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Bihun et al.

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[54] **WIRE MAT ASSEMBLY FOR A BOX SPRING**

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[22] Filed: **Dec. 20, 1971**

[21] Appl. No.: **209,755**

[52] **U.S. Cl.** **5/247**, 5/260

[51] **Int. Cl.** **A47c 23/02**

[58] **Field of Search** 5/246, 247, 260, 5/255; 267/103, 106, 107, 110, 111

[56] **References Cited**

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[57] **ABSTRACT**

A wire mat assembly particularly adapted for use in a box spring and composed of formed wire members positively connected together by integral formations providing mechanical interlocks.

15 Claims, 10 Drawing Figures

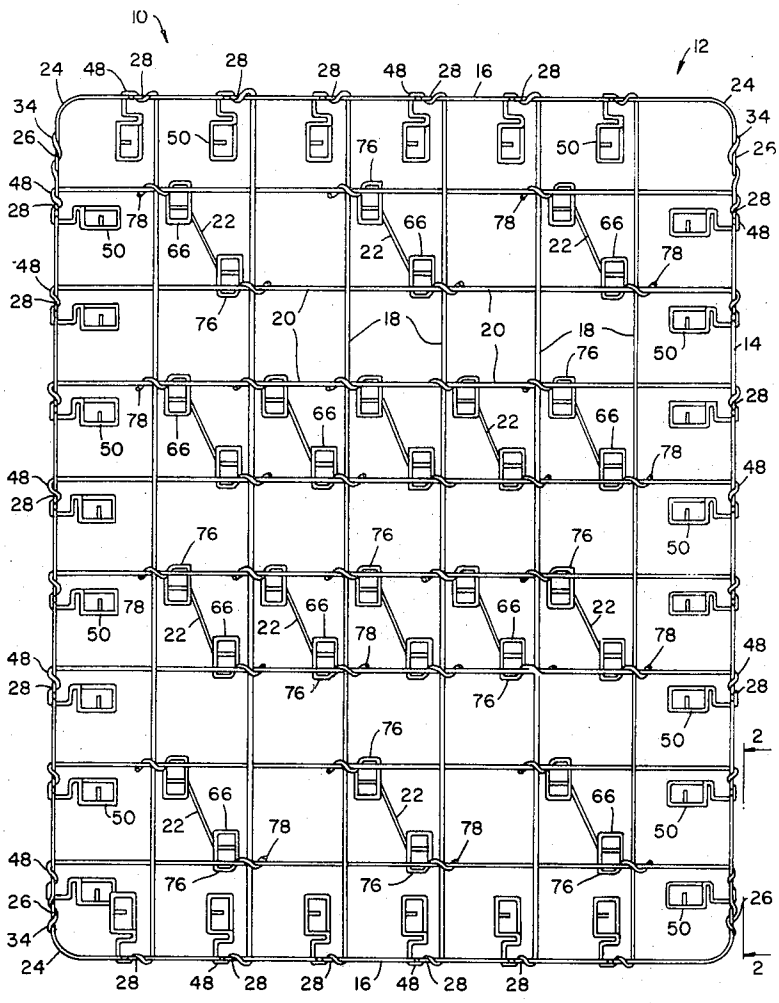
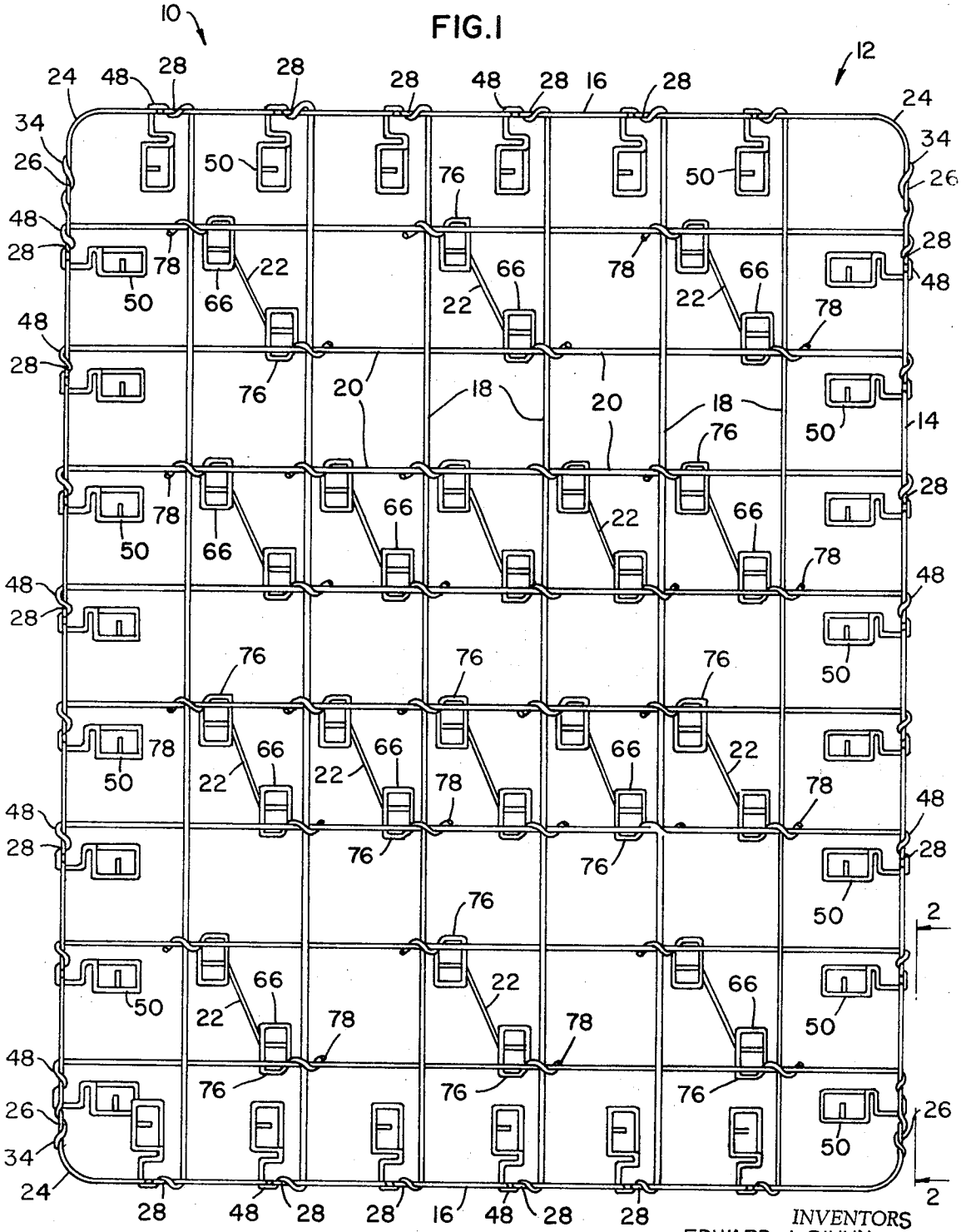


