

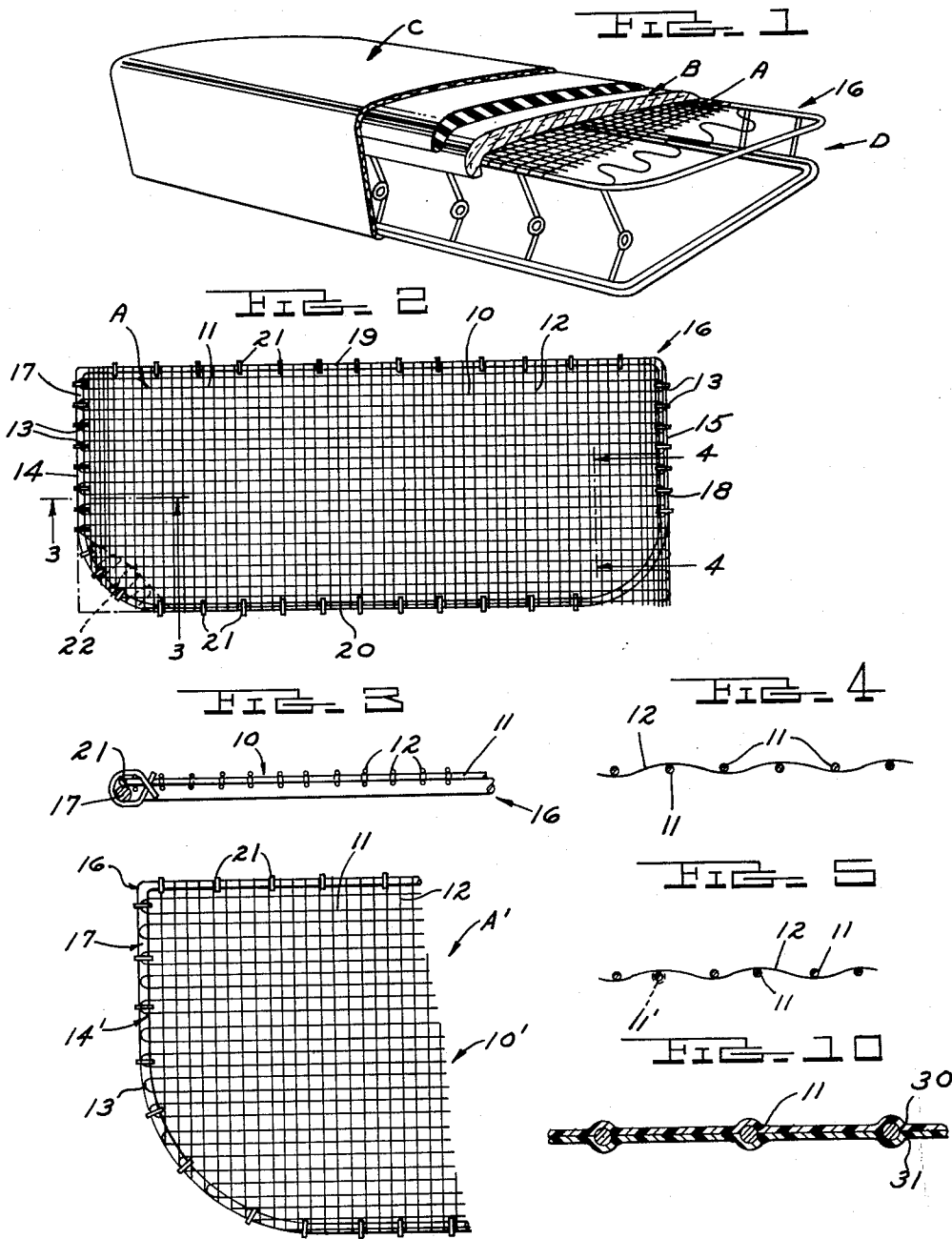
May 12, 1964

R. P. DOERER
COMPOSITE INSULATOR

3,132,354

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2 Sheets-Sheet 1



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2 Sheets-Sheet 2

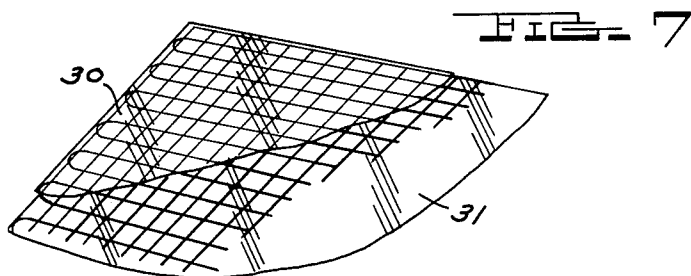
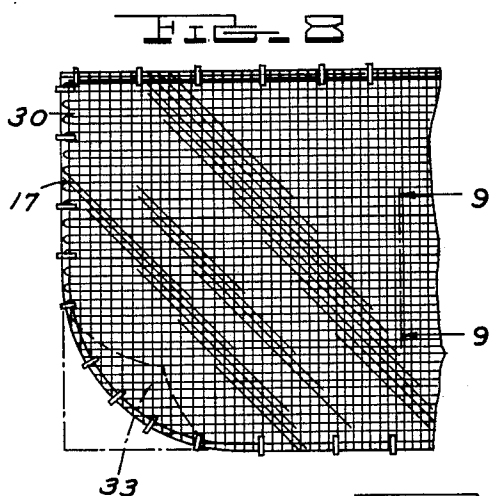
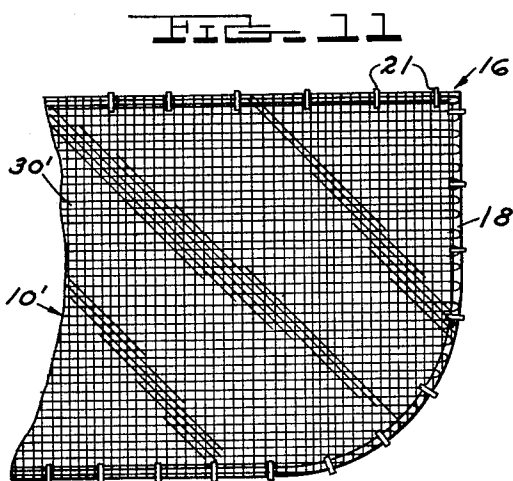
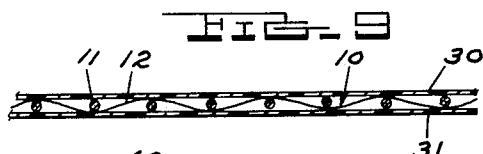
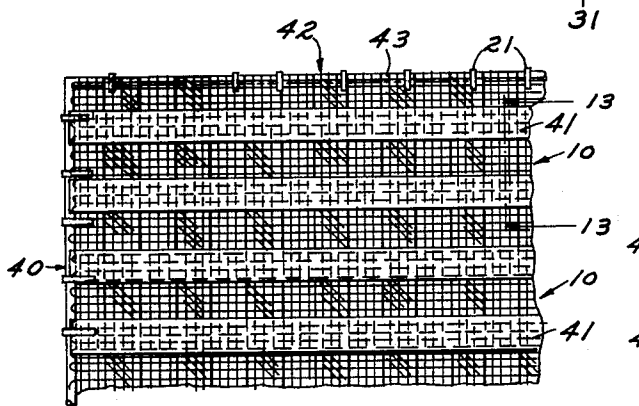
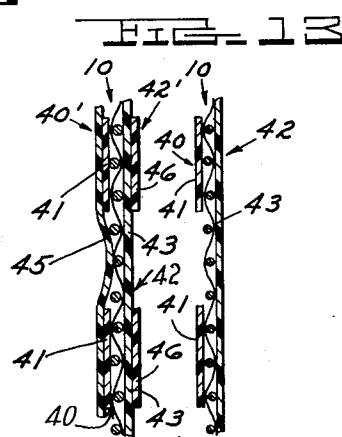


FIG. 12

FIG. 14 INVENTOR.
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3,132,354

COMPOSITE INSULATOR

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9 Claims. (Cl. 5—354)

This invention relates generally to insulators and refers more particularly to an insulator for use between an overlying padding and an underlying supporting spring structure of an upholstered assembly.

One of the essential objects of the invention is to provide an insulator comprising a flexible layer having a first set of substantially horizontally extending, laterally spaced, flexible strands extending in one direction, a second set of substantially horizontally extending, laterally spaced, flexible strands extending in a direction transverse to the said one direction and intersecting the strands of the first set, and means at the margin of the insulator for securing the same to the border frame of the supporting spring structure.

Another object is to provide an insulator wherein the strands are secured to each other at the points of intersection.

Another object is to provide an insulator wherein the strands of one set respectively extend over alternate strands of the other set and under the remaining strands of the said other set.

