July 26, 1966 G. S. FASANELLA 3,262,135

BEDDING STRUCTURE

Filed May 13, 1964 2 Sheets-Sheet 1

Fig. 1.

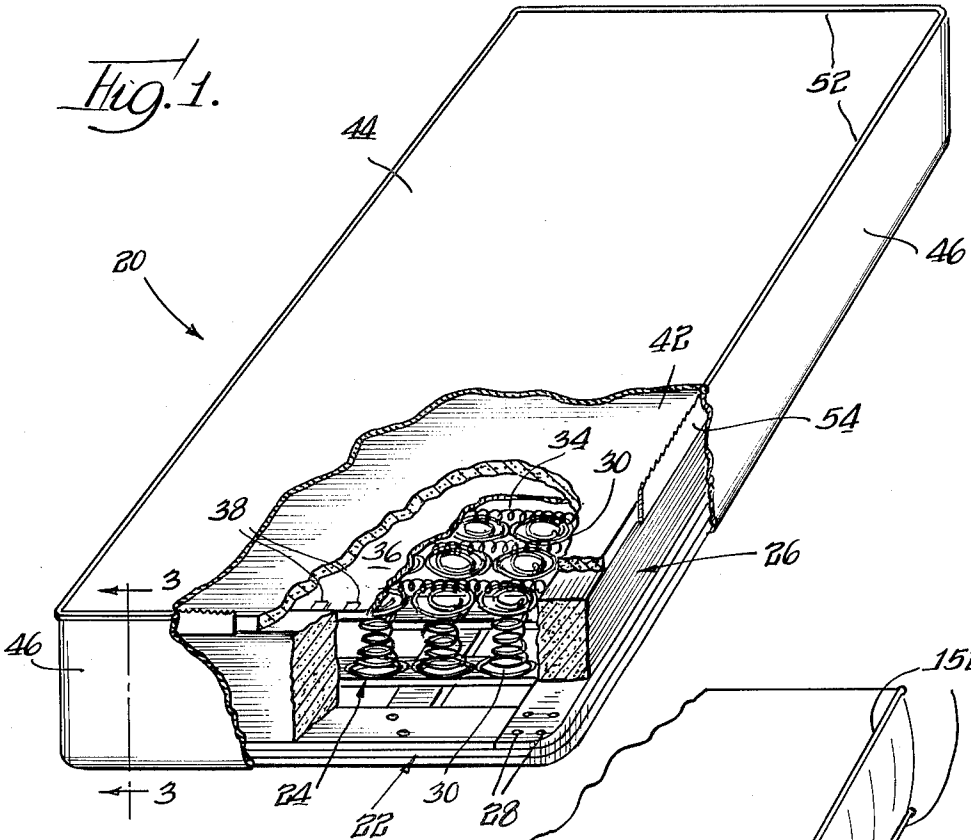
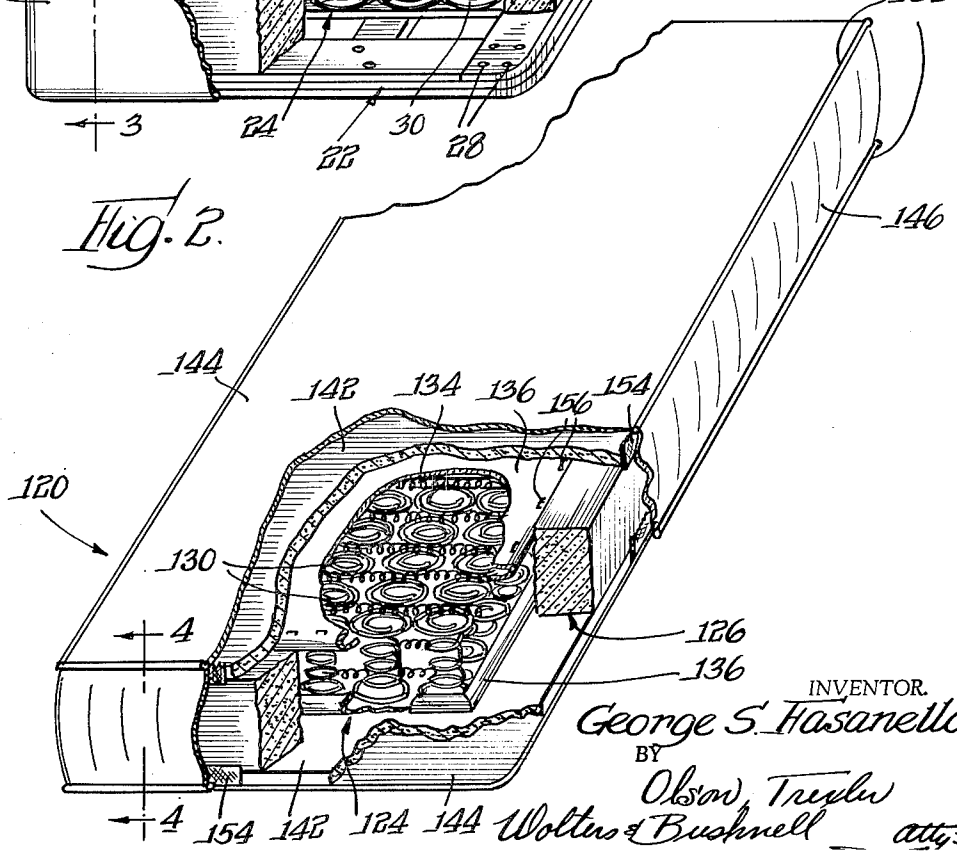



