Nov. 28, 1967 F. H. BARTZ 3,354,477

MATTRESS CONSTRUCTION

Filed Aug. 25, 1966 3 Sheets-Sheet 1

Fig. 1.

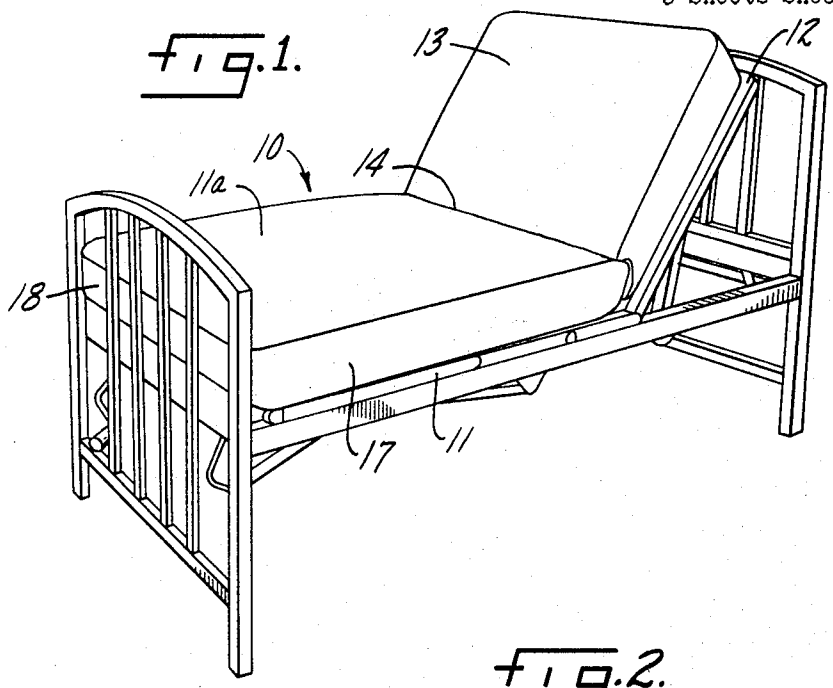
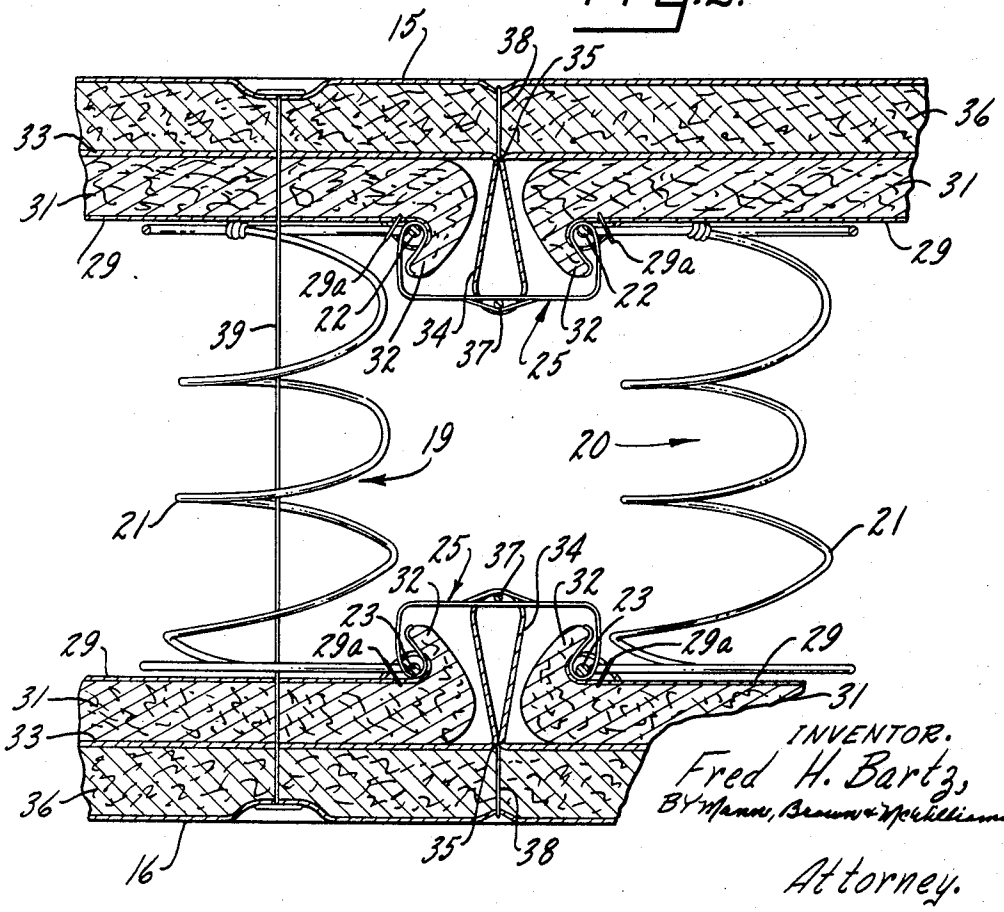