FIG. 1



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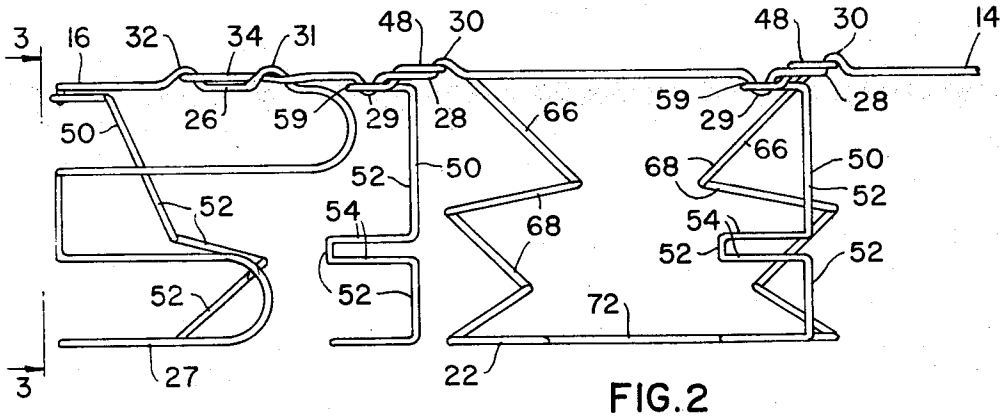