Fig. 2.

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Filed May 13, 1964 2 Sheets-Sheet 2

Fig. 3.

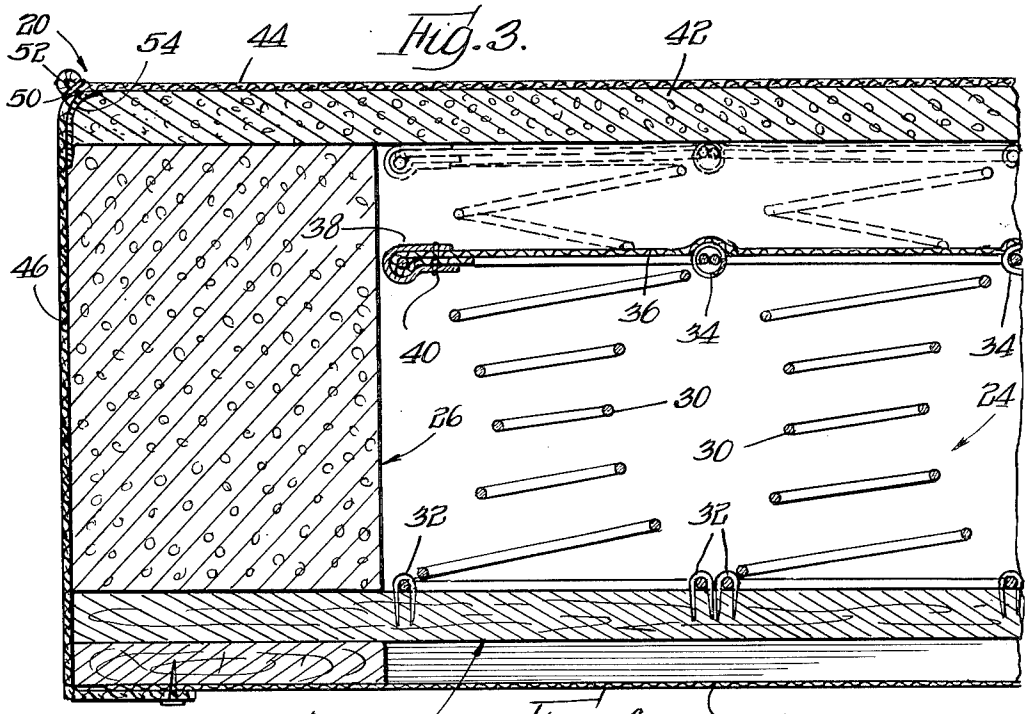
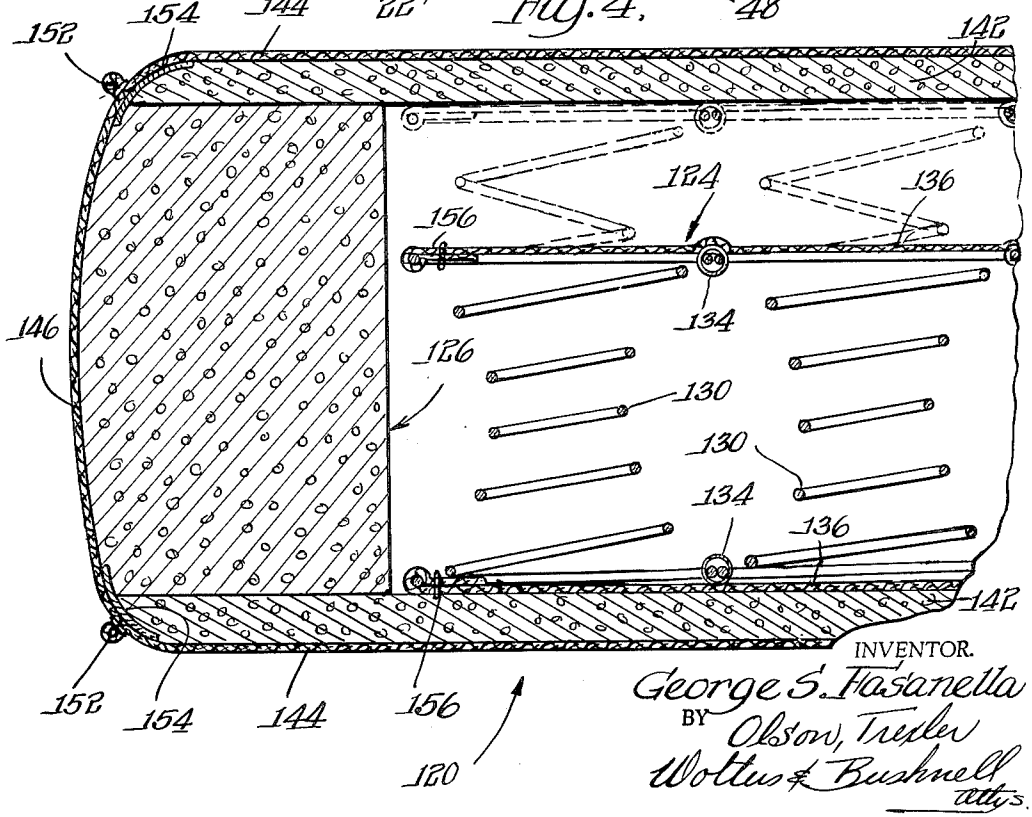



Fig. 4.

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United States Patent Office 3,262,135 Patented July 26, 1966



3,262,135

# BEDDING STRUCTURE

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5 Claims. (Cl. 5—351)

This invention relates generally to mattresses, boxspring units and analogous bedding structures.

In the past, innerspring mattresses and boxspring units have been commonly constructed of an assemblage of coil springs encompassed by a layer of non-woven cotton or other fiber padding. Since the coil springs in such a structure ordinarily depend on adjacent springs to share imposed loads, the edge of the unit has proved to be a weak area due to the absence of additional springs outwardly thereof. Attempts have been made heretofore to reinforce this edge with either a continuous steel border wire or spaced stiffening springs connected to the coil springs at the edge of the unit. However, where these members have been made strong enough to develop adequate reinforcement, they have produced a perimetric region noticeably lacking in resiliency. An uncomfortable sleeping surface has resulted.

More modernly, the edge springs have been reinforced with a strip of foam rubber or similar material, this strip being wedged to an appreciable depth between the opposite end coils of each edge spring to coact resiliently therewith in successfully firming up the otherwise weak edge of the unit. Such a mattress structure is disclosed in U.S. Patent No. 2,940,089, granted to Max Koenigsberg on June 14, 1960, and entitled "Mattress Structure." Even this eminently useful construction tends however to present a greater stiffness at the border of the unit than more centrally thereof.