Another object is to provide an insulator comprising an elongated flexible layer having a first set of substantially horizontally extending, laterally spaced, substantially parallel, flexible strands extending lengthwise of the layer, a second set of substantially horizontally extending, laterally spaced, substantially parallel, flexible anchoring strands extending at right angles to and intersecting the strands of the first set and secured thereto at the points of intersection, and means at the margin of the insulator for securing the same to the border frame of the supporting spring structure.

Another object is to provide an insulator wherein the strands of one set are portions of a single continuous member having open return bent portions connecting the ends of the adjacent strands.

Another object is to provide an insulator comprising a first flexible layer composed of the aforesaid strands having an additional flexible layer or layers upon one or both of its opposite surfaces.

Another object is to provide an insulator wherein the additional flexible layer, or each additional flexible layer, is a flexible sheet coextensive with and substantially completely covering a surface of the first layer.

Another object is to provide an insulator wherein the additional layer, or each additional layer, comprises a plurality of laterally spaced, substantially parallel, flexible strips covering and secured to spaced portions only of a surface of the first layer.

Another object is to provide an insulator wherein the additional layer, or each additional layer, also comprises a plurality of laterally spaced, substantially parallel, flexible strips extending transversely of the first-mentioned strips covering and secured to spaced portions only of the surface of the first layer.

Other objects and features of the invention will become apparent as the description proceeds, especially when taken

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in conjunction with the accompanying drawings, wherein:

FIGURE 1 is a perspective view of an upholstered assembly provided with an insulator embodying the invention, and showing parts broken away and in section.

FIGURE 2 is a top plan view of the insulator shown secured to the border frame of the supporting spring structure except at one corner, to illustrate at that corner the initial configuration of the insulator.

FIGURE 3 is an enlarged fragmentary sectional view taken on the line 3—3 of FIGURE 2.

FIGURE 4 is an enlarged fragmentary sectional view taken on the line 4—4 of FIGURE 2.

FIGURE 5 is a view similar to FIGURE 4 showing a modification of the insulator of FIGURE 2.

FIGURE 6 is an enlarged fragmentary view showing a further modification of the insulator of FIGURE 2.

FIGURE 7 is an enlarged fragmentary perspective view of an insulator of modified construction.

FIGURE 8 is a fragmentary plan view of the insulator shown in FIGURE 7.

FIGURE 9 is an enlarged diagrammatic fragmentary sectional view taken on the line 9—9 of FIGURE 8.

FIGURE 10 is an enlarged fragmentary sectional view of a portion of the insulator in FIGURES 7 and 8, showing the contact between the outer layers of the insulator in the spaces between the strands of the intermediate layer.

FIGURE 11 is a fragmentary plan view of a modification of the insulator shown in FIGURES 7 and 8.

FIGURE 12 is an enlarged fragmentary plan view showing a modification of the insulators of FIGURES 7—11.

FIGURE 13 is an enlarged diagrammatic fragmentary sectional view taken on the line 13—13 of FIGURE 12.

FIGURE 14 is a diagrammatic view similar to FIGURE 13 showing a further modification.

In the drawings, A is an elongated, rectangular, substantially horizontally extending, flexible insulator embodying the invention disposed between an overlying padding B for an exterior trim material C and an underlying supporting spring structure D of an upholstered assembly.

As shown, the insulator A comprises an elongated, substantially rectangular, flexible layer 10 composed of a set of laterally spaced, parallel, flexible, resilient strands 11, extending lengthwise of the insulator, and a set of laterally spaced, parallel, flexible strands 12 extending transversely of the insulator at right angles to and intersecting the strands 11.

The strands 11 are preferably portions of a single continuous member having open return bent portions 13 connecting the corresponding ends of the adjacent strands. In other words, the straight parallel portions or sections of the single continuous member which extend from one edge 14 to the opposite edge 15 of the layer 10 are of uniform length and form the strands 11.

The strands 12 are of uniform length and are straight and parallel, and are here shown as separate members although it is to be understood that they could likewise, if desired, be portions of a single continuous member.

Referring to FIGURE 4, it will be seen that the strands 12 weave over and under the successive strands 11, that is they extend over alternate strands 11 and under the remaining strands 11. The strands 11 and strands 12 are

preferably secured together at the points of intersection as by a suitable adhesive.