FIG.2

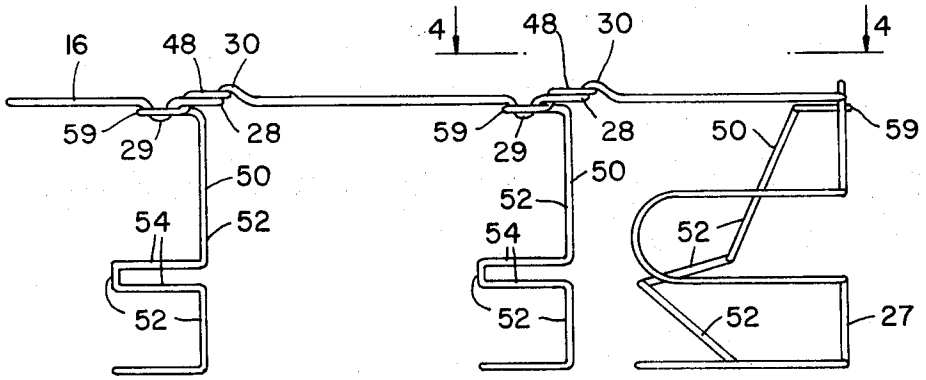


FIG.3

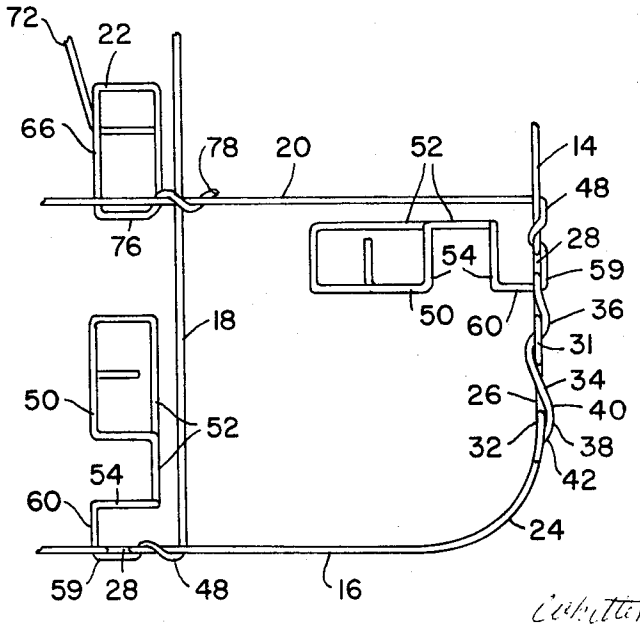


FIG.4

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FIG.5

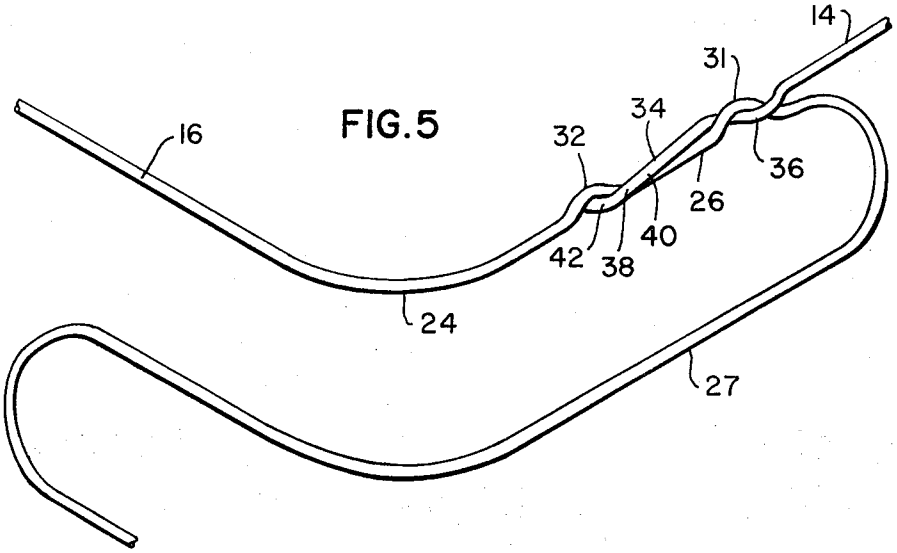


FIG.9

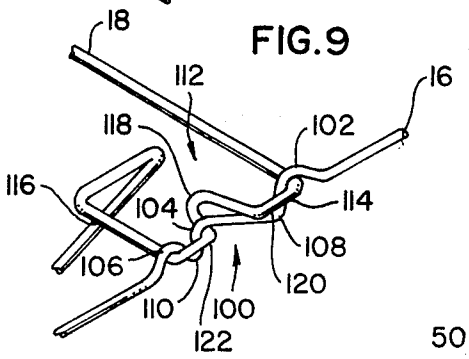


FIG.6

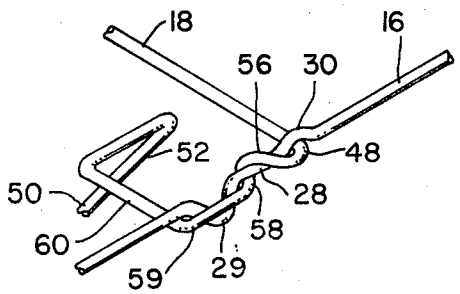


FIG.10

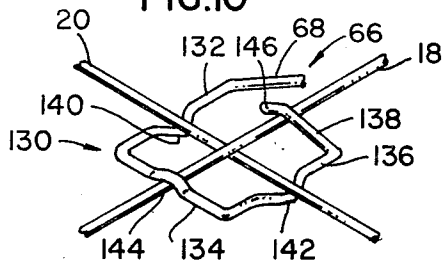


FIG.7

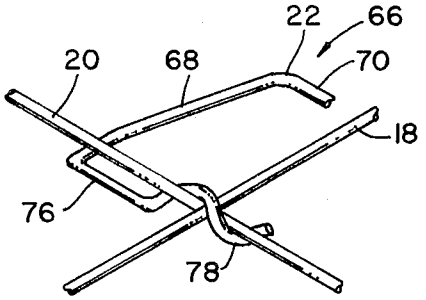
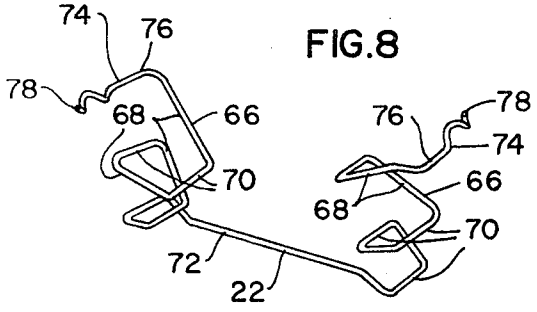


FIG.8



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WIRE MAT ASSEMBLY FOR A BOX SPRING

SUMMARY OF THE INVENTION

It is a primary object of this invention to provide a wire mat assembly for a box spring or the like composed of formed wire members held together by integral formations mechanically interlocked with one another, and not requiring the use of any clips or like devices for securing the formed wire members together.

Another object is to provide a wire mat assembly having inside formed wire spring elements which are provided with integral formations mechanically interlocked into the assembly, and which may be readily added to or removed from the assembly as desired.

Another object is to provide a wire mat assembly having crossing outside formed wire spring elements which are mechanically interlocked at the points of crossing by the inside spring elements.

Another object is to provide a wire mat assembly as described in the preceding paragraph in which the inside spring elements have supporting sections preferably of V-shaped fishmouth-configuration resiliently supporting the outside spring elements.