Therefore, an important object of the present invention is to provide a construction for mattresses, boxspring units and analogous bedding structures wherein an independently functioning border formation is arranged to possess substantially the same degree of resiliency as the central portion of the structure whereby to establish a surface of uniform firmness.

A more general object of the invention is to provide a new and improved construction for mattresses, boxspring units and analogous bedding structures.

Another object of the invention is to provide a construction for mattresses, boxspring units and analogous bedding structures in which a border formation is arranged to be operable independently of a surrounded spring unit whereby to permit selection of a desired degree of firmness in the border formation.

These and other objects and features of the invention will become more apparent from a consideration of the following descriptions.

A structure in accord with the invention includes a spring unit comprising a plurality of coil spring elements. An endless border member of resilient foam material perimetrically surrounds this spring unit in detached relationship therewith whereby to respond freely and independently to human body loads imposed on the assemblage. The border member is selected to possess a dimension outwardly of the spring unit which is at least as great as the overall diameter of one of the spring elements whereby to promote the free and independent response of the two basic components. In addition, the spring unit and the border member are advantageously enclosed in a pliant sheath or covering which forms a closed envelope for retaining the spring unit and the border member in assembled relationship.

In order that the principles of the invention may be readily understood, two embodiments thereof, applied respectively to a mattress and boxspring but to which the application is not to be restricted, are shown in the accompanying drawings wherein:



FIG. 1 is a perspective view of a boxspring unit embodying the invention, portions of the unit being broken away to reveal the details of construction;

FIG. 2 is a perspective view of a mattress unit embodying the invention, portions of the mattress unit being likewise broken away to reveal the details of construction;

FIG. 3 is an enlarged, elevational view in cross-section, taken substantially along the line 3—3 of FIG. 1, the normal condition of the spring unit being shown in broken outline and a compressed condition thereof being suggested in solid outline.

FIG. 4 is an enlarged, elevational view in cross-section, taken substantially along the line 4—4 of FIG. 2, the normal condition of the spring unit being shown in broken outline and a compressed condition thereof being suggested in solid outline.

Referring now in detail to the drawings and giving first consideration to FIGS. 1 and 3, a boxspring unit indicated generally by the numeral **20** will be seen to include a base frame **22**, a spring unit **24** and a border member **26**. The base frame **22** is fabricated from wood or other suitably rigid material, and the individual elements of the base frame **22** are permanently assembled using screws **28** or other conventional fasteners. With particular reference to FIG. 3, the spring unit **24** includes a suitable number of coil spring elements **30**. The coil spring elements **30** are advantageously fashioned as diploconical, wire coils and are conveniently arranged in rectilinear configuration in rows of tiers as is well illustrated in FIG. 1. At their lower ends, the spring elements **30** are fastened to the base frame **22** by staples **32** or other suitable means; and at their top ends, the spring elements **30** are interconnected by hog rings, not shown, and horizontal extending coil springs **34** in the conventional mtnner. Thus, the spring elements **30** are coupled together to form a resilient network.

A spring unit insulator **36** comprising a sheet of suitable fabric is advantageously disposed over the top ends of the spring elements **30** to be fastened in place at the edge spring elements by means of abbreviated tapes **38**. Tapes **38** are secured by stitching **40** or other fastening means.

In compliance with an important feature of the invention, the spring unit **24** is perimetrically surrounded by the border member **26**; and it will be appreciated that the border member **26** may be made as a single element or as a composite of several individual parts. In either event, the border member comprises an endless member present at all points along the edge of the boxspring unit **20**. As is well shown in FIG. 3, the border member **26** surrounds the spring unit **24** in detached relationship therewith, being advantageously spaced apart from the edges of the spring unit by some small distance. Because the border member and the spring unit are arranged in detached or free relationship relative to each other, they may respond substantially independently to human body loads imposed on the boxspring unit **20**.