The strands may be of any suitable material for the purposes set forth. In the present instance, the strands 11 provide the main support for the insulator and are preferably formed of wire such, for example, as M.B. grade steel wire or oil-tempered steel wire. The strands 12 maintain a predetermined spacing between strands 11 and are preferably formed of a fibrous material such as cotton, Dacron, nylon or jute. It will be understood, however, that both sets of strands can, if desired, be formed of the wire described or of the fibrous material described. Likewise, the strands 11 may be of the fibrous material and the strands 12 of the wire described.

The intersecting strands 11 and 12 mutually cooperate to support the load. Instead of extending at right angles to each other, one set of strands could be disposed diagonally with respect to the other. Moreover, while the stronger, heavier gauge strands 11 are shown extending longitudinally of the insulator and the lighter gauge strands 12 transversely thereof, this could be reversed so that the lighter gauge strands extended longitudinally and the heavier gauge strands extended transversely.

The length of the insulator A measured from one edge 14 to the other edge 15 is substantially equal to the length of the border frame 16 of the supporting spring structure D measured between the straight parallel portions of the contoured ends 17 and 18 thereof. The width of the insulator is substantially equal to the distance between the parallel longitudinal sides 19 and 20 of the border frame.

When the insulator is laid over the border frame, the corners of the insulator will extend beyond the rounded portions of the contoured ends 17 and 18 of the border frame. This is shown in full lines at the right in FIGURE 2 and in dot and dash lines at the left in FIGURE 2, the dot and dash lines indicating the original outline of the rectangular insulator before it is secured to the border frame.

The insulator is secured to the border frame by fasteners preferably in the form of hog rings 21. The hog rings 21 along the sides 19 and 20 of the border frame encircle or embrace the border frame and also the strands 11 near the sides of the insulator. The hog rings along the ends 17 and 18 of the border frame encircle or embrace the border frame and also the return bent portions 13, except at the rounded corners of the border frame. The corners of the insulator are folded over the rounded corners of the border frame before the hog rings are applied, as shown at 22, and the hog rings embrace the strands 11 rather than the portions 13 in this region.

As shown in FIGURES 2 and 4, the strands 11 are all spaced apart the same distance. However, as shown in the modification of FIGURE 5, the strands 11 may be spaced apart different distances to provide more support in certain areas to compensate for heavy localized loads. Also, certain of the strands 11 may be of heavier gauge than others, for the same reason. The dotted lines in FIGURE 5 show a strand 11' of larger gauge than the others.

If certain strands are of different gauge, they would normally be separate elements rather than portions of a single continuous member. However, strands of one gauge might be formed of one continuous member, and strands of another gauge might be formed of another continuous member.

The strands 12 are spaced apart uniformly except near the ends of the insulator where they are closer together. Obviously all of the strands 12 could be spaced apart the same distance from one end of the insulator to the other, if desired. It is obvious also that the strands 12 may be of the same or different gauge.

FIGURE 6 shows a modification of the insulator A, designated A'. The insulator A' differs from the insulator A first of all in that the layer 10' of which it is formed is not rectangular. The ends, one of which is

designated 14', are contoured to match the shape of the ends of the border frame. In other words, the strands 11 in the region of the curved portions of the contoured ends of the border frame are shorter, as shown. The strands 12 are also shorter in this region. Otherwise, the insulator of FIGURE 6 is like that shown in FIGURES 1-5.

FIGURES 7-9 illustrate an insulator having a modified construction. The insulator there shown comprises the flexible layer 10, described in connection with FIGURES 2-5, as one component thereof, and includes also the additional flexible, rectangular layers 30 and 31 upon opposite surfaces of the layer 10. The layers 30 and 31 are in the form of flexible thin sheets of any suitable material, preferably plastic, such, for example, as polyethylene. The sheets 30 and 31 are identical and are of the same size and configuration as layer 10 so as to be coextensive therewith. Hence, the sheets 30 and 31 fully cover the opposite surfaces of layer 10.

It will be understood that while two sheets 30 and 31 are shown, one could be omitted so that the insulator would consist of the layer 10 and a sheet 30 or 31 on only one surface thereof.

FIGURE 8 shows one end portion of the insulator secured to the border frame of the supporting spring structure in the same manner as the insulators A and A', by hog rings 21. The corner 33 of the insulator adjacent the contoured portion of either end of the border frame is folded over that portion of the border frame, as shown in FIGURE 8, the dot and dash lines indicating the original rectangular shape of the insulator before it is folded.