Fig. 2.



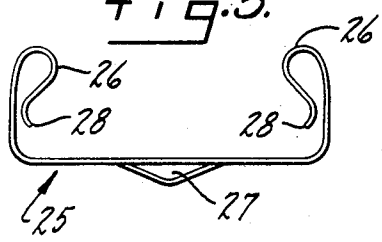
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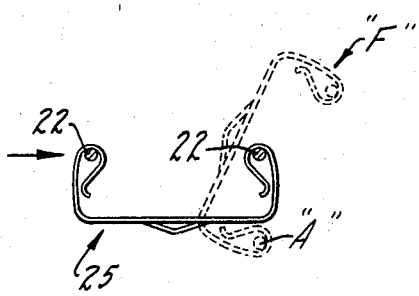
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MATTRESS CONSTRUCTION

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Fig. 3.





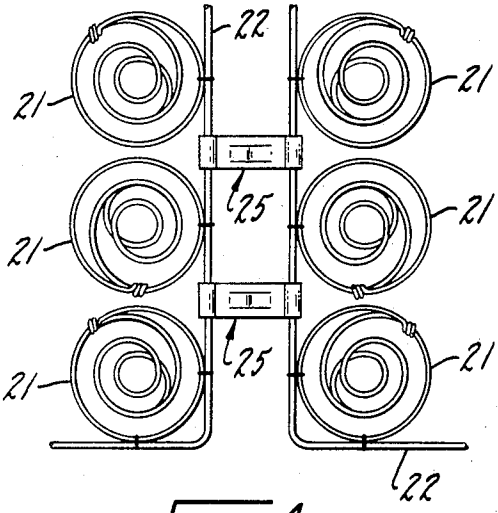


Fig. 4.

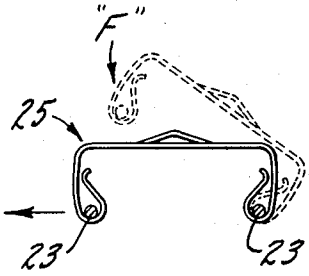


Fig. 5.

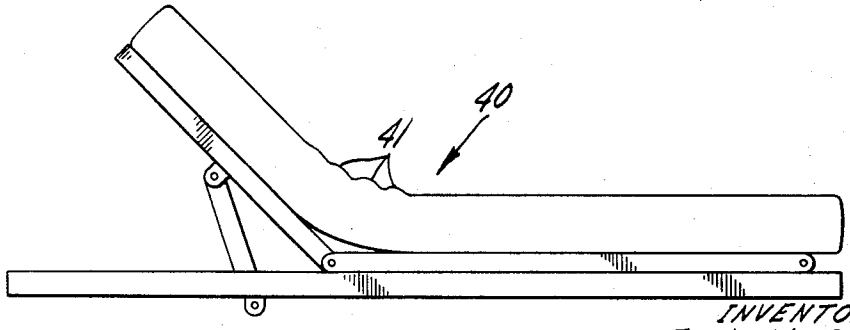


Fig. 6.

