

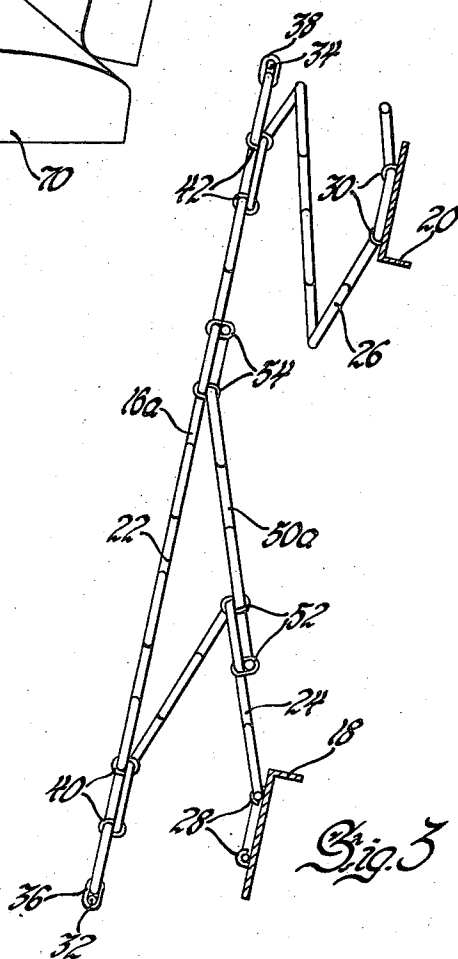
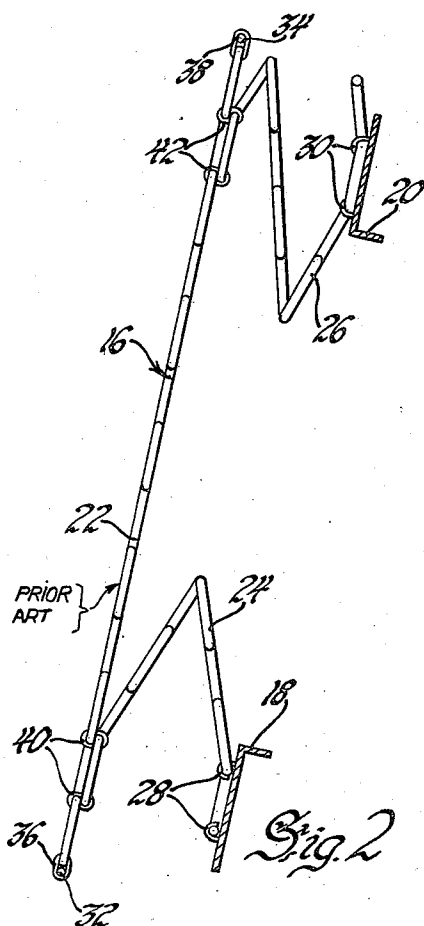
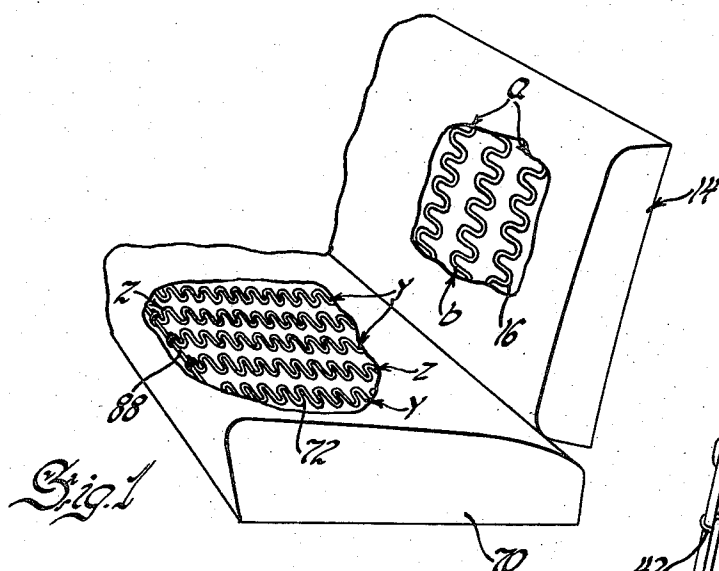
Oct. 21, 1958