Another object is to provide a wire mat assembly having a border wire or frame composed of separate formed wire members and provided with integral end formations mechanically interlocked with one another.

Another object is to provide a wire mat assembly having crossing outside formed wire spring elements provided with supporting end sections preferably of V-shaped fishmouth-configuration and mechanically interlocked with the border wire of the assembly.

Another object is to provide a wire mat assembly composed of interlocking formed wire members which can be readily assembled without clips or the like and without the need for expensive tools or assembling equipment.

Other objects and features of the invention will become apparent as the description proceeds, especially when taken in conjunction with the accompanying drawings, wherein:

FIG. 1 is a top plan view of a wire mat assembly for a box spring constructed in accordance with my invention.

FIG. 2 is an enlarged fragmentary view taken on the line 2—2 in FIG. 1.

FIG. 3 is a fragmentary view taken on the line 3—3 in FIG. 2.

FIG. 4 is a fragmentary view taken on the line 4—4 in FIG. 3.

FIG. 5 is a fragmentary perspective view of the corner construction showing the mechanical interlock between the formed wire members of the border frame or wire.

FIG. 6 is a fragmentary perspective view illustrating the interlocking connection between one of the crossing outside formed wire spring elements and one of the border members.

FIG. 7 is a fragmentary perspective view illustrating the interlocking connection of one of the inside formed wire spring elements with two crossing outside spring elements.