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MATTRESS CONSTRUCTION

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Fig. 8.

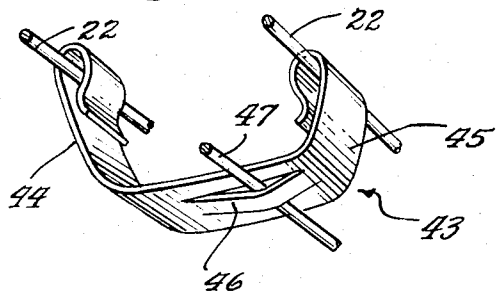
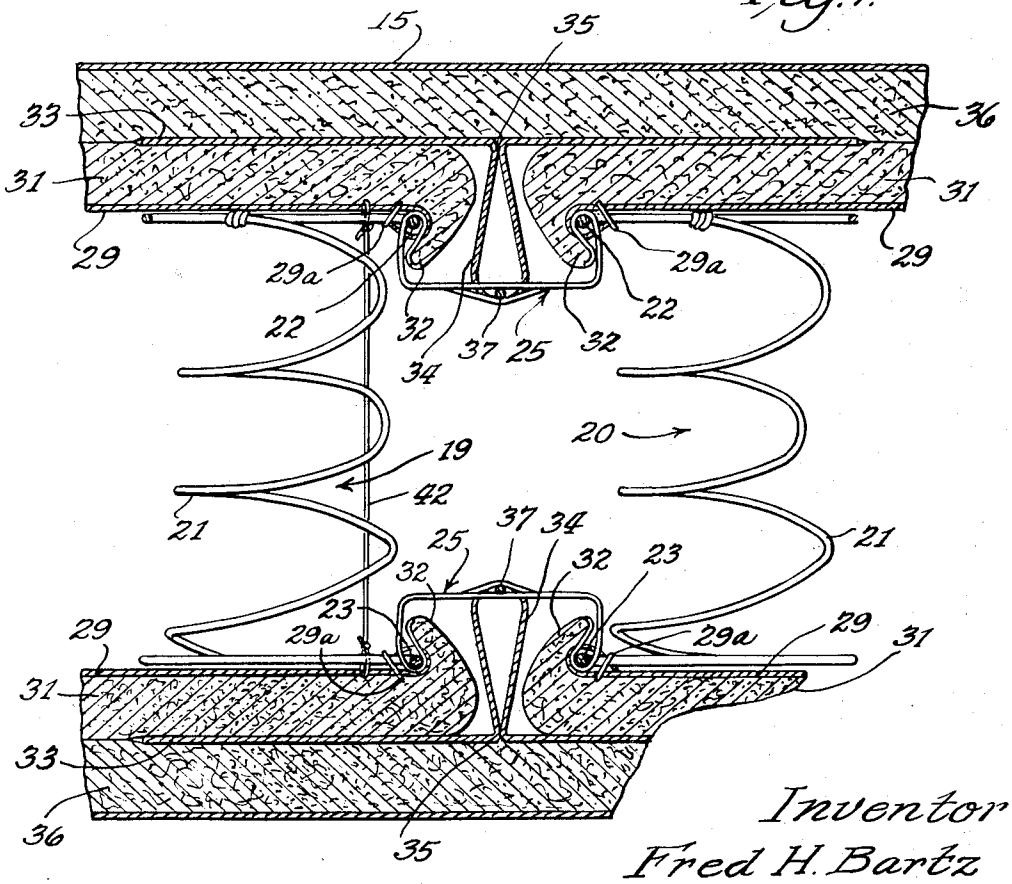


Fig. 7.



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3,354,477

MATTRESS CONSTRUCTION

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Filed Aug. 25, 1966, Ser. No. 582,782
13 Claims. (Cl. 5—352)

ABSTRACT OF THE DISCLOSURE

A foldable mattress consisting of spring sections which are connected together by U-shaped clips which provide spaces into which upholstery is tucked during folding movement of the sections.

This is a continuation-in-part of applicant's application Ser. No. 496,868 filed Oct. 18, 1965, now abandoned.