J. L. LELLI
SPRING CONSTRUCTION

2,856,987

Filed Oct. 6, 1954

3 Sheets-Sheet 1



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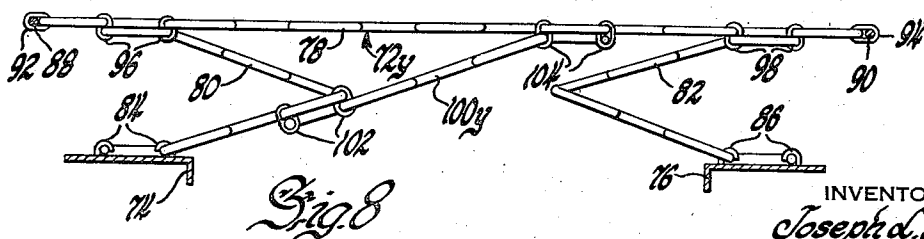
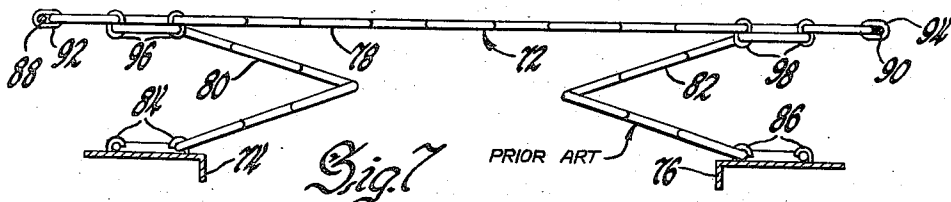
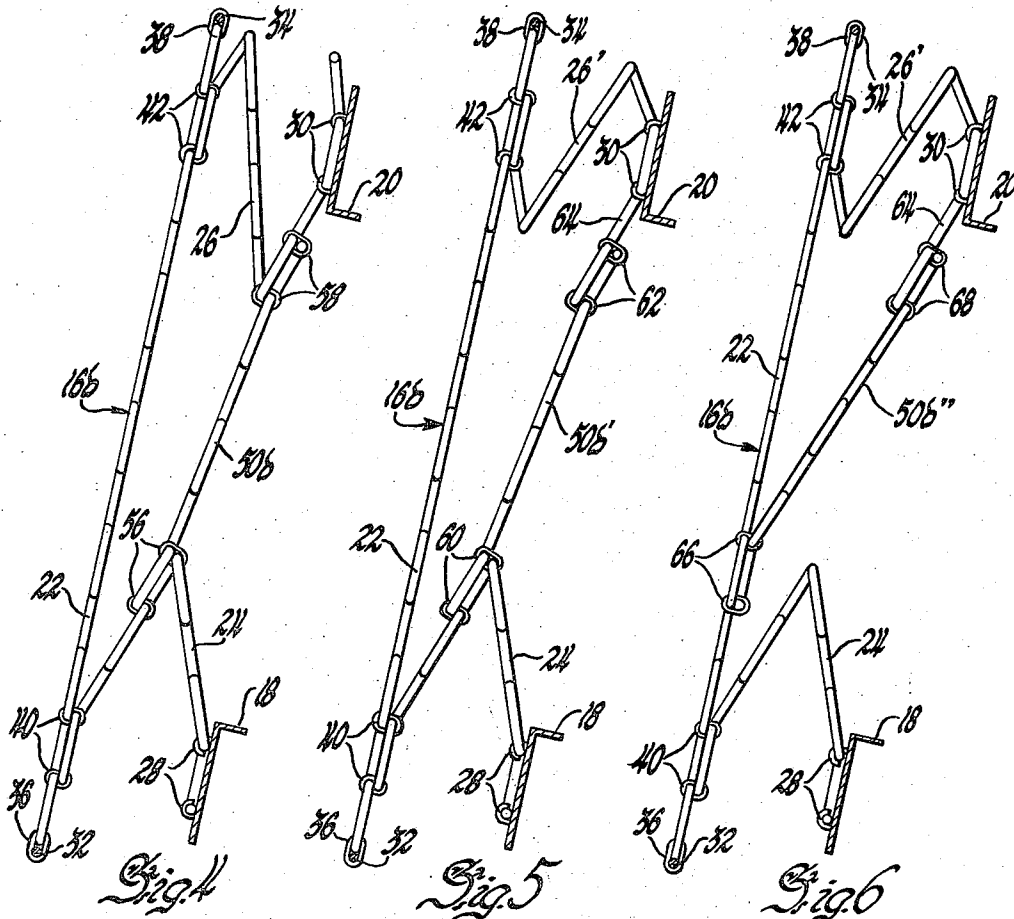
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2,856,987