Other structural features of the boxspring unit **20** are arranged to promote this free and independent response of the border member **26** and the spring unit **24**. For example, the spring elements **30** are selected to be of substantially equal height; and the border member **26** is cooperatively selected to possess substantially the same height as the spring elements in their relaxed or unloaded condition. The relaxed or unloaded condition of the spring elements **30** and therefore of the spring unit **24** is shown in FIG. 3 in broken outline where the equality of heights will be apparent from the illustration. The free and independent action of the spring unit **24** relative

to the border member **26** is illustrated by a compressed condition of the spring unit which is suggested in solid outline in FIG. 3. The free and independent response of the spring unit and the border member is also promoted by arranging the border member to take a dimension outwardly of the spring unit which is at least as great as the overall, common major diameter of spring elements **30**. The border member **26** thus may take a thickness or dimension in the horizontal plane that is from three to five inches in extent. The border member **26** has proved effective as an independent resilient element when provided in this thickness or in a greater thickness.

The detached state of the border member **26** permits fabrication of that member from a resilient material having a selected degree of resiliency, and the independent action of the border member assures that it will respond in strict accordance with the pre-selected resiliency of the material from which it is fabricated. Foamed polymeric materials have proved eminently suitable for use in fabricating the border member **26**, and polyurethane foams have proved particularly useful in this regard. In order to provide uniformity and continuity of support in the boxspring unit **20**, the border member **26** is selected to possess a resiliency substantially equal to the resiliency of the spring unit **24**. From such information as the density of the polymeric foam and the spring characteristics of the elements **30**, the resiliency of the spring unit and the border member can be calculated so as to produce a match or equality in the behavior of these two components. Similarly, the border member may be made to possess relatively greater stiffness or less resiliency than the spring unit without effecting the response of either component merely by suitably selecting the density and thickness of the material for the border member. Such an arrangement would of course be of advantage for a mattress unit used in a convertible sofa, for example, since the edge of such a mattress is used as a seating surface requiring a greater degree of support. The added stiffness or lowered resiliency would of course be provided without the use of border wires, edge springs or similar reinforcements; and accordingly, the resultant structure would not be subject to fracture or permanent deformation of such elements in use. In addition, this stiffened edge could be provided at only one side of the mattress unit and the remainder of the border could be arranged to match the spring unit in resiliency if desired.

With reference again to FIGS. 1 and 3, a thin topping pad or sheet **42** is disposed over the assembled spring unit **24** and the border member **26**; and advantageously, the topping sheet **42** is selected to be comparatively pliant in order not to interfere with the independent action of the spring unit and border member. Accordingly, the topping sheet **42** may be fabricated from a relatively low density foamed polymer, such as polyurethane foam. A fabric top panel **44**, border panels or skirts **46** and a bottom dust cover **48** cooperate with the topping sheet **42** and the base frame **22** in forming a closed envelope for retaining the spring unit **24** and the border member **26** in assembled relationship. In accordance with conventional practice, the top panel **44** and the border panels **46** may be joined by a sewn tape **50** so as to provide an edge bead **52**. If desired, a thin, flexible tape **54** of foamed material may be applied to the perimeter of the topping sheet **42** as by a suitable adhesive. In order to preserve positioning of the topping sheet **42** relative to the border member **26**, a suitable cement or adhesive may be applied between the contacting surfaces of these components. When the sheet **42** is thus bonded to the border member **26**, interconnection between the sheet **42** and the spring unit **24** is strictly avoided. This condition is illustrated in the solid line showing of FIG. 3.

It is to be understood that a mattress may be constructed to embody the invention as well as a boxspring unit. Therefore, such a mattress, designated generally by the reference numeral **120**, is illustrated in FIGS. 2 and 4; and since the mattress **120** incorporates many elements which are similar to those found in the boxspring unit **20**, like digits have been used to designate like parts with the prefix digit "1" being employed to distinguish those elements associated with the embodiment of FIGS. 2 and 4.



