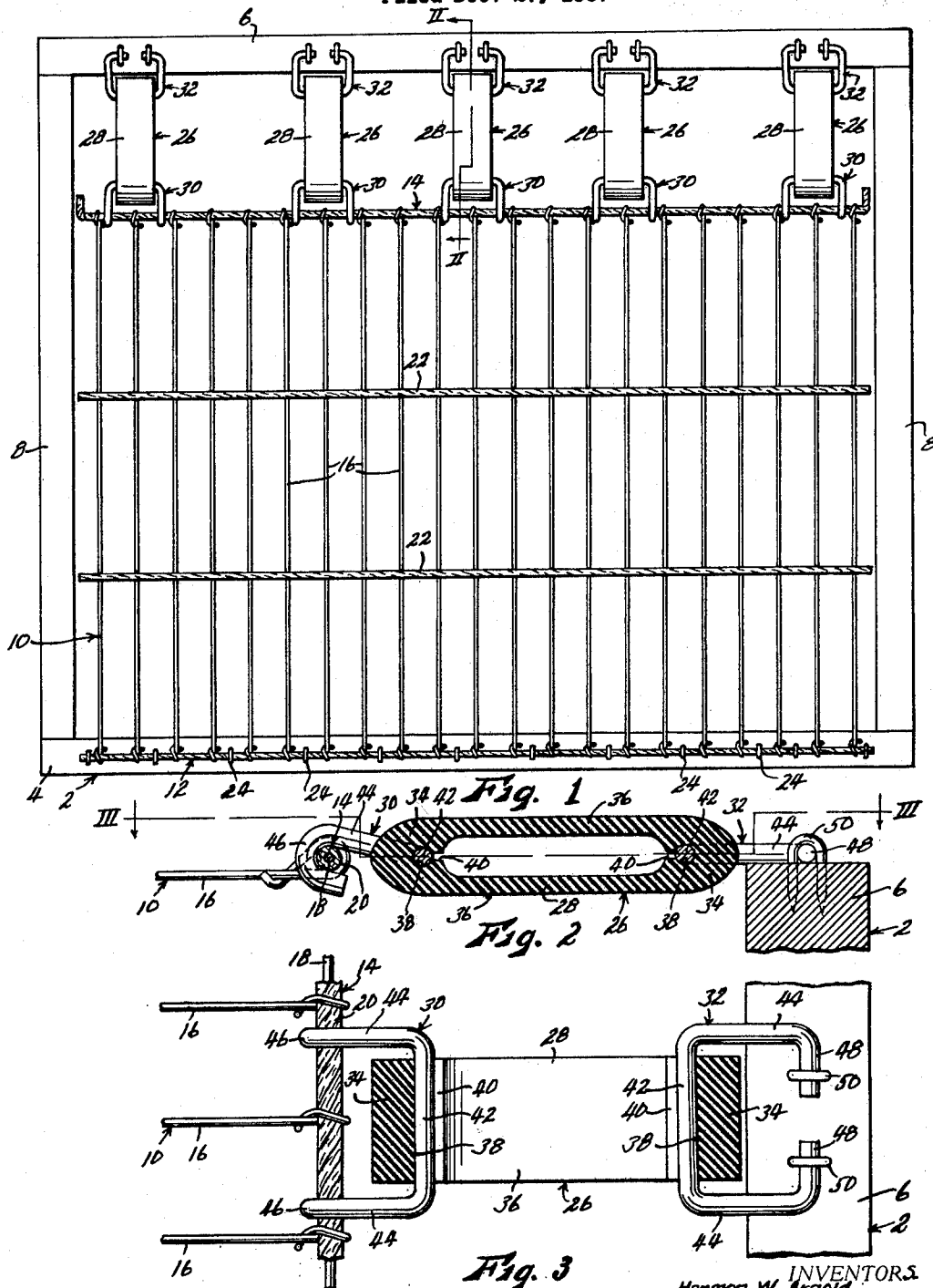


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UPHOLSTERY DECK SUSPENDER

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UPHOLSTERY DECK SUSPENDER

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4 Claims

ABSTRACT OF THE DISCLOSURE

An upholstery deck suspender adapted to support a planar or planar-surfaced upholstery padding deck resiliently in a rigid furniture frame, said suspender comprising a flattened, elongated rubber loop adapted to extend longitudinally of itself between contiguous but spaced apart edges of said frame and said deck, and a pair of U-shaped wire hangers engaged pivotally in respectively opposite ends of said loop and adapted to be secured respectively to said frame and said deck.