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Filed Oct. 6, 1954

3 Sheets-Sheet 2



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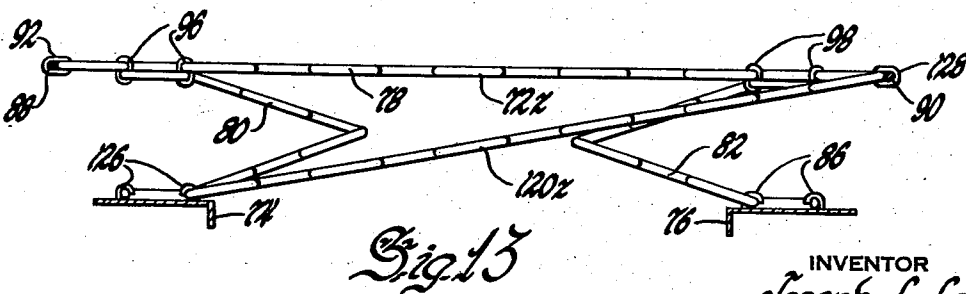
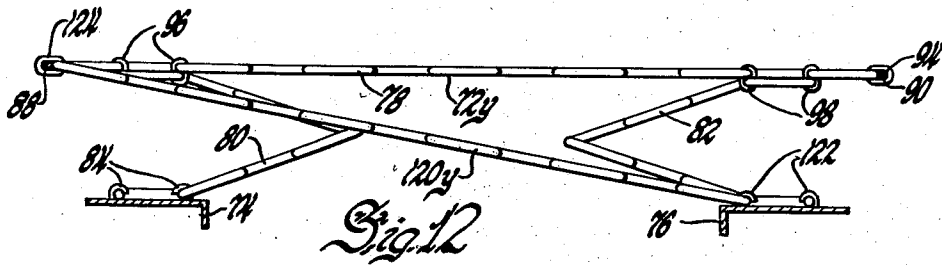
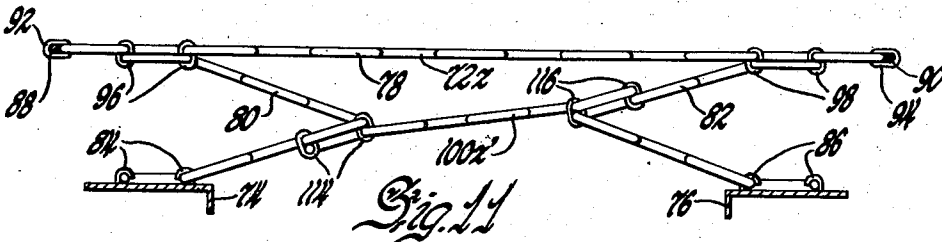
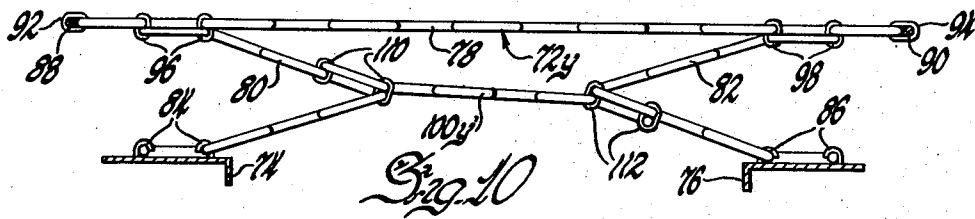
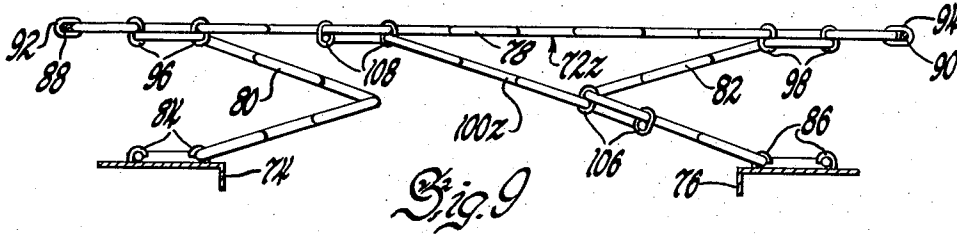
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Filed Oct. 6, 1954