In embodying the invention in a mattress structure, a rigid base frame, such as the base frame **22**, is of course omitted and the topping sheet and top panel together with the spring insulator are duplicated on the underside of the unit. If desired, many minor variations in structure may be employed. For example, the spring unit insulators **136** may be attached to the edge spring units using staples **156** instead of stitching. However, the detached relationship of the spring unit **124** and the border member **126** is to be preserved in compliance with the invention. It will thus be apparent that whether the invention is embodied in a boxspring unit or in a mattress, the resultant structure presents the characteristics of the resilient border member at the edge and the characteristics of the spring unit inwardly of the edge.

From the foregoing descriptions, it will be evident that the instant invention presents a bedding structure which has desirable border characteristics and which is neat and tailored in appearance. It will also be apparent that a bedding structure constructed in accordance with the invention is easy to produce and susceptible of standardization. The border region of a bedding structure in accordance with the invention tends to prevent wrinkling, destruction or sagging of the border region; and by replacing the heavy border springs by light foam material, the total weight of the unit is held to a minimum for facility in manipulation by the housekeeper.

Therefore, the specific examples herein shown and described are to be considered as being primarily illustrative. Various changes beyond those described will, no doubt, occur to those skilled in the art; and such changes are to be understood as forming a part of this invention insofar as they fall within the spirit and scope of the appended claims.

The invention is claimed as follows:

**1.** For use in bedding structures and analogous articles, the combination comprising: a spring unit including a plurality of coil spring elements of predetermined overall diameter; border means of resilient material perimetrically surrounding said spring unit in detached relationship therewith whereby to respond freely and independently to human body loads imposed thereon, said border means having a dimension outwardly of said spring unit that is at least as great as the overall diameter of a said spring element whereby to promote said free and independent response, and enclosing means encompassing said spring unit and said border means to form a closed envelope for retaining said spring unit and said border means in an assembled relationship.

**2.** For use in bedding structures and analogous articles, the combination comprising: a spring unit including a plurality of coil spring elements and connector means coupling said spring elements together whereby to form a resilient network; border means of resilient foam material perimetrically surrounding said spring unit in detached relationship therewith whereby to respond freely and independently to human body loads imposed thereon, said foam material having a resiliency substantially equal to the resiliency of said spring unit whereby to provide uniformity and continuity of support; and enclosing means encompassing said spring unit and said border means to form a closed envelope for retaining said spring unit and said border means in assembled relationship.

**3.** For use in bedding structures and analogous articles, the combination comprising: a spring unit including a plurality of coil spring elements and connector means coupling said spring elements together whereby to form a resilient network; border means of resilient foam material

perimetrically surrounding said spring unit in detached relationship therewith whereby to respond freely and independently to human body loads imposed thereon, said foam material having a resiliency substantially less than the resiliency of said spring unit at least at one edge whereby to permit use of said edge as a seating surface; and enclosing means encompassing said spring unit and said border means to form a closed envelope for retaining said spring unit and said border means in assembled relationship.

**4.** For use in bedding structures and analogous articles, the combination comprising: a spring unit including a plurality of coil spring elements of predetermined overall diameter and connector means coupling said spring elements together whereby to form a resilient network; endless border means of resilient material perimetrically surrounding said spring unit in detached relationship therewith whereby to respond freely and independently to human body loads imposed thereon, said border means having a dimension outwardly of said spring unit that is at least as great as the overall diameter of a said spring element whereby to promote said free and independent response; and enclosing means encompassing said spring unit and said border means to form a closed envelope for retaining said spring unit and said border means in assembled relationship.

**5.** For use in bedding structures and analogous articles, the combination comprising: a spring unit including a plurality of coil spring elements of predetermined overall



diameter and substantially equal height and connector means coupling said spring elements together whereby to form a resilient network; endless border means of resilient foam material perimetrically surrounding said spring unit in detached relationship therewith whereby to respond freely and independently to human body loads imposed thereon, said border means having substantially the same height as said spring elements and said border means having a dimension outwardly of said spring unit that is at least as great as the overall diameter of a said spring element, whereby to promote said free and independent response; and enclosing means pliantly encompassing said spring unit and said border means to form a closed envelope for retaining said spring unit and said border means in assembled relationship.

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