This invention relates to new and useful improvements in upholstery accessories, and has particular reference to suspenders for mounting decks for padding layers in the rigid frames of automotive seating, furniture and the like.

In many types of upholstered seating, the padding and upholstery layers are applied over a deck member mounted in the rigid frame, and it is usually desirable that the deck member be secured in said frame around some or all of its peripheral edges by means permitting resilient vertical yielding of the deck, in order to provide a feeling of softness and depth. The deck itself may be of any of several types, either planar or having a planar top surface, for supporting the padding properly. For example, the deck could consist of a sheet of wire or wire-reinforced fabric, which would provide no vertical yield at all if its edges were rigidly secured in a frame, so that yieldable edge suspenders are necessary. Chain-link wire fabrics would also be included in this class. Even if the deck has some vertical yieldability, as by being formed of a series of upwardly bowed sinuous spring wires, it may still be desirable to provide yieldable edge mountings, or suspenders, in order to provide still greater softness or "depth" for the cushion. The primary object of the present invention is the provision of an improved suspender or edge connector for upholstery decks of the types mentioned above.

Helical steel springs are currently in common usage for this purpose. Rubber suspenders have heretofore been proposed, and have certain advantages over steel springs. Principally, rubber or synthetic substitutes are easily available which are cheaper than steel springs, and which provide an elongation on the order of 300 to 500%, while steel helical springs generally are limited to elongation on the order of less than 100% before permanent deformation occurs. Thus the rubber provides a cushion of greater softness and depth of yieldability than steel springs, or the same degree of yieldability as a given set of steel springs could be provided by rubber hangers of shorter length, and requiring less space. However, the use of rubber has been subject to certain disadvantages which have prevented its widespread adoption. Principally, these difficulties have centered about the problems of making suitable end connections between the rubber member and the frame and upholstery deck. For example, most end connections resulted in flexing of the rubber member transversely to its longitudinal extent, causing unequal stresses in different portions of its cross-sectional area and leading to early failure. Also, most end connections, for example those in which the rubber member is nailed, riveted, or clamped, result in stress concentrations at the connections, also leading to early failure. Still another defect

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appears to be inherent in the yieldability of the rubber itself. This results in continuously repeated rubbing or abrasion between the rubber and whatever end connecting member or hanger is used, so that failure has often occurred as a result of this abrading wear. Accordingly, another object of the present invention is the provision of an upholstery deck hanger in which the yieldability is provided by a member formed of rubber or the like, but having a configuration and special end connections substantially overcoming the above enumerated difficulties.

Other objects are simplicity and economy of construction, efficiency and dependability of operation, and adaptability for use with seating frames and upholstery decks of many different types.

With these objects in view, as well as other objects which will appear in the course of the specification, reference will be had to the accompanying drawing, wherein:

FIG. 1 is a top plan view of a rigid seating frame having an upholstery deck suspended therein, along one of its edges, by the suspenders of the present invention,

FIG. 2 is an enlarged, fragmentary sectional view taken on line II—II of FIG. 1, and

FIG. 3 is a fragmentary sectional view taken on line III—III of FIG. 2.

Like reference numerals apply to similar parts throughout the several views, and the numeral 2 applies generally to a rigid furniture seating frame consisting of a front rail 4, rear rail 6, and side rails 8, all permanently joined in rectangular form. This frame may be formed of wood, metal, or any other suitable material. In this frame is mounted an upholstery deck indicated generally by the numeral 10. As previously pointed out, this deck may be of many different types and constructions, but as shown it comprises a flexible, planar sheet including a front strand 12, a rear strand 14 parallel to said front strand, and a continuous series of parallel, closely spaced apart spring wires 16 extending transversely between and permanently attached to said front and rear strands. As best shown in FIGS. 2 and 3, the front and rear strands may each consist of a spring wire core 18 covered by a sheath 20 of a soft, indentable material such as twisted paper, in order to give cross wires 16 better purchase thereon. To maintain proper spacing between wires 16 along their entire lengths, one or more intermediate strands 22 of twisted paper may be disposed between and parallel with strands 12 and 14, cross wires 16 piercing said intermediate strands.