3 Sheets-Sheet 3



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2,856,987

SPRING CONSTRUCTION

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Application October 6, 1954, Serial No. 460,626

10 Claims. (Cl. 155—179)

This invention relates to spring cushions and more particularly to an improvement in sinuous spring assemblies of the type commonly used in automotive seat and back cushions.

Automotive cushions are generally constructed of parallel rows of sinuous flat spring strips that extend across spaced rails of a cushion frame. Each sinuous spring strip has a platform for supporting the load and depending legs for anchorage to the rails. The depending legs are usually V-shaped and underlie the edges of the platform with the apices of the legs facing each other. Border wires transversely interconnect the sinuous spring strips at the edges of the platform. Some portions of a seated human body require more support than others and sinuous spring bracing may be provided for those areas of the platform that require increased local resistance in order to furnish the additional support.

The foregoing type of spring cushion has proved to be quite comfortable and well adapted for economical mass production. Difficulty is encountered, however, in designing a stable cushion with proper resiliency characteristics. A cushion is said to be unstable when the platform is easily shifted in lateral direction, and a tendency toward instability is inherent in the foregoing type of spring cushion as the V-shaped depending legs permit lateral sway of the spring strips. Difficulty is encountered in properly securing the upholstery padding and covering material to the spring assembly when instability is present and for this reason a stable spring construction that does not sacrifice comfort is to be highly regarded.

An object of the invention is to increase the stability of sinuous spring assemblies. A further object of the invention is to provide the platforms of sinuous spring assemblies with increased local resistance. Another object of the invention is to impart spring action to the border wires to achieve more efficient spring assemblies.

In carrying out the invention, rows of sinuous spring braces are added to a conventional spring assembly and suitably connected to the assembly in angularly disposed relation to the platform and in row-spaced crisscross relation with each other to stabilize the platform against lateral shifting movement, to provide increased local resistance to the platform and to apply force couples to the border wires to achieve spring action therefrom. The crisscross spring bracing may be secured to the spring assembly in various manners. For example, a spring brace may extend between a rail and a border wire, between a rail and a depending leg, between a rail and the platform, between a depending leg and the platform or between the depending legs.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred form of the present invention is clearly shown.

In the drawings:

Figure 1 is a partially broken away perspective view

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of an automotive seat and back cushion to which the invention may be applied and embodying spring assemblies formed from rows of sinuous spring strips;

Figure 2 is a side elevation of a conventional back cushion sinuous spring strip as is usually found in the rows *a* and *b* of Figure 1 and to which the diagonal bracing of the invention may be applied;

Figures 3 and 4 are side elevations of back cushion sinuous spring strips for the rows *a* and *b* of Figure 1 diagonally braced in accordance with the invention, the diagonal bracing of the rows *a* (Figure 3) being in crisscross relation with the diagonal bracing of the rows *b* (Figure 4);

Figure 5 is a side elevation of one alternate form of diagonal bracing for the back cushion rows *b* of Figure 1 that may be utilized with a variant form of upper depending leg;

Figure 6 is a side elevation of another alternate form of diagonal bracing for the back cushion rows *b* of Figure 1 that may be utilized with the variant form of upper depending leg;

Figure 7 is a side elevation of a conventional seat cushion sinuous spring strip as is usually found in the rows *y* and *z* of Figure 1 and to which the diagonal bracing of the invention may be applied;

Figures 8 and 9 are side elevations of seat cushion sinuous spring strips for the rows *y* and *z* of Figure 1 diagonally braced in accordance with the invention, the diagonal bracing of the rows *y* (Figure 8) being in crisscross relation with the diagonal bracing of the rows *z* (Figure 9);

Figures 10 and 11 are side elevations of modified forms of diagonal bracing for the rows *y* and *z* of Figure 1; and

Figures 12 and 13 are side elevations of a different form of the invention wherein diagonal sinuous spring bracing is placed between rows *y* and *z* of the seat cushion of Figure 1 that utilize conventional spring strips as shown in Figure 7, the successive diagonal braces (Figure 12, Figure 13, Figure 12, etc.) being in row-spaced crisscross relation with each other.

