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.

26 Claims, 3 Drawing Figures
This is a division of copending application Ser. No. 66,789 Lehmann filed Aug. 25, 1970 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 the 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 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 or cover means 9, for instance of textile material, is provided about the sides 4 of 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 or covering part 9 is approximately equal to the thickness of the spring core of the finished mattress.

A cover plate means or cover 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 or cover means 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 or cover means 9 and project beyond its outer face 14.

After the belt or cover means 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 or covering part 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 or covering part 9, closely surrounded on the one hand by the foamed material sheets 10 and on the other hand by the edges of the belt or covering part 9. In this way, the space within the spring core 1 and defined by the foamed material sheets 10 and the belt or covering part 9 is substantially sealed against ingress of, for example, un-gelled synthetic foamed plastics material. The side plates 23 of the mould are arranged in spaced disposition on 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 or covering part 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 or covering part 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 ma-
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 simultaneously 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 or covering part 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 or covering part 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 or covering part 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 or covering part 9a and the opposite inner face 13a of the retaining 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 gap 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 or covering part 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 or covering part 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 the 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.

1 claim:

1. A cushion body which includes: a spring core comprising a plurality of coil springs having the end portions of their end turns located at least approximately in two spaced parallel planes, cover means covering outer peripheral portions of said coil springs, cover plate means arranged in substantially parallel spaced relationship to each other and firmly clamping said coil springs therebetween while preloading the coils which are located adjacent the periphery of said core, and foamed solidified synthetic material surrounding said cover means and the peripheral portions of said cover plate means and having at least portions of said coil springs embedded therein.

2. A cushion body according to claim 1, in which the end portions of the end turns of said coil springs are embedded in said foamed solidified synthetic material.

3. A cushion body according to claim 2, in which the end portions of said end turns of said coil springs extend outwardly beyond the respective adjacent end of said cover means.

4. A cushion body according to claim 1, in which said cover plate means extend outwardly beyond said cover means.

5. A cushion body according to claim 1, in which said cover plate means form part of the top and bottom of said mattress, and in which said cover means between said top and bottom form a part of the surrounding wall means of said mattress.

6. A cushion body according to claim 3, in which the end portions of the end turns of said coil springs extend to the outer end of the respective adjacent outer end of the cover plate means.

7. A cushion body according to claim 1, in which the diameter of at least those turns of said coil springs which are adjacent said cover means decreases from said cover plate means toward that place of symmetry of said spring core which is substantially parallel to said cover plate means.

8. A cushion body according to claim 1, in which the inner surface of said cover means are located exclusively between said pre-fabricated parts, and said core body according to claim 1, in which the cover means is provided with opening means between said cover plate means.

9. A cushion body according to claim 1, in which the cover means are of foamed solidified synthetic material having at least a portion of the respec-
3,790,972

tive adjacent end turns of said coil springs embedded therein.

11. A cushion body according to claim 1, in which the edges of said cover means engage inner surface portions of said cover plate means, and in which said foamed solidified synthetic material surrounds only said cover means and the respective adjacent end faces of said cover plate means.

12. A cushion body according to claim 1, in which the end turns of coil springs adjacent said cover means extend between the edges of the latter and the respective adjacent cover plate means while foamed solidified synthetic material extends into the thus formed gaps between the edges of said cover means and the respective adjacent cover plate means.

13. A cushion body according to claim 1, in which portions of said coil springs embedded in said synthetic solidified foamed material are at least partially embedded in at least one of said cover plate means.

14. A cushion body according to claim 1, in which said cover means are formed by strip material which is thinner than said cover plate means.

15. A cushion body according to claim 1, in which said cover means are more air permeable than said cover plate means.

16. A cushion body according to claim 1, in which said cover means consists of a material selected from the group consisting of foamed material, textile material, and synthetic material.

17. A cushion body according to claim 1, in which said cover plate means are made of solidified foamed material.

18. A cushion body according to claim 1, in which said cover means includes a belt member.

19. A cushion body which includes:

a spring core assembly comprising a plurality of coil springs having top and bottom end coils, at least portions of said end coils of said springs defining the top and bottom of said core assembly, said end coils including partial segments lying at outer edge locations of said spring core assembly,

side wall cover means of approximately the same height as said coil springs located around the outer periphery of said coil spring assembly,

cover sheets over the top and bottom of said spring core assembly, at least the peripheral portions of said cover sheets being operable to preload at least said partial segments of said coil springs, and

foamed solidified synthetic material side walls surrounding said side wall cover means and firmly interconnecting said partial segments of said coil springs, said side walls, and said cover sheets.

20. A cushion body which includes:

a spring core assembly comprising a plurality of coil springs having top and bottom end coils, said end coils of said springs defining the top and bottom of said spring core assembly and including partial segments lying at outer edge locations of said spring core assembly,