This invention is directed to new and useful improvements in mattress constructions, and is particularly concerned with improvements which facilitate folding of the mattress.

Various types of folding beds have been known and used for years for the purpose of enabling either a flat disposition of a mattress (as in a bed) or an angular disposition approximating the disposition of a chair so as to allow a person to sit generally upright on the mattress while having a back support. Ordinary mattress constructions do not lend themselves well to the folded position for the reason that the material of the mattress tends to assume a curvilinear disposition without a neat fold line between the horizontal section and the upright section of the mattress. Furthermore, when the mattress is of a coiled spring type, which is oftentimes desirable, folding of the mattress puts strain on the various springs and connecting wires. Coil springs are subjected to twisting forces in the folded position and the axes of the spring at and near the fold line tend to be distorted out of a position normal to the body of the person supported on the mattress. In the past special hinge structures have been proposed to facilitate folding of the mattress, but, in general, such constructions are limited to folding of the mattress in one direction. They are not foldable in reverse directions.

With the foregoing in mind, the major purposes of the present invention are to provide a foldable mattress construction that is foldable in reverse directions so as to allow inversion of the mattress in use, to so form a foldable mattress that it is comfortable in both the flat and folded positions, to so form a foldable mattress construction that a neat parting line is provided between the angularly disposed sections of the mattress without having a bulge or a curvilinear form at and near the fold line, the mattress being so formed that the axes of the coil springs near the fold line are disposed normal to the body of the person supported on the mattress, all without imposing undue stresses on the spring sections or upholstered sections of the mattress and while permitting the mattress to be handled in the customary manner, these and other purposes of the invention being more apparent in the course of the ensuing specification and claims when taken with the accompanying drawings, in which:

FIGURE 1 is a perspective view illustrating a mattress formed in accordance with the present invention;

FIGURE 2 is a sectional view of a certain novel hinge construction for the mattress of FIGURE 1;

FIGURE 3 is a perspective view of a hinge clip which is utilized in the invention;

FIGURE 4 is a plan view of a portion of spring sections illustrated in FIGURE 2 and held together by spring clips as illustrated in FIGURE 3;

FIGURE 5 is a diagrammatic view illustrating the action of the hinge clips of FIGURES 2, 3 and 4 when spring sections of the mattress are moved to a folded position;

FIGURE 6 is a diagrammatic view of an ordinary mattress which is folded to provide an inclined section and a horizontal section of the mattress;

FIGURE 7 is a sectional view of a modification using the principles of the invention; and

FIGURE 8 is a side view of a modified form of arrangement for attaching the ends of spring sections together while incorporating the principles of the present invention.

Like elements are designated by like characters throughout the specification and drawings.

With specific reference now to the drawings and in the first instance to FIGURE 1, numeral **10** generally designates a mattress formed in accordance with the principles of the present invention. The mattress **10** is illustrated in a foldable bed construction, which construction has a first frame section **11** which is adapted to support a horizontal portion **11***a* and a second section **12** which is pivotal with respect to the first section so as to enable an inclined disposition of one section **13** of the mattress. Foldable bed frames of this nature are old and well known to the art. The invention is not directed to the foldable bed frame, but is directed to certain novel principles of construction of the mattress **10** which enable a neat fold line **14** between the horizontal section of the mattress and the inclined section of the mattress as appears in FIGURE 1.

Mattress **10** has the customary outer layer of ticking or sheet material covering comprised of an upper panel **15** and a lower panel **16** (not seen in FIGURE 1), side panels **17** and end panels **18** formed of the same ticking or covering. The side and end panels **17** and **18** of the mattress are sewn to the mattress construction in the usual fashion, and the details of such side and end panel constructions do not form part of the present invention.

In accordance with the principles of the invention, the mattress is of the innerspring type and is so formed as to provide spaced spring sections generally designated at **19** and **20** in FIGURE 2. These spring sections are formed with the customary and usual coil springs **21** which are fixed to tie wires extending widthwise and/or lengthwise of the spring sections. The spring sections have the customary upper and lower marginal wires **22** and **23**, which define the overall outline of the spring sections and which may be held in spaced relation by the coil springs **21**. The coil springs allow yieldability of the upper and lower marginal wires toward and away from one another. These marginal wires extend along the sides and ends of the spring sections at both the top and bottom thereof.