The flexible sheets 30 and 31 are secured to the intermediate layer 10 and are also secured to each other in the spaces between the strands of the intermediate layer. For this purpose the intermediate layer 10 may be laid over the sheet 31, adhesive applied to the layer 10 and to the surface of the sheet 31 it engages, and the layer 30 applied over the intermediate layer 10. Pressure may be applied, and heat if necessary depending on the adhesive employed, to secure the layers to each other. Where only one sheet is employed, it may be secured to the layer 10 in the manner described, that is by adhesive accompanied by heat and pressure if necessary. FIGURE 9 is a cross-section showing the sandwich construction. It will be understood that this view is diagrammatic to better illustrate the parts of the composite structure, and that actually the sheets 30 and 31 contact each other and closely embrace the strands. A true section on the line 9-9 of FIGURE 8 would closely simulate the snug arrangement shown in FIGURE 10.

The layers 30 and 31 give additional strength or body to the insulator. Also, they permit the strands to be spaced farther apart.

FIGURE 11 illustrates a modification of the insulator of FIGURES 7-10, which differs only in the contour or marginal outline of the insulator. The insulator in FIGURE 11 conforms in outline to the configuration of the border frame of the supporting spring structure. In other words, the layer 10' shown in FIGURE 6 is the intermediate layer of the insulator in FIGURE 11, and the flexible sheets on either side thereof are similarly contoured to be coextensive with and fully cover opposite surfaces of the intermediate layer. The sheets, one of which is indicated at 30', are otherwise like sheets 30 and 31 described above. Here again, it will be understood that only one sheet 30 or 31 may be employed.

FIGURES 12 and 13 illustrate a modification of the insulator of FIGURES 7-11, wherein the layers on opposite sides of the intermediate layer 10 are not continuous sheets but rather separate strips. Hence, the layer 40 on one side comprises a plurality of laterally spaced, substantially parallel, flexible strips 41 which extend lengthwise of the insulator, and the layer 42 on the opposite side is composed of a plurality of laterally spaced, substantially parallel, flexible strips 43 which extend transversely

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of the insulator, or at right angles to the strips 41. It will be understood that FIGURE 13 is a diagrammatic view to better illustrate the parts of the composite structure. Actually, the section on the line 13—13 of FIGURE 12 would closely simulate the snug arrangement shown in FIGURE 10.

While only a corner portion of the insulator is shown in FIGURE 12, it will be understood that strips 41 on one surface of the intermediate layer 10 extend from one end of the intermediate layer to the other and preferably are uniformly spaced apart from one side to the other, being of lengths corresponding to the length of the intermediate layer. The strips 43 on the other surface of the intermediate layer likewise extend from one side of the intermediate layer to the other and preferably are uniformly spaced apart from one end to the other, being of lengths corresponding to the width of the intermediate layer.

It will also be understood that while the insulator of FIGURE 12 includes the rectangular layer 10, the contoured layer 10' may be substituted therefor, in which event the lengths of certain of the strips 41 and 43 will be different to conform to the corresponding dimension of the layer 10'.

It will be understood that while two layers or sets of strips are shown, one set could be omitted so that the insulator would consist of the layer 10 or 10' and the strips 41 or 43 on only one surface thereof.

The strips 41 and 43 are formed of the same material as the sheets 30 and 31 and are secured to the strands of the intermediate layer and to each other in the spaces between the strands by a suitable adhesive. FIGURE 10, although it refers to another insulator, is illustrative of the manner in which the strips embrace and are secured to the strands, and contact and are secured to each other between the strands.

FIGURE 14 illustrates a modification of the insulator of FIGURES 12 and 13. As shown, additional layers 40' and 42' are on the outer sides respectively of the layers 40 and 42. The layer 40' has the transverse strips 45 which are at right angles to the strips 41 and are vertically opposed and parallel to the transverse strips 43 of the layer 42. The transverse strips 45 are also coextensive with the strips 43 of the layer 42.

Likewise, the layer 42' has the longitudinal strips 46 which are vertically opposed and parallel to the longitudinal strips 41 of the layer 40 and coextensive therewith.

The strips 45 of layer 40' are secured to the strips 41 of layer 40 at the points of crossing, and the strips 46 of layer 42' are secured to the strips 43 of layer 42 at the points of crossing. Likewise, the strips 45 and 46 are secured to the intermediate layer 10, and are secured to each other in the spaces between the strands of the intermediate layer. In this connection, it will be understood that FIGURE 14 is only diagrammatic, and that a snug sandwich construction, like that in FIGURE 10, is provided. A suitable adhesive is provided to secure the parts together.