In the drawing, deck 10 is mounted in frame 2 by securing front deck strand 12 to front frame rail 4 by staples 24 at intervals along the length thereof, the side edges of the deck are free and unsecured, and the rear deck strand 14 is secured to rear frame rail 6 by a series of suspenders embodying the present invention, and each indicated generally by the numeral 26. However, it is to be understood that this showing is illustrative only, being a particular frame-deck structure for specific purposes, and that if desired any or even all the edges of the deck could be secured to the frame by suspenders 26 if desired, the only requirement being that any deck edge to be so supported must be spaced inwardly from the contiguous frame rail.

Each suspender 26 comprises an elongated, flattened loop 28 formed of an elastically stretchable material such as natural or synthetic rubber, and a pair of hangers 30 and 32 for connecting the ends of said loop respectively to strand 14 and rail 6. Loop 28 is preferably formed by extrusion, the external surface thereof being smooth, and the cross-sectional contour thereof being uniform in a direction parallel to the loop axis. The end portions 34 of the loop are relatively thick and heavy, while the opposite reaches 36 of the loop intermediate said end portions are relatively thin, for a purpose to be described. Adjacent each end of the loop, in the thickened portion

thereof, a notch 38 is formed therein, said notch extending through the entire length of the loop parallel to the loop axis. Said notch is of circular cross-sectional contour, and is connected to the interior opening of the loop by a coextensive narrow slit 40, said slit being narrower than the diameter of notch 38.

Each hanger member 30 and 32 is formed of heavy round wire, and is of substantially U-shape, whereby it may be easily inserted through loop 28. Each hanger has a straight central portion 42 which may be engaged in notch 38 at one end of the loop by snapping it through the associated slit 40, and a pair of parallel legs 44 extending transversely to said central portion. Central portion 42 is of a diameter to fit snugly in its associated notch 38, but is pivotable about its axis therein. Preferably, this pivotal action is assisted by a suitable lubricant, which should be non-drying and non-destructive to the rubber or other material of which the loop is formed.

The legs 44 of each hanger are formed for easy attachment respectively to deck 10 and frame rail 6. As shown, the legs 44 of hanger 30 are each bent to form a hook 46 opening toward the central portion 42 of said hanger. Said hooks are coaxial on an axis parallel to said central portion, and are adapted to be engaged over rear strand 14 of deck 10. Virtually all decks have a border wire or other peripheral strand comparable to strand 14, about which hooks 46 can be engaged. Each leg 44 of hanger 32 is bent inwardly to form a short leg 48 extending parallel to central portion 42, and legs 48 are adapted to be secured to rear frame rail 6 as by staples 50 driven into said rail. The contiguous ends of legs 48 must be spaced apart sufficiently to permit assembly of the hanger with the loop.

The construction and installation of the suspenders having been fully described, their operation is self-evident since their sole ultimate function is to permit downward resilient yielding of upholstery deck 10 in use. However, its advantages as compared to the helical steel springs ordinarily employed for this purpose, and of the particular structural features thereof, are numerous. A typical steel spring, for example, will have a safe elongation (before permanent set) on the order of less than 100%. Rubber compounds, on the other hand, can be made to provide elongations on the order of 300 to 500%. Thus, for suspender units of the same length as ordinary steel spring units, a greater cushion softness or "depth" can be provided. If the elongation provided by ordinary steel spring units is considered satisfactory, the substitution of the present rubber units permits the use of shorter units with consequent lower costs and reduced space requirements. Next, the external surface of the loop being smooth and unbroken, there is no tendency thereof, as it is repeatedly stretched and relaxed in use, to chafe, pinch or tear the cushioning, trim or filling materials which overlie the deck and may contact the suspenders. The tendency of coil springs in this application to damage said materials between the convolutions thereof is well known. Also, rubber units are not so likely as wire springs to generate objectionable noises, such as caused by the end connections of wire springs, or the snapping or "singing" noises of wire springs. Furthermore, noises generated in one portion of an assembly are not so apt to be "telegraphed" to other portions of the assembly, so that noise is more likely to be isolated and/or reduced.

