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CUSHIONING MEMBER

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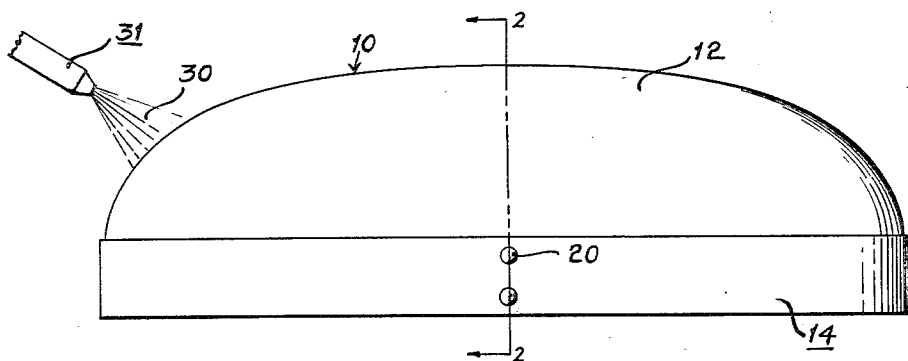


FIG. 1

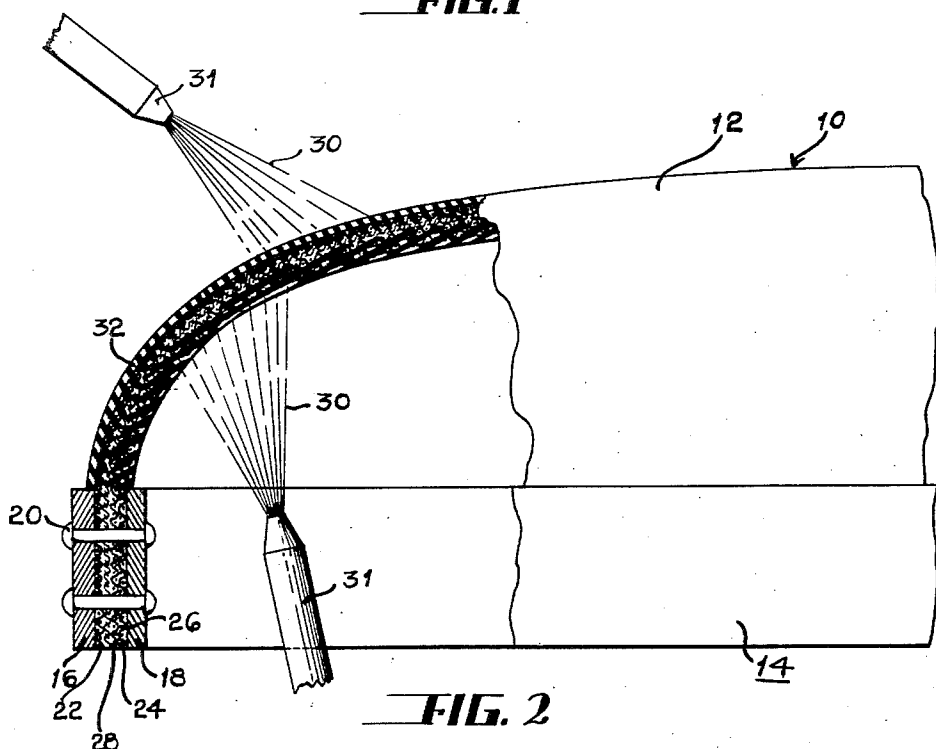


FIG. 2

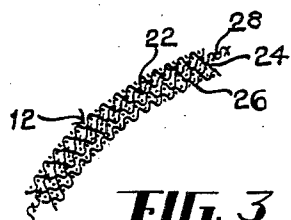


FIG. 3

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CUSHIONING MEMBER

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8 Claims. (Cl. 155—187)

This invention relates to an improved cushioning member and more particularly to a cushioning member fabricated from woven wire.

It has been common practice for several years to fabricate cushions for outdoor furniture from woven wire. These woven wire cushions are comfortable, exceptionally durable, and yet are economical to manufacture. The present invention evolved from efforts to construct woven wire cushions satisfactory for theater seats and bus seats, as well as other applications, wherein a pleasing appearance as well as exceptional durability is required.

An object of this invention is to provide a woven wire cushion of light weight having a smooth or embossed finish which may, if desired, simulate leather or upholstery, or the like.

Another object of this invention is to provide a woven wire cushion having resiliency characteristics which provide a comfortable cushion for both adults and children.