In further accordance with the invention, these spring sections are positioned end to end and aligned with one another. Hinge clips or links **25** are used to hold the opposed ends of the spring sections **19** and **20** in the spaced relation. These hinge clips are formed of spring metal and are illustrated in detail in FIGURE 3. Each spring clip, for example, is formed with a more or less U shape with the legs of the U shaped clip having looped or hook-like end portions **26** which are snapped over the marginal wires **22** and **23** as is seen in FIGURE 2. An open space thus exists between the opposed end wires **22** and **23** of the adjacent spring sections. The clips **25** also have apertures **27** in the center of the bight portion thereof which apertures are formed by depressing a portion of the metal of the spring clip downwardly so that these apertures may be aligned generally parallel to the end wires **22** and **23**. The hook-like end portion **26** of the clips have ends **28** which may be expanded away from the adjacent leg portions to allow passage of the end wires into the space within the hook-like shape while allowing some freedom of movement of the clip with respect to the end wires.

The clips **25** are spaced transversely of the mattress and along the opposed ends of the spring sections **19** and **20** every few inches or so, so that a plurality of clips connect the opposed upper marginal wires **22** of adjacent spring sections and a plurality of the clips **25** connect the opposed lower marginal wires **23** of the opposed spring sections on the lower face of the spring sections. These clips thus hold the marginal wires in spaced apart relation while enabling folding or pivotal movement of one section with relation to the other. The bight portions of the clips at both the upper and lower faces of the spring sections are positioned inwardly of the planes of the opposite faces of the spring sections.

The folding movement of the hinge clips is illustrated generally in FIGURE 5. The tendency of the coil springs is to hold the marginal wires in the same spaced relation. However, the rocking movement of the spring section **19** as produced by the bed section **12** tends to pull the marginal wire **23** of section **19** to the left as indicated by the arrow while at the same time tending to push the upper marginal wires **22** to the right as indicated by the arrows. This may result in the marginal wire **22** of the horizontal section **11***a* being forced downwardly toward the point A. The force on the marginal wire **23** of the swinging section tends to resist swinging movement of the lower clip **25**. The connections of the marginal wires **22** and **23** with the hook-like portions are loose fits so that there is play in these members. Also, if a person is sitting on the horizontal section while the upright section is moving, this also tends to push the marginal wire **22** down toward the point A. The result of some or all of these factors is to allow the upper hinge clip to move faster than the lower hinge clip so that in the final folded position the position of the hinge clips approximates the dotted line positions F in FIGURE 5.

It should be understood that the illustration in FIGURE 5 is intended only for purposes of explanation and that the action illustrated is not necessarily a precise illustration of the actual action. The actual action will vary slightly from time to time with such variable factors as body weight and position.

In further accordance with the invention, a sisal or burlap layer or ticking **29** is positioned over each of the faces of the spring sections and is looped around the marginal wires **22** and **23** at the hinge connected ends and held to the marginal wires as by means of staples **29***a*. This burlap or sisal layer may be cut at appropriate intervals transversely of the marginal wires to accommodate the ends of the spring links **25**. The links or clips **25** are thus positioned in cut out portions of the sisal layer. The opposite ends of the sisal layer may be connected to the outer ends of the spring sections in the same fashion or by some other means. A wool padding layer **31** is then positioned over each of the faces of the spring sections and in overlying relation to the burlap layer **29**. Each wool layer has the inner end portion thereof **32** folded over and tucked within the space between the legs of the hinge clips **25** in the manner illustrated in FIGURE 2, while still leaving space between the opposed and opposite ends of the wool layers **31** of each of the spring sections.