FIG. 8 is a perspective view of one of the inside spring elements.

FIG. 9 is a perspective view similar to FIG. 6 but showing a modification.

FIG. 10 is a perspective view similar to FIG. 7 but showing a modification.

Referring now more particularly to the drawings, the wire mat assembly is generally designated **10** and is composed of a horizontal rectangular border wire or frame **12** having elongated side and end formed wire members **14** and **16**, elongated outside formed wire spring elements **18** and **20**, and inside formed wire spring elements **22**. The wire mat assembly is particularly designed for use in a box spring and when used for that purpose will normally be clipped or otherwise secured to a supporting frame of wood or other material, not shown.

The border frame or wire **12** has two laterally spaced, parallel, side formed wire members **14** and two laterally spaced, paralle, end formed wire members **16**. The end border members **16** may be curved near their ends in arcs indicated at **24** to define the corners of the border frame **12**. The end portions of these end border members **16** beyond the arcs **24** have locking sections **26** substantially aligned with the side border members **14**. A terminal supporting portion **27** of each end border member **16** extends from each locking section **26**. These supporting terminal portions **27** may be of wavy or sinuous form and conform to the arc **24** at each corner, extending beneath the corner to provide a resilient support for the border frame at that point.

Each end border member **16** is substantially straight between the arcs **24**, being formed with spaced locking sections **28**. Each locking section **28** includes a vertical offset **29** of substantially V shape and a vertical offset **30** of inverted substantially V shape. These offsets **29** and **30** are spaced from one another and offset **29** is preferably somewhat deeper than offset **30**. The locking sections **28** are provided for making interlocking connection with the long outside spring elements **18** as will appear more fully hereinafter.

Each locking section **26** is formed with two vertical offsets which are spaced from one another and of substantially inverted V form. These offsets are designated **31** and **32**.

The side border members **14** have locking sections **34** at the ends. Each locking section **34** has a laterally outward horizontal offset **36** of substantially V shape and a terminal portion **38** of substantially L shape extending from the offset **36**.

As seen in FIG. **5**, the offset **36** of the locking section **34** of a side border member **14** extends through the offset **31** of the locking section **26** of an end border member **16** from the outside to the inside with respect to the border frame **12**. The long leg **40** of the L-shaped terminal portion **38** extends back over and across the locking section **26** between its offsets, and the short leg **42** of the L-shaped terminal portion **38** extends through the offset **32** from the outside to the inside of the border frame. In assembling the border frame, the L-shaped terminal portion **38** is flexed outwardly so that its short leg **42** snaps into the offset **32**, whereby the two sections **26** and **34** form a positive mechanical interlock insuring against any accidental separation of the parts. The locking sections **26** and **34** and particularly the L-shaped terminal portion **38** of section **34** are in a stressed condition when interlocked as shown in FIG. **5**.

Each side border member **14** is substantially straight between its end locking sections **34**, being formed with spaced locking sections **28** which have the offsets **29**

and 30 and are the same as the locking sections 28 of the end border members 16. The locking sections 28 of the side border members 14 are provided for making interlocking connection with the short outside spring elements 20 as will appear more fully hereinafter.

The crossing outside formed wire spring elements 18 and 20 are substantially identical except for the lengths of their straight intermediate portions. Therefore, only the long spring elements 18 will be described and corresponding portions of both the long and short spring elements 18 and 20 will bear the same reference characters so that a description of the long spring elements will suffice for both.

The long outside spring elements 18 have straight intermediate portions which extend lengthwise of the wire mat assembly in laterally spaced relation parallel to the side border members 14. The short spring elements 20 extend crosswise of the wire mat assembly in laterally spaced relation parallel to the end border members 16 in crossing relation to the long spring elements.

The long outside spring elements 18 have at each end a locking section 48 and a supporting section 50. The supporting sections 50 depend beneath the straight portions of the outside spring elements and are bent back and forth into a sinuous form having straight lengths of spacer bars 52 joined to straight lengths of substantially horizontal torsion bars 54 to provide rectangular loops and to resiliently resist deflection of the mat assembly when subjected to a downward force or load. The torsion bars 54 are at substantially right angles to the spacer bars and are stressed torsionally under load. The spacer bars 52 are angularly related to one another in a V-shaped configuration.