Referring now to the drawings and more particularly to Figure 1, the back cushion 14 is constructed of parallel rows *a* and *b* of sinuous flat spring strips 16 that extend across the lower and upper rails 18 and 20 (see Figures 1 through 6) of the supporting frame. Each of the spring strips 16 is formed of a steel wire that is sinuously bent or corrugated and includes a platform 22 that provides back support and lower and upper substantially V-shaped depending legs 24 and 26 that are non-pivotally anchored at their ends by clips 28 and 30 to the rails 18 and 20. Lower and upper border wires 32 and 34 are transversely connected to the sinuous spring strips by clips 36 and 38 to form lower and upper edges for the platform. The platform and legs may be integral or may be non-pivotally secured in assembled relation by clips 40 and 42 as shown.

Figure 2 is illustrative of prior art spring strips that were common to all of the rows of the back cushion prior to the invention. On examination, it can be seen that the platform of the cushion is susceptible to lateral shifting due to rockability of the legs thereby resulting in cushion instability. It can also be seen that the kidney supporting area of the platform should provide greater support than the head supporting area. A softer head supporting area is achieved by utilizing the double-V or S-shaped upper leg 26.

Referring to Figures 1, 3 and 4, the invention, as applied to the back cushion 14, comprises the attachment of sinuous spring braces 50*a* and 50*b* to the spring strips 16*a* and 16*b* respectively in angularly disposed relation to the platform 22 with the braces 50*a* and 50*b* of the

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neighboring spring strips 16a and 16b having a crisscross relation with each other to stabilize the platform 22 against lateral shifting movement. On the application of a load to the platform, the crisscross bracing imposes oppositely directed forces on the neighboring spring strips that consequently apply force couples to the border wires so that spring action is derived therefrom. The crisscross bracing additionally imparts supplemental resistance to the kidney supporting area of the back cushion.

The diagonal bracing for the spring strips of the rows a of Figure 1 is shown in Figure 3 as comprising sinuous spring braces 50a that are non-pivotally secured by clips 52 and 54 to the apex of the lower leg 24 and to an intermediate loop of the platform 22. Figures 4, 5 and 6 show alternate forms of diagonal bracing 50b, 50b' and 50b'' for the spring strips of the rows b of Figure 1, and any of these forms may be used with the diagonal bracing 50a of the rows a that is shown in Figure 3. The diagonal braces 50b of Figure 4 are non-pivotally secured by clips 56 and 58 between the apices of the lower and upper legs 24 and 26. The diagonal braces 50b' of Figure 5 are non-pivotally secured by clips 60 and 62 between the apex of the lower leg 24 and the upper rail 20 (through the tail portion 64 of the upper leg 26' which is a variant form of upper leg from the upper leg 26 of Figure 4).

The diagonal braces 50b'' of Figure 6 are non-pivotally secured by clips 66 and 68 between an intermediate loop of the platform 22 and the upper rail 20 (through the tail portion 64 of the variant form of upper leg 26').

Referring again to Figure 1, the invention is applied to the seat cushion 70 in similar manners to the application thereof to the back cushion 14. The seat cushion 70 is constructed of parallel rows y and z of sinuous flat spring strips 72 that extend across the front and rear rails 74 and 76 (see Figures 7 through 13) of the supporting frame. Each of the spring strips 72 includes a platform 78 that provides bottom support and front and rear substantially V-shaped depending legs 80 and 82 that are non-pivotally anchored at their ends by clips 84 and 86 to the rails 74 and 76. Front and rear border wires 88 and 90 are transversely connected to the spring strips by clips 92 and 94 to form front and rear edges for the platform. The platform and legs may be integral or may be non-pivotally secured in assembled relation by clips 96 and 98 as shown.