A further layer of ticking or cloth **33** is then positioned over both faces of the combined spring sections. This ticking layer may extend from one end of one section to the end of the other section farthest therefrom, or it may extend only to intermediate portions of the spring sections while in an overlying relation to the wool layers **31**, so long as the layer **33** spans the opening between the opposed marginal wires **22** and **23** of the opposed spring sections. Each layer **33** has a looped portion **34** extending inwardly within the opening between the legs of the clips. This loop may be formed by simply sewing spaced portions of the layer **33** together as indicated at **35** so as to define a loop as shown, and with the loop generally extending fully along the width of the mattress.

The looped portion **34** has openings cut out at spaced portions taken widthwise thereof so that the looped portions may depend inwardly beyond the bight portion of the spring clips **25**. When in this relation, a wire or rod **37** is passed through the apertures **27** of the aligned clips and through the looped portions so as to hold the looped portions **34** in the position illustrated all along the width of the mattress. Other devices may be used to hold the looped portions to the bight portions of the spring clips. The looped portions **34** effectively tie the outer mattress layers to the inner portions of the clips and between the opposed ends of the spring sections.

An additional wool padding layer **36** is then positioned in overlying relation to both faces of the sub-assembly previously formed while extending from one end of the combined spring section to the other.

After the wool layer is positioned, an outer panel of ticking **15** is positioned over one face of the mattress while another and similar layer **16** is positioned over the other face of the mattress.

The outer panels of ticking layers **15** and **16** are preferably tied to the looped portion **34** as by passing a thread line therebetween as indicated at **38**. This thread line may extend along the full width of the mattress.

After these layers are assembled, tufts **39** may be passed through the opposite padding layers on the opposite faces of the mattress while the upholstery is clipped to the ends and sides of the marginal wires in the customary fashion. The sides and end panels are then affixed to the overall mattress construction in the usual fashion.

In use, the particular hinge connection between the spring sections enable the overall mattress to be folded in either direction and when so folded, the parting line between the horizontal section and an upwardly inclined section is neat and makes a well defined line as appears at **14** in FIGURE 1. In the folded position, the upholstery material in the upright section **13** adjacent the fold line overlies the upholstery material adjacent the fold line in the horizontal section. This eliminates the general curvilinear form of conventional mattress constructions as illustrated in FIGURE 6 at **40** and eliminates the rumpled or ridgelike portions of the mattress which usually appear in the portion of the mattress between the horizontal portion and the inclined portion as designated at **41** in FIGURE 6. The upholstery layers are effectively tied to the spring clips between adjacent sections. During the folding movement, the upholstery layers tend to move into the space between the leg portions of the clips. The particular disposition of the clips allows a space in which the upholstery may move. The upholstery is effectively constrained against movement away from this space.

Due to the novel hinge action described, the face of the mattress which is opposite the face containing the fold line moves neatly with the movement of the clips without undue stretching of the upholstery material.

Due to the novel principles employed, the two spring sections maintain their essentially individual nature and folding of the adjacent section does not put undue strain on any of the spring wires making up the spring sections of the mattress.

It should be understood that variations are possible within the scope of the invention. For example, the invention is applicable to various types of coil spring constructions in mattresses as long as they are tied together in the general manner illustrated. Also, a mattress may be formed with more than one section through use of the principles disclosed herein. For example, a mattress may be provided with three spring sections, and hinged in the manner illustrated, so as to provide a generally upwardly inclined end portion and further portions disposed at a shallow V shaped angle with one another so as to accommodate the knees of a person. Insulator panels may be incorporated, as by positioning such panels between the spring sections and the sisal layers **29**. In some cases, the outer layer **36** of upholstery may be dispensed with and

the cover panel of ticking then will be positioned over the layer 31 and extending from end to end and from side to side of the overall mattress construction. It is preferred to employ the outer layer 36 to properly mask the space between spring sections.

A further modification is illustrated in FIGURE 7. In FIGURE 7, tufts 39 represented in FIGURE 2 have been eliminated and a tie means in the form of stitching 42 is secured between the layers 29 near the end of the spring section adjacent the hinge. This tie means prevents outward expansion of the sections of the mattress from the normal position illustrated in FIGURE 2 during folding of the mattress. The tufts represented at 39 in FIGURE 2 prevent the same expansion. A plurality of such ties are spaced transversely of the mattress. The use of tie means as illustrated at 42 in FIGURE 7 is especially desirable if the covering of the mattress is intended to be waterproof. The tie means illustrated by the stitching lines 42 in FIGURE 2 need only be used on the foot or horizontal section of the mattress illustrated in FIGURE 1, although it can, of course, be used on both of the relatively movable sections.

