springs 5, are, in the area of the belt 9, closely surrounded on the one hand by the foamed material sheets 10 and on the other hand by the edges of the belt 9. In this way, the space within the spring core 1 and defined by the foamed material sheets 10 and the belt 9 is substantially sealed against ingress of, for example, ungelled synthetic foamed plastics material. The side plates 23 of the mould are arranged in spaced disposition relative to the edges of the foamed material sheets 10 and the outer surface of the belt 9 to define a space to receive a foaming synthetic material, which latter may be warm or cold foam, preferably, however cold foam so that on foaming and subsequent curing, a foamed material layer 16 is formed which has a thickness that corresponds approximately to the thickness of the foamed material sheets 10. The foamed material layer 16 combines or unites with the foamed sheets 10 and, with a suitable choice of the material, also with the belt 9, so that the foamed material sheets 10 can be connected to one another and at the same time to the belt 9. The foamed material layer 16 is foamed out up to the plane of the outer surfaces 17 of the foamed material sheets 10 so that the narrow edges 18 thereof will be located in the plane of said outer surfaces 17 and the foamed material layer 16 will be connected to the narrow edges 15 of the foamed material sheets 10.

Furthermore, during the foaming action, the foam enters those parts of the groove-like recesses 24 which are located outwardly of the belt 9, and thus the ends 12 of the end turns 7 of the springs 5 located in such recesses become embedded in the foam. Since the foam also penetrates into the foam material sheets 10, the protruding ends 12 of the end turns 7 of springs 5 are completely surrounded by foam. By means of this embedding in foam of the parts 12, a positive connection between the spring core 1 and the foamed material covering takes place which can be produced simulta-

neously with the formation of the covering. As a result thereof, movements of the spring core relative to the foamed material covering are prevented. Furthermore, separation of the foamed material parts 16, 10 and belt 9 from the spring core is obviated. The foaming out may also be effected in such a way that at the same time a connection of the narrow edges of the belt 9 to the inner faces 13 of the foamed material sheets 10 is attained. Upon opening the mould on completion of the gelling of the foam, the loading of the core brought about by the mould plates 21, 22 is substantially maintained.

In the embodiment shown in FIG. 2 the width of the belt 9a, arranged approximately symmetrically in relation to the central plane of the spring core 1a, is less than the height of the spring core 1a, the foamed material sheets 10a as before, corresponding in size to the planview of the spring core 1a. The end turns 7a of the spring 5a of the spring core 1a being located at the sides 4a or defining these sides project into the gap 11 between the actual edge 12a of the belt 9a and the opposite inner face 13a of the pertaining foamed material sheet 10a. On foaming of the foamed material layer 16a, the foam enters the gaps 11 so that those parts of the end windings of the springs 5a are embedded in the foamed material and consequently are connected thereto. As shown in the drawing, bridge or web-shaped strips of the foamed material layer 16a are formed in the gaps 11, which on the one hand are connected to the inner faces 13a of the foamed material sheets 10a, and on the other hand, are connected to the narrow edges 12a of the belt 9a. The end turns 7a of the springs 5a are embedded in the strips so that a positive connection between the spring core 1a and the foamed material covering is attained. Also with the embodiment illustrated in FIG. 2, the end turns 7a of springs 5a can be arranged to project beyond the outer face 14a of the belt 9a so that a still larger part of these end turns is embedded in the foamed material layer 16a. The springs 5a are connected to one another by means of the fine wires 6, as before.

As shown in FIG. 3, instead of the covering parts 9, 16 which, according to FIG. 1 extend beyond the height of the spring core, also web-shaped covering parts 9b may be provided, the total height of which is less than the thickness of the spring core 1b, only a spring 5b being shown of core 1b. In the embodiment illustrated, the bridge or web-shaped pieces 9b are arranged at the insides 13b of the foamed material sheets 10b within the marginal region thereof, so that each bridge piece 9b defines a shape corresponding to the outline form of the mattress, the two bridge pieces 9b lying parallel one to the other and in opposed disposition. The bridge pieces 9b may, as pre-fabricated parts, be fixed with their corresponding longitudinal edges 12b to the inner surface 13b of the sheet 10b by means of an adhesive, for example, by cold foam. It is however also possible, in an advantageous manner, to make the bridge pieces 9b in a single foaming process and to connect the same to plates 10b while, especially in this instance an embedding of the end turns 7b of the spring core 1b in the bridge pieces 9b can be effected in a simple manner so that both large sides 2b, 3b of the spring core 1b are connected to the covering in the edge area of the mattress.

The bridge pieces 9b provided at the edges 4b of the spring core 1b form, with their spaced edges 25b which in spaced relationship to each other face each other

form an opening 26 which extends around the spring core. With this design, a reduction in the weight of the mattress, an increase in the air permeability thereof, and soft spring properties are attained.

It is, of course, to be understood that the present invention is, by no means, limited to the specific showing in the drawing, but also comprises any modifications within the scope of the appended claims.

It may also be added that any standard foamable material as, for instance, foam rubber material may be used in connection with the present invention.