Figure 7 is illustrative of prior art spring strips that were common to all of the rows of the seat cushion prior to the invention. On examination it can be seen that the platform of the seat cushion is susceptible to lateral shifting due to the rockability of the legs thereby resulting in cushion instability.

Referring to Figures 1, 8 and 9, the invention, as applied in one manner to the seat cushion 70, comprises the attachment of sinuous spring braces 100y and 100z to the spring strips 72y and 72z respectively in angularly disposed relation to the platform 78 with the braces 100y and 100z of the neighboring spring strips 72y and 72z having a crisscross relation with each other to stabilize the platform 78 against lateral shifting movement. The diagonal braces 100y for the spring strips of the rows y of Figure 1 as shown in Figure 8 are non-pivotally secured by clips 102 and 104 to the apex of the front leg 80 and to an intermediate loop of the platform 78. The diagonal braces 100z for the spring strips of the rows z of Figure 1 as shown in Figure 9 are non-pivotally secured by clips 106 and 108 to the apex of the rear leg 82 and to an intermediate loop of the platform 78.

Figures 10 and 11 show alternate forms of diagonal bracing 100y' and 100z' for the spring strips of the rows y and z of Figure 1. The diagonal braces 100y' of Figure 10 are non-pivotally secured by clips 110 and 112 between the apices of the front and rear legs 80 and 82. The diagonal braces 100z' of Figure 11 are

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non-pivotally secured by clips 114 and 116 between the apices of the front and rear legs 80 and 82. The diagonal braces 100y' have an upward forward inclination as they are secured to the upper sides of the apices of the front legs 80 and to the lower side of the apices of the rear legs 82, while the diagonal braces 100z' have an upward rearward inclination as they are secured to the lower side of the apices of the front legs 80 and to the upper side of the apices of the rear legs 82 so that the braces 100y and 100z will have a crisscross relation.

Figures 12 and 13 illustrate a different form of the invention wherein the rows y and z of the seat cushion of Figure 1 are of conventional form as shown in Figure 7 and are sufficiently spaced to permit diagonal sinuous spring braces 120y and 120z to be interposed between the rows in crisscross relation with each other. The diagonal braces 120y are non pivotally connected to the rear rails 76 by clips 122 and to the front border wire 88 by clips 124. The diagonal braces 120z are non-pivotally connected to the front rails 74 by clips 126 and to the rear border wire 90 by clips 128.

While preferred embodiments of the invention have been described fully in order to explain the principles of the invention, it is to be understood that modifications of structure may be made by the exercise of skill in the art within the scope of the invention which is not to be regarded as limited by the detailed description of the preferred embodiments.

I claim:

1. In a sinuous spring assembly of the type comprising transversely interconnected parallel rows of sinuous spring elements each including a platform portion for supporting a load and depending legs connected to the platform and to a frame; the improvement comprising rows of sinuous spring braces interposed between certain of the rows of elements and connected to the assembly in angularly disposed relation to the platform and in row-spaced crisscross relation with each other to stabilize the platform against a lateral shifting movement under load.

2. In a sinuous spring assembly of the type comprising parallel rows of sinuous spring elements each including a platform for supporting a load and depending legs connected to the platform and to a common frame, the assembly having border wires transversely interconnecting the platforms to form the load supporting surface of the assembly; the improvement comprising rows of sinuous spring braces with each brace being directly connected to spaced portions of a respective element in angularly disposed relation to and directly below the platform thereof, the braces of neighboring elements having a crisscross relation with each other to stabilize the load supporting surface of the assembly against a lateral shifting movement under load, the spring action of the bracing serving to supplement the spring action of the elements, and the crisscross arrangement of the bracing imposing force couples in the neighboring elements to achieve supplemental spring action from the border wires that interconnect the elements.

3. In a sinuous spring assembly of the type comprising parallel rows of sinuous spring elements each including a platform for supporting a load and depending legs connected to the platform and to a frame with border wires transversely interconnecting the elements to form the platform; the improvement comprising rows of sinuous spring braces interposed between the rows of elements and connected to the border wires in angularly disposed relation to the platform and in row-spaced crisscross relation with each other to stabilize the platform against a lateral shifting movement under load.