Also, in FIGURE 7, the layer 33 which carries the loop 34 may be simply glued to one or the other of the upholstery sections 31 and 36 so as to eliminate any holes which may be required by the stitching at 38 in FIGURE 2.

FIGURE 8 illustrates a modified form of clip which is used in the same manner as the clips 25 in FIGURE 2. The clip 43 in FIGURE 8 is formed with one leg 44 longer than the other 45. This leg is attached to the end wire of the foot section of the mattress. The shorter leg 45 is attached to the end wire of the head section (the section to be raised) of the mattress. Also, the portion 46 of the clip which receives the transversely extending connecting wire as represented at 47 is offset from the center of the bight portion toward the shorter leg of the clip. Clips of this type further enhance the movement of the upholstery into the space between the spaced end wires of the two spring sections. It may be noted that the two legs of the clip of FIGURE 8 diverge slightly from the bight portion so as to further enhance the constraining action on the upholstery, to create the neat fold line represented at 18 in FIGURE 1.

In the event that undue wear is encountered on the loop portion of the tie member 34 due to contact with the wires of the springs 21 it should be understood that the end wires 22 may be extended and spaced from the coiled springs to avoid such wear and contact.

Other forms of hinge means may be used to hold the spring sections in spaced relation while creating the open space for the movement of upholstery thereinto. It is preferred to use the clip means spaced along the width of the marginal wires in the manner illustrated herein, so that the superimposed weight of a person resting on one portion or another of the area above the connection will be transmitted to both spring sections so that they will work and yield more or less in unison.

Whereas I have shown and described a certain operative form of the invention, it should be understood that there are many variations in and to the invention which will be apparent to those skilled in the art and which will fall in the scope and spirit thereof. The scope of the invention, therefore, should be limited only by the scope of the hereinafter appended claims.

I claim:

1. A foldable mattress construction including a pair of coil spring sections and upper and lower layers of upholstery overlying and underlying said sections and fixed thereto, said spring sections having inner ends in spaced and opposed relation, upper and lower clips connecting said opposed ends while holding them in spaced relation, said upper and lower clips being pivotally connected to each of the oppositely facing end wires of said spring sections at the upper sides thereof and the lower sides thereof, said clip means having intermediate portions bowed inwardly toward one another and tie means connecting said upholstery to said intermediate portions of said clips whereby upon folding movement of said sections upholstery is precluded from moving outwardly from the fold line to thereby create a neat fold line between said sections.

2. The structure of claim 1 wherein said tie means includes a loop carried by a layer of sheet material in each upholstery layer and extending within the space between said spring sections and a wire extends through each loop and apertures in said clips.

3. The structure of claim 2 wherein a mattress cover sheet is fixed to said layer of sheet material at the location of said loop.

4. A foldable mattress construction including a pair of spring sections and upper and lower layers of upholstery overlying and underlying said sections and fixed thereto, said spring sections having inner ends in spaced and opposed relation and U shaped clip means movably connecting said opposed ends while holding them in spaced relation, said upholstery being fixed to said clip means at the bight portion thereof, said clip means being positioned so that the bight portion thereof is inwardly of the ends of the leg portions thereof to thereby provide an open and unobstructed space for reception of upholstery upon folding of said sections with relation to one another.

5. The structure of claim 4 wherein said upholstery layers overlying said clip means include an inner padding layer, a layer of sheet material positioned over said inner padding layer, an outer padding layer positioned over said sheet material and a cover sheet positioned over said outer padding layer, said inner padding layer being formed in two sections with end portions in spaced relation, said outer padding layer overlying said bight portion.

6. The structure of claim 4 wherein said clip means includes a plurality of similar clips.

7. The structure of claim 4 wherein said clip means have leg portions snap fitted over transversely extending marginal wires at the ends of said spring sections.