The locking section 48 extends in continuation of the straight portion of each outside spring element 18 and leads to the supporting section 50. The locking section 48 extends from the end of the straight portion of the outside spring element through the offset 30 and then a portion 56 thereof curves back over the border member to the inner side thereof, having a further portion 58 bent downwardly to a laterally outwardly extending loop 59 which extends behind and across the outer side of the offset 29 and leads in a horizontal supporting bar 60 to the supporting section 50.

In interlocking the outside spring elements 18 and 20 with the border members 14 and 16, the spring elements are passed under the border members in engagement with the offsets 30, and the supporting sections 50 are flexed and twisted upward past the outer sides of the border members and over them to the inner sides thereof. These supporting sections 50 are then pressed down and flexed to engage the loop portions 59 behind the offsets 29. In this position of the parts, the locking sections 28 and 48 are in a stressed condition positively interlocked with one another.

The inside spring elements 22 are preferably constructed as shown in FIG. 8. As there seen, each inside spring element 22 includes two supporting sections 66 which are formed of portions of the wire element bent back and forth into a sinuous form having straight lengths of spacer bars 68 joined to straight lengths of substantially horizontal torsion bars 70 to provide rectangular loops and to resiliently resist deflection of the mat assembly when subjected to a downward force or load. The torsion bars 70 are at substantially right angles to the spacer bars and are stressed torsionally under load. The spacer bars 68 are angularly related to one another in a V-shape fishmouth-configuration. The lowermost spacer bars of the supporting sections 66 of each inside spring element are connected together by an integral horizontal connecting piece 72.

Each inside spring element 22 also has a locking section 74 at the upper end of each supporting section 66. Each locking section 74 includes a horizontal supporting and locking bar 76 and a helical terminal portion of pigtail 78 extending from one end of the supporting and locking bar 76,

In the assembled condition of the mat assembly, the inside spring elements 22 are interlocked with the outside spring elements 18 and 20 at certain points of crossing thereof. As seen in the drawings, the long outside spring elements 18 overlie the short outside spring elements 20. The supporting and locking bars 76 are disposed under and support the short outside spring elements 20 at one side of a crossing point, and the pigtail 78 extends over the long outside spring element 18 at the crossing point and then winds under the short outside spring element 20 at the opposite side of the crossing point. This can be clearly seen in FIGS. 4 and 7.

In assembly the end of the pigtail is engaged under a short outside spring element 20 adjacent a crossing point and brought down over the crossing point. The supporting section 66 is then flexed and pressed downward to engage the supporting and locking bar 76 under the short outside spring element 20 at the opposite side of the crossing point. In this assembled condition of the parts, the locking section 74 as well as the crossing outside spring elements are under sufficient stress to positively, mechanically maintain the interlocked relation.

The wire members or elements 12–20 make up the entire wire mat assembly. These members or elements are made of resilient spring wire stock which is performed to the desired configuration. The mechanical interlocks provided between the side and end border members 14 and 16, between the border members and the outside spring elements 18 and 20, and between the outside spring elements and the inside spring elements 22 are positive, mechanical interlocks in which the locking sections are held in a flexed condition under stress when assembled so that they will not accidentally become disassembled. No clips, welds or any other means are provided to hold the various members and parts together. No special tools are required to assemble the parts. The parts may be readily disassembled however when desired.

Any number of inner spring elements 22 may be employed depending upon the stiffness of the mat assembly desired. These inner spring elements may be readily added or subtracted.

The supporting sections 66 of the inside spring elements 22 and the supporting sections 50 of the outside spring elements 18 and 20 support the top surface of the mat assembly at the desired elevation. The lower ends of these supporting sections 66 and 50 may be clipped or stapled or otherwise secured to a supporting frame when the mat assembly is used in a box spring. The lowermost torsion bars of these supporting sections may be thus secured to a supporting frame, or in the case of the inside spring elements 22, their connecting pieces 72 may be secured to the supporting frame.

FIG. 9 illustrates a modification of the border member locking section and outside spring element locking section. The modified locking section **100** of the border member **16** has three upward vertical offsets **102, 104** and **106** of inverted V-shape which are connected by the V-shaped portions **108** and **110.** The V-shaped and inverted V-shaped portions **102–110** lie in a common vertical plane.