4. In a spring construction of the type comprising a supporting frame having front and rear rails, transversely interconnected parallel rows of sinuous spring elements each including a platform extending across the frame for supporting a load and front and rear depending legs an-

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chored to the rails; the improvement comprising sinuous spring braces connected across the legs of the elements in angularly disposed relation to the platform, the neighboring braces having a crisscross relation with each other to stabilize the platform.

5. In a spring construction of the type comprising a supporting frame having front and rear rails, transversely interconnected parallel rows of sinuous spring elements each including a platform extending across the frame for supporting a load and front and rear depending legs anchored to the rails; the improvement comprising sinuous spring braces connected to the elements between the legs and platforms thereof and in angularly disposed relation to the platform, the neighboring braces elements having a crisscross relation with each other to stabilize the platform.

6. In a spring construction of the type comprising a supporting frame having front and rear rails, transversely interconnected parallel rows of sinuous spring elements each including a platform extending across the frame for supporting a load and front and rear depending legs anchored to the rails; the improvement comprising sinuous spring braces disposed directly below the platforms and connected to the elements in angularly disposed relation to the platforms, the braces of the neighboring elements having a crisscross relation with each other to stabilize the assembly, and the braces of some elements being connected across the legs of the elements and the braces of other elements being connected between the legs and the platforms of the elements whereby the spring action of the bracing supplements the spring action of the elements.

7. In a spring construction of the type comprising a supporting frame having front and rear rails, parallel rows of sinuous spring elements each including a platform extending across the frame for supporting a load and front and rear substantially V-shaped depending legs, front and rear border wires transversely interconnecting the elements to form front and rear edges for the platform, the legs having their ends anchored to the rails and underlying the platform edges; the improvement comprising sinuous spring braces connected across the legs of the elements in angularly disposed relation to the platform, the braces of neighboring elements having a crisscross relation with each other to stabilize the platform against a lateral shifting movement under load, the crisscross bracing imposing force couples in the neighboring elements to achieve spring action from the border wires.

8. In a spring construction of the type comprising a supporting frame having front and rear rails, parallel rows of sinuous spring elements each including a platform extending across the frame for supporting a load and front and rear substantially V-shaped depending legs, front and rear border wires transversely interconnecting the elements to form front and rear edges for the platform, the legs having their ends anchored to the rails and underlying the platform edges; the improvement comprising sinuous spring braces connected to the elements between certain of the legs and platforms thereof and

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in angularly disposed relation to the platform, the braces of neighboring elements having a crisscross relation with each other to stabilize the platform against a lateral shifting movement under load, the crisscross bracing imposing force couples in the neighboring elements to achieve spring action from the border wires.

9. In a spring construction of the type comprising a supporting frame having front and rear rails, parallel rows of sinuous spring elements each including a platform extending across the frame for supporting a load and front and rear substantially V-shaped depending legs, front and rear border wires transversely interconnecting the elements to form a load supporting surface and front and rear edges therefor, the legs having their ends anchored to the rails and underlying the edges; the improvement comprising sinuous spring braces disposed directly below the platforms and connected to the elements in angularly disposed relation to the platforms, the braces of some elements being connected across the legs of the elements and the braces of other elements being connected between certain of the legs and the platforms of the elements so that neighboring braces are in crisscross relation with each other to stabilize the load supporting surface against a lateral shifting movement under load, the spring action of the bracing serving to supplement the spring action of the elements, and the crisscross arrangement of the bracing imposing force couples in the neighboring elements to achieve supplemental spring action from the border wires that interconnect the elements.

10. In a spring construction of the type comprising a supporting frame having front and rear rails, parallel rows of sinuous spring elements each including a platform extending across the frame for supporting a load and front and rear substantially V-shaped depending legs, front and rear border wires transversely interconnecting the elements to form front and rear edges for the platform, the legs having their ends anchored to the rails and underlying the platform edges; the improvement comprising rows of sinuous spring braces interposed between the rows of elements in angularly disposed relation to the platform, some of the braces being connected between the front rail and rear border wire and others of the braces being connected between the rear rail and front border wire so that neighboring braces are in crisscross relation with each other to stabilize the platform against a lateral shifting movement under load, the crisscross bracing imposing force couples on the border wires to achieve spring action therefrom.

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