The strips of layers 40' and 42' are of the same material as the strips of layers 40 and 42. Also, the contoured layer 10' may of course be substituted for the rectangular layer 10, as explained above in connection with FIGURE 12. Likewise, the layers 40 and 40' of strips on one side of the layer 10 could be omitted, in which event the layer 10 would have layers 42 and 42' of strips only on the opposite side thereof.

What I claim as my invention:

1. An elongated composite insulator for use between an overlying padding and an underlying supporting spring structure of an upholstered assembly; comprising an elongated layer composed of laterally spaced substantially parallel longitudinally extending flexible strands and laterally spaced substantially parallel transversely extending flexible strands extending over and under successive longitudinally extending strands, a layer on one side of said

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elongated layer and comprising a plurality of laterally spaced substantially parallel flexible strips extending longitudinally from one end to the other of said elongated layer, and a layer on the opposite side of said elongated layer and comprising a plurality of laterally spaced substantially parallel flexible strips extending transversely from one longitudinal side edge to the other of said elongated layer, the strips of the second and third mentioned layers being secured to the strands of said elongated layer.

2. The insulator defined in claim 1, wherein the longitudinally extending flexible strands of said elongated layer are formed from wire, and the transversely extending flexible strands of said elongated layer are formed from fibrous material.

3. The insulator defined in claim 1, wherein the longitudinally extending strips of said second mentioned layer are formed from plastic material, and the transversely extending strips of said third mentioned layer are formed from plastic material.

4. The insulator defined in claim 1, wherein a layer is disposed on the outer side of the second mentioned layer and comprises a plurality of laterally spaced transversely extending substantially parallel flexible strips extending across and secured to the longitudinally extending strips of said second mentioned layer, and a layer is disposed on the outer side of the third mentioned layer and comprises a plurality of laterally spaced longitudinally extending substantially parallel flexible strips extending across and secured to the transversely extending strips of said third mentioned layer.

5. The insulator defined in claim 4, wherein the flexible transversely extending strips of the layer disposed on the outer side of the second mentioned layer are formed from plastic material, and the flexible longitudinally extending strips of the layer disposed on the outer side of the third mentioned layer are formed from plastic material.

6. The insulator defined in claim 4, wherein the longitudinally extending strips of said second mentioned layer are formed from plastic material, the transversely extending strips of the layer disposed on the outer side of the second mentioned layer are formed from plastic material and are secured to the plastic longitudinally extending strips of said second mentioned layer, the transversely extending strips of said third mentioned layer are formed from plastic material, and the longitudinally extending strips of the layer disposed on the outer side of the third mentioned layer are formed from plastic material and are secured to the plastic transversely extending strips of said third mentioned layer.

7. The insulator defined in claim 4, wherein the transversely extending strips of the layer on the outer side of said second mentioned layer are opposed and substantially parallel to the transversely extending strips of the third mentioned layer, and the longitudinally extending strips of the layer on the outer side of said third mentioned layer are opposed and substantially parallel to the longitudinally extending strips of the second mentioned layer.

8. The insulator defined in claim 4, wherein the transversely extending strips of the layer on the outer side of said second mentioned layer are coextensive with the transversely extending strips of the third mentioned layer, and the longitudinally extending strips of the layer on the outer side of said third mentioned layer are coextensive with the longitudinally extending strips of the second mentioned layer.

9. In combination, an upholstery spring structure having a horizontally extending elongated border frame, a horizontally arranged elongated flexible insulator extending longitudinally of said border frame and including an elongated layer composed of laterally spaced substantially parallel flexible strands extending longitudinally of said border frame, and laterally spaced substantially parallel flexible strands extending transversely of said border

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frame and crossing said longitudinally extending strands, adjacent longitudinally extending strands being connected at opposite ends thereof by open return bent portions, a layer on one side of said elongated layer and comprising a plurality of laterally spaced substantially parallel flexible strips extending lengthwise of said border frame, a layer on the opposite side of said elongated layer and comprising a plurality of laterally spaced substantially parallel flexible strips extending transversely of said border frame, the strips of the second and third mentioned layers being secured to the strands of said elongated layer, and means securing said insulator to said border frame, including fasteners embracing opposite sides of said border frame and the longitudinally extending strands of said insulator adjacent said opposite sides of said border frame,

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and fasteners embracing opposite ends of said border frame and the return bent portions of said longitudinally extending strands of said insulator.

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