A further object of this invention is to provide a woven wire cushion in which an elastomer impregnated in the woven wire web improves the resiliency thereof, the elastomer further providing a tough protective surface over the woven wire.

Other objects and advantages reside in the construction of parts, the combination thereof and the mode of operation, as will become more apparent from the following description.

One of the distinctive features of this invention is a reduction in the diameter of the wire woven to provide the cushioning member. It has long been the practice to fabricate woven spring wire cushions from eight mesh woven wire having a diameter approximately 0.04 inch.

Cushions so formed are satisfactory for adult use, however, are too stiff to be comfortable for a child. Furthermore, such cushions, when used on moving vehicles such as automobiles or busses, fail for the reason that repeated bouncing of the passenger on the cushion, due to roughness of the road, strains the wires of the cushion, ultimately rendering the cushion valueless.

It is possible to obtain 0.04 inch wire of a correct analysis and temper from which cushions suitable for use by children can be constructed. Although such a cushion would feel soft and luxurious to an adult, the cushion would fail under the weight of an adult, with the individual wires being flexed beyond the elastic limit so as to become deformed. Clearly, such a cushion would fail readily in a moving vehicle.

It is well known in the art that a small diameter wire of a given temper and analysis will flex a greater amount without strain, than a wire of a larger diameter of the same temper and analysis.

Thus, should a cushion be formed from two or more layers of relatively small diameter woven wire, the total weight of the wire used being less than that used in the aforesaid cushion, the cushion will be comfortable for a child. It would perhaps be too soft for the average adult, but, due to the enhanced flexibility of the wire, it would not become deformed under the weight of an

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adult. Such a cushion would not be satisfactory for adult use in moving vehicles for the reason that added road shock would strain the individual wires.

If additional layers of woven wire are added to the cushion formed from small diameter wire, the cushion becomes too stiff and therefore "bouncy." The bounce is partly eliminated by the various layers of wire nesting one with the other as set forth in my application Number 413,769, filed March 3, 1954, now U.S. Patent No. 2,806,513, for a Reinforced Screen Wire Resilient Support, however, sufficient structural strength for supporting adults and sufficient elasticity to accommodate both adults and children even on moving vehicles is obtained by laminating several layers of woven wire employing an elastomer as a snubber and bonding agent.

Since the 0.02 inch diameter wire weighs only one fourth as much as the 0.040 inch diameter wire, a three layer laminated web of 0.020 inch wire is actually lighter in weight than the single web of 0.040 inch wire. The smaller wire is also easier to weave, the result being economy in cost of manufacture and weight.

In the drawings, Figure 1 is a side elevational view of a cushioning member formed from woven wire showing a spray nozzle in position for applying an elastomer to the convex side of the cushion.

Figure 2 is an enlarged partial sectional view taken substantially along the line 2—2 of Figure 1 showing an additional spray nozzle positioned under the cushion for applying an elastomer to the concave side thereof.

Figure 3 is an enlarged partial sectional view taken substantially along the line 2—2 of Figure 1 showing the construction of the web of the cushioning member before application of the elastomer.

Referring to the drawings in detail, the cushioning member indicated by the reference numeral 10 is formed from an arched resilient web 12 supported by an annular frame 14. The annular frame 14 includes a pair of parallel bands 16 and 18 drawn together by rivets 20 so as to grasp the margins of the web 12 therebetween. The bands 16 and 18 may be constructed from any suitably rigid material, such as a metal, or a plastic, or the like.

The arched web 12 is formed from three layers 22, 24 and 26, of woven wire. For reasons to become apparent in the following, a layer of fabric 28 such as tightly woven canvas cloth is sandwiched between the layers 22 and 24 of woven wire, the fabric layer 28 being separated from the convex surface of the web 12 by the single layer 22 of woven wire.

The arched shape of the web 12 may be obtained by forming the individual woven wire layers in a suitably shaped die, although it would be possible to form the several layers of woven wire and fabric into an arched shape all in a single operation, rather than individually.

In the drawing, the web is shown as having an elliptical cross-section. This is for the purposes of illustration. Clearly, a wide variety of shapes may be devised, limited only by the structural characteristics of the woven wire. Examples of other shapes which may be satisfactorily formed are given in my earlier United States Patents Nos. 2,278,049 and 2,126,439.