8. A foldable mattress construction including a pair of coil spring sections and upper and lower layers of upholstery overlying and underlying said sections and fixed thereto, said spring sections having inner ends in spaced and opposed relation and clip means pivotally connecting said opposed ends while holding them in spaced relation, said clip means being shaped to providean open space between the ends of said sections at an area inwardly of the planes of the faces of said spring sections, said upholstery being fixed to said clip means by tie means extending into said space.

9. A foldable mattress construction including a pair of coil spring sections and upper and lower layers of upholstery overlying and underlying said sections and fixed thereto, said spring sections having inner ends in spaced and opposed relation, upper and lower U shaped clips connecting said opposed ends while holding them in spaced relation, said sections having transverse marginal wires pivotally connected to ends of said clips, said upholstery being fixed to the bight portions of said upper and lower clips, said clips having their bight portions disposed inwardly with respect to the faces of said sections and the means connecting said upholstery layers to said bight portions of said clips, said clips providing a space between end wires of said sections to allow reception of said upholstery material upon folding movement of said sections.

10. A foldable mattress construction including a pair of coil spring sections and upper and lower layers of upholstery overlying and underlying said sections and fixed thereto, said spring sections having inner ends in opposed relation, means defining a space opening inwardly from the faces of said sections and between the opposed ends of said sections and connecting said sections together for relative folding movement while holding said opposed ends in spaced relation, said space extending the entire

width of said sections and having a depth and width, taken between the opposed ends of said sections, said means being movably connected to each of said spring sections of an extent sufficient to allow upholstery overlying said space to move into said space upon folding of said sections and in an amount such as to provide a neat fold line between said sections, and means for constraining those portions of said upholstery overlying and adjacent to said space to movement into said space upon folding movement of said sections.

11. A foldable mattress construction including a pair of coil spring sections and upper and lower layers of upholstery overlying and underlying said sections and fixed thereto, said spring sections having inner ends in opposed relation, means defining spaces opening inwardly from the faces of said sections and between the opposed ends of said sections and connecting said sections together for relative folding movement while holding said opposed ends in spaced relation, said spaces extending the entire width of said sections and having a depth and width, taken between the opposed ends of said sections, of an extent sufficient to allow upholstery overlying said spaces to move into one or the other of said spaces upon folding of said sections and in amount such as to provide a neat fold line between said sections, and means connected between said first named means and said upholstery for constraining those portions of said upholstery overlying and adjacent to said spaces to movement into one or the other of said spaces upon folding movement of said sections.

12. The structure of claim **11** wherein said space defining means is in the form of a plurality of U-shaped clips having the ends of their leg portion pivotally connected to marginal wires of said sections, there being a plurality of clips pivotally connected to the upper marginal wires of said sections and a plurality of clips pivotally connected to the lower marginal wires of said sections, a wire connecting the bight portions of the clips connected to said upper marginal wires and a wire connecting the bight portions of the clips connected to said lower marginal wires, said clips being connected so that their bight portions are positioned inwardly of the marginal wires to which they are connected, said constraining means being connected to the wires connecting the bight portions of said clips.

13. A foldable spring construction for a foldable mattress including a pair of coil spring sections having inner ends in spaced and opposed relation, upper and lower U-shaped clips connecting said opposed ends and holding them in spaced relation, said sections having transverse marginal wires pivotally connected to ends of said clips, said clips having their bight portions disposed inwardly with respect to the faces of said sections, said clips providing a space between said end wires of said sections during folding movement of said sections whereby upon folding movement of said sections upholstery material positioned over said sections may move into the spaces between said sections.

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CASMIR A. NUNBERG, *Primary Examiner.*

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,354,477 November 28, 1967

Fred H. Bartz

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 7, lines 2 and 3, strike out "said means being movably connected to each of said spring sections" and insert the same after "relation," in column 6, line 75.

Signed and sealed this 7th day of January 1969.

(SEAL)
Attest:

Edward M. Fletcher, Jr.
Attesting Officer

EDWARD J. BRENNER
Commissioner of Patents