What I claim is:

1. A method of producing a spring cushion body in which a coil spring core is covered with and secured to foamed, elastomeric material, said spring core being formed by assembling a plurality of coil springs into a spring core having end coils defining a surface with partial segments of the end coils lying on the periphery of said surface, said method comprising placing a side wall band around the sides of said spring core with one peripheral edge adjacent said peripheral segments of said end coils, positioning said spring core with said side wall band in a mold with a sheet of foamed, elastomeric material covering the end coils defining said surface and with a space between the side walls of the mold and sides of said spring core completely surrounding the sides of the spring core, said space being closed on the inner side by said side wall band and on the other sides by said mold to provide a completely enclosed space, admitting a foamable and solidifiable elastomeric material to said space and permitting the material to foam and solidify to form a foamed elastomeric material filling said space and bonded to said sheet of foamed, elastomeric material and to said side wall band, so that said foamed material forms an integral cover of said surface of said end coils and the sides of said core, said peripheral segments of said end coils being embedded in the foamed material to secure said end coils to the casing formed by said foamed material.

2. A method of producing a spring cushion body in which a coil spring core is covered with and secured to foamed, elastomeric material, said spring core being formed by assembling a plurality of coil springs into a spring core having end coils defining a surface with partial segments of the end coils lying on the periphery of said surface, said method comprising placing a side wall band around the sides of said spring core with one peripheral edge adjacent the peripheral segments of said end coils and with said segments projecting outwardly beyond the peripheral edge of said band, covering the surface defined by the end coils with a cover sheet of foamed, elastomeric material, moving said peripheral segments toward the opposite ends of said springs and retaining them in such position under stress, enclosing a space surrounding the sides of said spring core with the side band and peripheral edge of said cover sheet of foamed material forming one side of said space and forming the other sides of said space to enclose completely said space with said peripheral segments projecting beyond said side into with said space, admitting a foamable and solidifiable elastomeric material into said space and permitting the material to foam and solidify to form a wall of foamed, elastomeric material surrounding the sides of said spring core and bonded to said side band and the peripheral edge of said cover sheet, so that said foamed material forms an integral cover of said surface of said coils and the sides of said core, with said peripheral segments of the end coils em-

bedded in the foamed material to secure the end coils to said casing.

3. A method of producing a spring cushion body in which a coil spring core is covered with and secured to foamed, elastomeric material, said spring core being formed by assembling a plurality of coil springs into a spring core having end coils defining a surface with partial segments of the end coils lying on the periphery of said surface, said method comprising placing a side wall band around the sides of said spring core extending between the end coils of the opposite ends of the coil springs to surround said spring core completely between the end coils of the springs, positioning said spring core with said side wall band in a mold with a sheet of material in the bottom of the mold, and with a second sheet of material covering the ends of the coil springs defining said surface at the top of the mold, at least one of said sheets being of foamed, elastomeric material, the side walls of said mold being spaced from the sides of said spring core to provide a space surrounding said spring core enclosed by said side wall band and edges of said sheets and by the walls of said mold with said partial segments projecting into said space, moving said partial segments of the end coils defining said surface covered by the sheet of foamed, elastomeric material toward the opposite ends of said springs defining the opposite surface and retaining them in such position under stress, admitting a foamable and solidifiable elastomeric material into said space and permitting the material to foam and solidify to form a wall of foamed, elastomeric material surrounding said spring core bonded to said side wall band and to said sheet of foamed material with said partial segments embedded in said foamed material, so that said spring core is enclosed on at least one surface of the end coils and sides by an integral cover of foamed, elastomeric material with the partial segments of the end coils defining said surface embedded in said foamed material.

4. A method of producing a spring cushion body as claimed in claim 1, in which said side wall band extends between the end coils at both ends of the springs of said spring core to cover completely the sides of said spring core between said end coils, and the side walls of the mold are spaced from the side band and sides of said spring core the width of said sides, to provide a wall of foaming material completely surrounding the sides of said spring core.

5. A method of producing a spring cushion body as claimed in claim 2, in which said partial segments project beyond the peripheral edge of said sheet of foamed material, so that said segments are embedded in the foamed material admitted to said space.

6. A method of producing a spring cushion as claimed in claim 3 in which the other sheet in the mold is of foamed, elastomeric material, and the foaming material in the space is bonded to both said sheets and said side wall band and secured to the partial segments of the end coils at both ends so that the entire spring core is completely enclosed by foamed, elastomeric material secured to the spring core by the partial segments of the end coils.

7. A method of producing a spring cushion body, as claimed in claim 3, in which the top wall of said mold is moved downwardly toward the bottom to compress said springs and to place the partial segments of the end coils under stress.