With respect to the suspender unit itself, the present structure solves many of the problems heretofore attendant on the use of rubber. The use of a continuous loop rather than a strap or bar of rubber eliminates any necessity of nails, screws, clamps or the like for securing the rubber. Such fastenings invariably result in localized concentrations of rubber stress at the fastening, and are a common cause of failure. The entire width of the loop, in a direction parallel to its axis, is supported evenly and uniformly on central portions 42 of the hangers so that

there can be substantially no inequality of stress from side to side of the loop, and hence no tendency to flex the loop horizontally. The ends of the loop have free vertical pivotability on the hangers, particularly if they are properly lubricated, so that there is no tendency for the rubber to flex vertically. Hence there is no tendency of the rubber to flex in any direction transverse to the loop, and all portions of the rubber, except those portions immediately behind the hangers, are maintained solely in tension, the tension being equal across the entire cross-sectional contour of the loop at any point in the length of the loop. Such unequal stressing and transverse flexure of a rubber connector, particularly at its end connections, has been found to be a significant cause of failure in extended periods of use, and its elimination provides longer, trouble-free life.

The provision of thick, heavy end portions 34 in the loop provides that the elongation of the loop in use is confined principally to the thinner intermediate reaches 36 of the loop, while the end portions remain relatively undeformed. This reduces the abrasion wear at the hangers which normally occurs whenever a repeatedly flexed rubber member has tight frictional engagement with a metal element, and hence reduces the likelihood of wear failure at these points. Also, the heavier rubber section at the ends of the loop provides a greater thickness through which the wire hangers must wear before the assembly is rendered ineffective.

The engagement of the hangers in notches 38 permits complete pre-assembly of the hangers before delivery to furniture or seating manufacturers, thus tending to insure proper installation, and eliminating much of the handling and labor cost normally required in the installation of steel springs on the production line. The engagement of the hangers in notches 38 also prevents any tendency of the loop to "walk" or "creep" peripherally around the hangers due to repetitive flexing and relaxing in use. Such movement of the loop could of course bring the relatively thin intermediate reaches 36 of the loop into engagement with the hangers, and this would eliminate the advantages of having thick sections engaging the hangers.

The U-shape of the hangers, particularly of hanger 30, has the advantage of dividing the tensile load of the loop into two half-loads applied at different, spaced apart points of rear strand 14 of deck 10. This reduces the load concentration on the deck, so that it is better enabled to support the load and retain its form for longer periods.

Finally, loop 28, being of uniform cross-sectional contour throughout its length, in a direction parallel to its axis, is well adapted for production by extrusion thereof in continuous tubular lengths, and severing of said tubular form transversely into short lengths. The effective strength of the loop can easily be varied by changing the length severed from the tube. This method, permitted by our structure, is extremely economical and efficient.

While we have shown and described a specific embodiment of our invention, it will be readily apparent that many minor changes of structure and operation could be made without departing from the spirit of the invention.

What we claim as new and desire to protect by Letters Patent is:

1. An upholstery deck suspender for mounting an upholstery deck having a generally planar upper surface in a rigid furniture frame, said suspender comprising:

(a) an elongated member formed of elastic material and adapted to be extended longitudinally of itself between said frame and an edge of said deck, said elastic member comprising a flattened, elongated loop, and

(b) means for attaching the ends of said elastic member respectively to said frame and said deck, said attaching means for each end of said loop constituting a rigid hanger member formed in substantially a U-shape whereby it may be inserted through said loop, the central portion of said hanger being engaged

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through said loop transversely to the longitudinal extent of said loop for pivotal movement about its own axis relative to said loop, and both of the end portions of said hanger being adapted to be attached to said frame or said deck at spaced apart points thereof.

2. An upholstery deck suspender as recited in claim 1 wherein the cross-sectional contour of said loop, radially thereof, is substantially thicker at the portions thereof engaged by said hangers than in the portions thereof intermediate said hangers, whereby elongation of said loop is confined principally to said intermediate portions, thereby to reduce abrading relative movement between said loop and said hangers.

3. An upholstery deck suspender as recited in claim 1 wherein said loop is provided at each end thereof with an internal notch extending parallel to the loop axis and being of a cross-sectional contour for receiving the central portion of one of said hangers pivotally therein, said notch being interconnected with the interior of said loop

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by a slit narrower than the thickness of said central hanger portion, whereby said central hanger portion may be snapped into said notch through said slit, whereby said loop is prevented from creeping peripherally about said central hanger portions.

4. An upholstery deck suspender as recited in claim 3 wherein the cross-sectional contour of said loop radially thereof, is substantially thicker in the portions thereof at and immediately adjacent said hangers than in the portions thereof intermediate said hangers.

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