The modified locking portion **112** of the outside spring element **18** has the horizontal bars **114** and **116.** Bar **114** extends at right angles to the main portion of the spring element and has an intermediate inward offset **118** of V-shaped configuration approximately midway of its length to provide straight portions **120** and **122** on either side of the offset. All portions of the bars **114** and **116** lie in the same horizontal plane as the main or straight intermediate portion of the outside spring element.

In assembled condition as shown in FIG. **9,** the locking section **112** extends from the end of the straight main portion of the outside spring element through the offset **102.** The straight portion **120** of bar **114** extends outside the locking section **100** of the border member and the offset portion **118** loops back to the inner side of the locking section **100** and then extends outwardly through the middle upward offset **104.** The straight portion **122** of the bar **114** loops across the outer side of the V-shaped portion **110** of locking section **100** and terminates in the support bar **116** which extends inwardly through the inverted V-shaped offset **106.**

To interlock an outside spring element **18** and border member **16** having the modified locking sections, the spring element is passed under the border member in engagement with the offset **102** and then by lifting the supporting section of the outside spring element over the border member and twisting the locking section of the outside spring element relative to that of the border member the portion **122** of bar **114** may be passed under and looped around the V-shaped portion **110.** In the interlocked position of the parts, the locking sections are in a stressed condition positively holding them mechanically interlocked with one another.

It will be understood that these modified locking sections may also be used for the outside spring elements **20** and border members **14.**

FIG. **10** illustrates a modification of the locking section at the upper end of each supporting section **66** of the inside spring elements **22.** The modified locking section **130** comprises a substantially horizontal, rectangular frame having the four bars **132, 134, 136** and **138.** The two opposed bars **132** and **136** have midway of their lengths the aligned, downward, V-shaped offsets **140** and **142.** The bar **134** has midway of its length the upward offset **144** of inverted V-shape. The bar **138** opposite bar **134** is shorter than the latter and has a downturned terminal portion **146** which forms an inverted V-shaped offset which is aligned with the inverted V-shaped offset **144.**

In assembled condition as shown in FIG. **10,** the inside spring elements **22** are interlocked with the outside spring elements **18** and **20** at certain points of crossing thereof. The bars **132** and **136** are disposed under and support the lower outside spring elements **20** at opposite sides of a crossing point, with the spring elements **20** seated in the V-shaped offsets **140** and **142.** The bar **134** extends over the upper outside spring element **18** at one side of the crossing point, the spring element **18** being disposed in the inverted V-shaped offset **144.** The bar **138** has its terminal portion **146** snapped over the spring element **18** at the opposite side of the crossing point. In its natural or free state condition, bar **138** is substantially coplanar with bars **132, 134** and **136,** but when assembled as in FIG. **10,** bar **138** is flexed upward slightly and held in a stressed condition.

To assemble the inside spring element, it is twisted to engage the three bars **132, 134** and **136** over and under the outside spring elements **18** and **20** adjacent a crossing point as illustrated in FIG. **10,** and then the fourth bar **138** is flexed to engage its terminal portion **146** over the element **18.** In this assembled condition of the parts, the locking section **130** as well as the crossing outside spring elements are under enough stress to positively, mechanically maintain the interlocked relation.

What I claim as my invention is:

1. In a wire spring assembly, a rectangular border frame having first and second formed wire members provided with integral locking sections releasably interlocked with one another, one locking section of each pair of interlocked locking sections of said members having longitudinally spaced first and second recessed portions, the other locking section of said pair of interlocked sections having a first part extending through said first recessed portion and a second part extending from said first part through said second recessed portion.

2. The structure defined in claim **1,** wherein said recessed portions are formed by coplanar offsets in said one locking section, said first part of said other locking section extending through said first recessed portion from one side of said one locking section to the other and said second part extending from said first part back across said one locking section to said one side thereof and then through said second recessed portion.

3. The structure defined in claim **2,** wherein said offsets and said first part are V-shape, V-shaped.

4. The structure defined in claim **2,** wherein said coplanar offsets are of inverted generally V-shaped, said first part is of generally V-shape, and said second part is of generally L-shape.

5. In a wire spring assembly, a rectangular border frame having elongated side and end formed wire border members, laterally spaced first elongated outside formed wire spring elements extending between and connected to said end border members, laterally spaced second elongated outside formed wire spring elements extending between and connected to said side border members in crossing relation to said first outside spring elements, and inside formed wire spring elements at the points of crossing of certain of said outside spring elements for supporting both outside spring elements at each such crossing point and having integral locking sections releasably interlocked with both outside spring elements at each such crossing point.