8. A method of producing a spring core cushion body which includes the steps of: fabricating a spring core assembly of a plurality of coil springs so that at least portions of the end coils of said springs define the top and bottom of said core assembly and include partial segments of said end coils lying at outer edge locations of said spring core assembly, placing side wall cover means of approximately the same height as said coil springs around the outer periphery of said coil spring assembly and placing elastomeric cover sheets over the top and bottom of said spring core assembly, positioning said spring core assembly, said side wall cover means, and said elastomeric cover sheets in a mold having an open space surrounding the sides of the spring core assembly, said space being bounded on the inner side by said side wall cover means and on an outer side by the inside surfaces of said mold, moving at least the peripheral portions of said cover sheets toward each other so as to preload at least said partial segments of said coil springs, and while holding said side wall cover means and said cover sheets in their thus established relative positions during maintained preload of said partial segments, filling said space with foamable and solidifiable elastomeric material, and permitting said material to foam and solidify to form foamed elastomeric side walls united to said cover sheets and firmly interconnected with said partial segments of said coil springs.

9. A method of producing a spring core cushion body which includes the steps of: fabricating a generally rectangular spring core assembly of a plurality of coil springs so that the end coils of said springs define the top and bottom of said spring core assembly and include partial segments of said end coils lying at outer edge locations of said spring core assembly, placing side wall cover means of approximately the same height as said coil springs around the outer periphery of said coil spring assembly and placing elastomeric foam material cover sheets over the top and bottom of said spring core assembly, positioning said spring core assembly, said side wall cover means, and said elastomeric cover sheets in a mold having an open space surrounding the sides of the spring core assembly, said space being bounded on the inner side by said side wall cover means and on an outer side by the inside surfaces of said mold, moving at least the peripheral portions of said cover sheets toward each other so as to preload at least said partial segments of said coil springs and while holding said side wall cover means and said cover sheets in their thus established relative positions during maintained preload of said partial segments, filling said space with foamable and solidifiable elastomeric material, and permitting the same to foam and solidify and form foamed elastomeric side walls united to said foam sheets and said partial segments of said coil springs.

10. A method according to claim 9 which includes moving said peripheral portions of said sheets toward each other to such an extent that the end coils of said coil springs are at least partially embedded in said cover sheets.

11. A method according to claim 9 which includes placing said side wall cover means relative to said partial segments of said end coils so that said partial segments protrude outwardly beyond the outer surface of said side wall cover means and are embedded in said foamable elastomeric material when the latter has solidified.

12. A method according to claim 9 which includes placing said side wall cover means relative to said partial segments of said end coils so that said partial segments protrude outwardly beyond the outer surface of said side wall cover means and are interconnected with said sheets and said foamable synthetic material when the latter has solidified and united with said sheets.

13. A method of producing a spring core cushion body which includes the steps of: fabricating a generally rectangular spring core assembly of a plurality of coil springs so that at least portions of the end coils of said springs are approximately located in two spaced parallel planes and include partial segments of said end coils lying at outer edge locations of said spring core assembly, placing side wall cover means of approximately the same height as said coil springs around the outer periphery of said coil spring assembly and placing elastomeric foam material cover sheets over the top and bottom of said spring core assembly, positioning said spring core assembly, said side wall cover means, and said elastomeric cover sheets in a mold having an open space surrounding the sides of the spring core assembly, said space being bounded on the inner side by said side wall cover means and on an outer side by the inside surfaces of said mold, and while holding said spring core assembly, said side wall cover means, said cover sheets and said mold in their thus established relative positions, filling said space with foamable and solidifiable elastomeric material, and permitting said material to foam and solidify and form foamed elastomeric side walls united to said foam cover sheets and firmly interconnected with said partial segments of said coil spring.

14. A method according to claim 13 which includes placing said side wall cover means relative to said partial segments of said end coils so that said partial segments protrude outwardly beyond the outer surface of said side wall cover means and are embedded in said foamable elastomeric material when the latter has solidified.

15. A method according to claim 13 which includes placing said side wall cover means relative to said partial segments of said end coils so that said partial segments protrude outwardly beyond the outer surface of

said side wall cover means and are interconnected with said sheets and said foamable elastomeric material when the latter has solidified and united with said sheets.

16. A method of producing a spring core cushion body which includes the steps of: fabricating a spring core assembly of a plurality of coil springs so that at least portions of the end coils of said springs are approximately located in two spaced parallel planes and include partial segments of said end coils lying at outer edge locations of said spring core assembly, placing side wall cover means around the outer periphery of said coil spring assembly and placing an elastomeric foam material cover sheet over the top of said spring core assembly, positioning said spring core assembly, said side wall cover means, and said elastomeric cover sheet in a mold having an open space surrounding the sides of the spring core assembly, said space being bounded on the inner side by said side wall cover means and on an outer side by the inside surfaces of said mold, and while holding said spring core assembly, said side wall cover means, said cover sheet and said mold in their thus established relative positions filling said space with foamable and solidifiable elastomeric material, and permitting said material to foam and solidify and form side walls united with said foam cover sheet and firmly interconnected with said partial segments of said coil springs.

17. A method according to claim 13 which includes placing said side wall cover means relative to said partial segments of said end coils so that said partial segments protrude outwardly beyond the outer surface of said side wall cover means and are embedded in said foamable elastomeric material when the latter has solidified.

18. A method according to claim 17 which includes placing said side wall cover means relative to said partial segments of said end coils so that said partial segments protrude outwardly beyond the outer surface of said side wall cover means and are interconnected with said sheet and said foamable elastomeric material when the latter has solidified and united with said sheet.

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