An elastomer 30 is applied to the arched web 12 so as to fill the foramina or interstices of the woven wire. As shown at 31 in Figures 1 and 2, the elastomer may be applied by spraying, although dipping or other methods are also suitable. The elastomer may be any suitable elastomeric material capable of adhering to the metal of the screen. Elastomers such as neoprene, which will not ordinarily adhere to metals, may be employed provided an adhesive layer (not shown) is first applied to the woven wire. Any of the marketed adhesives for bonding an elastomer to a metal may be used, the

adhesive being applied by dipping, spraying, or any other suitable means.

The layer of fabric 28 is provided in the web 12 to prevent waste which would result if the woven wire alone were sprayed with the elastomer. That is, the spray would tend to travel entirely through the web without filling the foramina. The fabric layer creates a barrier so that the elastomer will accumulate in the foramina of the woven wire.

A heavy layer 32 of elastomer is applied to the convex side of the web 12 to provide thereon a uniform surface. Formation of the uniform surface is promoted by placing the fabric layer 28 immediately under the first woven wire layer 22 on the convex side of the web 12.

In finishing the cushion, the elastomer surface on the convex side may be treated to provide a pleasing appearance. For example, the surface may be embossed or molded to simulate leather or fibers may be embedded in the surface to simulate pile fabric. Depending on the elastomer selected, a suitable heat treatment may be provided to cure the sprayed elastomer.

In some design applications it may be desirable to reverse the cushion to provide a concave "bucket" seat. This is readily accomplished by transposing the position of the fabric layer to a position intermediate the woven wire layers 24 and 26. The concave surface may then be finished as described hereinbefore.

The number of layers laminated to provide the web 12 is determined by the structural properties of the individual layers. In the present cushion, a carbon steel of high tensile strength is used. As the composition of the wire material, or the diameter of the wires, or the mesh of the weave, is varied, more or possibly fewer layers of woven wire may be required to obtain a satisfactory cushioning member.

By using a smaller size wire than required for a single layer of woven wire like that shown in my aforementioned patents, a greater flexibility with less fatigue results; extending the life of a cushion. Especially is this the case where the cushion is subjected to continuous vibration as when used on vehicles, such as buses, trucks, farm implements, automobiles and the like.

Although the preferred embodiment of the device has been described, it will be understood that within the purview of this invention various changes may be made in the form, details, proportion and arrangement of parts, the combination thereof and mode of operation, which generally stated consist in a device capable of carrying out the objects set forth, as disclosed and defined in the appended claims.

Having thus described my invention, I claim:

1. A cushioning member comprising a resilient web and means for supporting the web, said web including a layer of foraminous woven wire, and an elastomer impregnating said woven wire so as to fill the foramina therein.

2. A cushioning member comprising a resilient web

and means for supporting the web, said web including a layer of foraminous woven wire, an elastomer impregnating the woven wire so as to fill the foramina therein, and a layer of fabric laminated to said woven wire, the elastomer providing a bond therebetween.

3. A cushioning member comprising a resilient web and means for supporting the web, said web including a plurality of layers of foraminous woven wire, and an elastomer impregnating the layers of woven wire so as to fill the foramina therein, the elastomer providing a bond between the layers of woven wire.

4. A cushioning member comprising an arched resilient web and means for supporting the web, said web including a plurality of layers of foraminous woven wire, an elastomer impregnating the woven wires so as to fill the foramina therein, and a sheet of fabric sandwiched between the layers of woven wire, the elastomer providing a bond between the woven wire layers and the layer of fabric.

5. A cushioning member comprising an arched resilient web and means for supporting the web, said web including a plurality of layers of woven wire having thereon an adhesive coating, a layer of fabric sandwiched between said layers of woven wire, there being a single layer of woven wire on one side of said fabric layer, and an elastomer impregnating the woven wire layers so as to fill the foramina therein, said elastomer providing a bond between the woven wire layers and the fabric layer, there being a substantially uniform elastomer surface covering the single layer of woven wire adjacent the fabric layer.

6. A cushioning member according to claim 4 wherein the means for supporting the web is an annular band engaging the marginal portions of the arched web.

7. A cushioning member comprising an arched resilient web and means for supporting the web, said web including a layer of foraminous woven wire, and an elastomer impregnating said woven wire so as to fill the foramina therein.

8. A cushioning member comprising an arched resilient web and means for supporting the web, said web including a plurality of layers of woven wire, a layer of fabric sandwiched between said layers of woven wire, there being a single layer of woven wire on one side of said fabric layer, and an elastomer impregnating the woven layers so as to fill the foramina therein, said elastomer providing a bond between the woven wire layers and the fabric layer, there being a substantially uniform elastomer surface covering the single layer of woven wire adjacent the fabric layer.

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