6. The structure defined in claim **5,** wherein said locking section of each inside formed wire spring element includes a locking bar engaging the underside of the lower one of a pair of crossing outside spring elements at one side of said point of crossing, and a terminal portion extending from said locking bar and looped around said last-mentioned outside spring elements at said point of crossing, being extended over the upper outside spring element at the point of crossing and under said lower outside spring element at the other side of the point of crossing.

7. The structure defined in claim 5, wherein the locking section of each inside spring element includes a horizontal rectangular frame having two opposite frame bars engaged under the lower one of two crossing outside spring elements on opposite sides of a crossing point, a third bar connecting the first two bars and extending over the upper one of the two outside spring elements adjacent said crossing point and a fourth bar opposite said third bar, said fourth bar being connected to one only of said first and second bars and hooked over said upper one of said crossing outside spring elements at the side of said crossing point opposite said third bar.

8. The structure defined in claim 7, wherein said first and second bars have aligned downward offsets of V-shape in which said lower one of said crossing outside spring elements is seated, said third bar has an upward offset of inverted V-shape in which said upper one of said crossing outside spring elements is seated, and said fourth bar has a downturned terminal portion hooked over said upper one of said crossing outside spring elements.

9. The structure defined in claim 8, wherein each inside spring element has a depending portion extending from the locking bar thereof in which the wire is bent back and forth into a sinuous form having straight lengths of spacer bars joined to straight lengths of torsion bars and formed to substantially V-shaped fishmouth configuration.

10. In a wire spring assembly, a rectangular border frame having elongated side and end formed wire border members, laterally spaced first elongated outside formed wire spring elements extending from one end border member to the other, and laterally spaced second elongated outside formed wire spring elements extending from one side border member to the other in crossing relation to said first outside spring elements, said outside spring elements and said border members being provided with integral locking sections releasably interlocked with one another, said outside spring elements having integral supporting sections extending from said locking sections below said side and end border members.

11. The structure defined in claim 10, wherein the border member locking section of each pair of interlocked locking sections of said border members and outside spring elements has a downward offset, the outside spring element locking section of said pair having a first portion extending outwardly under said border member locking section at a point spaced from said offset and looped up and over said border member locking section, and a second portion extending from said first portion downwardly along the inner side of said border member locking section to an outwardly looped portion behind said offset.

12. The structure defined in claim 11, wherein said downward offset is of generally V-shape, said border member locking section has an offset of inverted generally V-shape spaced from said first-mentioned offset and under which said first portion of said outside spring element locking section is extended as aforesaid, and a support bar extending from said outwardly looped portion under said one border member locking section.

13. The structure defined in claim 10, wherein the border member locking section of each pair of interlocked locking sections of said border members and outside spring elements has portions of inverted V-shape connected by a V-shaped portion, the outside spring element locking section of said pair having a first portion extending outwardly under said border member locking section at a point spaced from but adjacent to one of said inverted V-shaped portions and looped inwardly behind and then outwardly through said one inverted V-shaped portion, and a second portion extending from said first portion and looping around the outer side of said V-shaped portion and then leading to a support bar extending inwardly through the other of said inverted V-shaped portions.

14. The structure defined in claim 13, wherein each border member locking section has another portion of inverted V-shape under which said first portion of said outside spring element locking section extends as aforesaid, all of said V-shaped and inverted V-shaped portions of said border member locking section being disposed in a common vertical plane, said first and second portions and said support bar of said outside spring element locking section being disposed in a common horizontal plane.

15. The structure defined in claim 14, wherein said supporting section depends from said support bar being bent back and forth in a sinuous form having straight lengths of spacer bars joined to straight lengths of torsion bars and formed to substantially V-shaped fishmouth-configuration.

* * * * *

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,761,972 Dated October 2, 1973

Inventor(s) EDWARD J. BIHUN and MICHAEL CASTELLO

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 6, Claim 3, line 38, cancel "V-shape,V-shaped" and substitute -- generally V-shaped --.

Column 6, Claim 4, line 40, cancel"V-shaped" and substitute -- V-shape --.

Signed and sealed this 15th day of January 1974.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

RENE D. TEGTMEYER
Acting Commissioner of Patents

ORM PO-1050 (10-69)

USCOMM-DC 60376-P69
* U.S. GOVERNMENT PRINTING OFFICE : 1969 O—366-334.

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