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[54] **SPRING UPHOLSTERY CUSHIONING**

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Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 30,890, April 22, 1970.

[52] **U.S. Cl.** **5/353,** 5/91, 5/351, 297/DIG. 2

[51] **Int. Cl.**.....**A47c 27/22,** A47c 7/20

[58] **Field of Search** 297/457; 5/351, 353, 110, 91

[56] **References Cited**

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[57] **ABSTRACT**

A pocket spring upholstery cushioning comprised of helical springs respectively encapsulated in a pod of flexible foam plastic and all mutually interconnected in co-planar, side by side assembly by an integral web of the same material. Said web has a thickness of less than the axial heights of the pods and connects them by their ends on one side only of the cushioning permitting independent relative movement of the spring ends on the other side of the cushioning.

6 Claims, 3 Drawing Figures

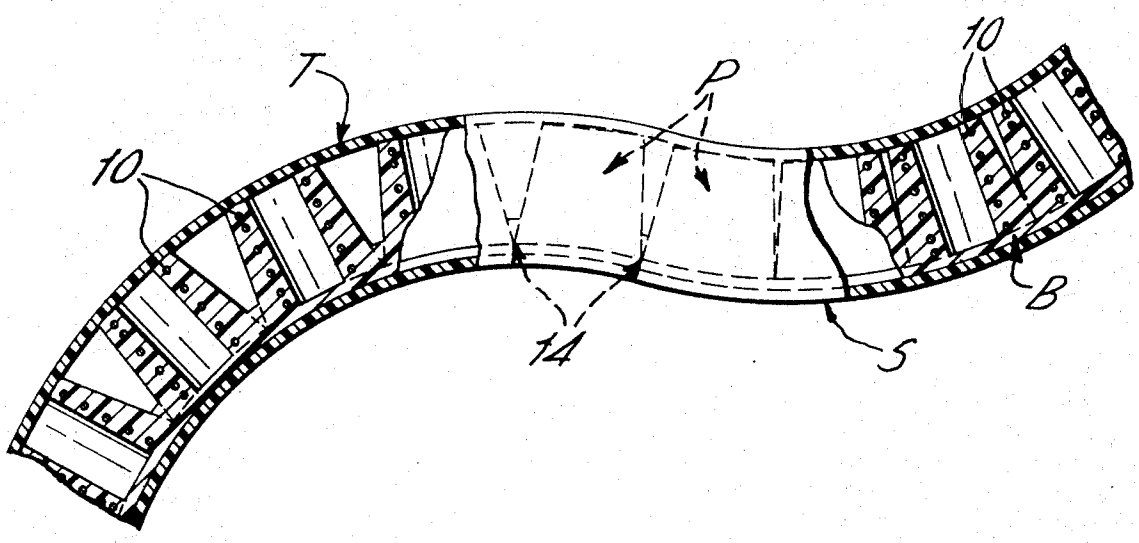


Fig. 1.

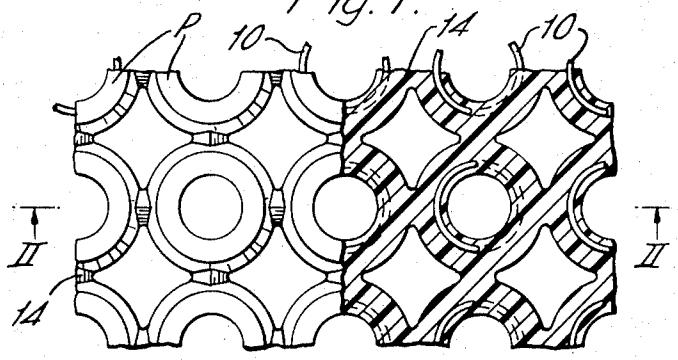


Fig. 2.

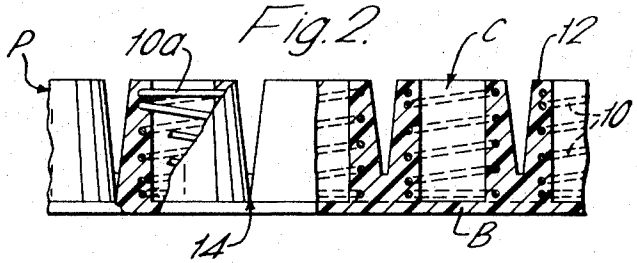
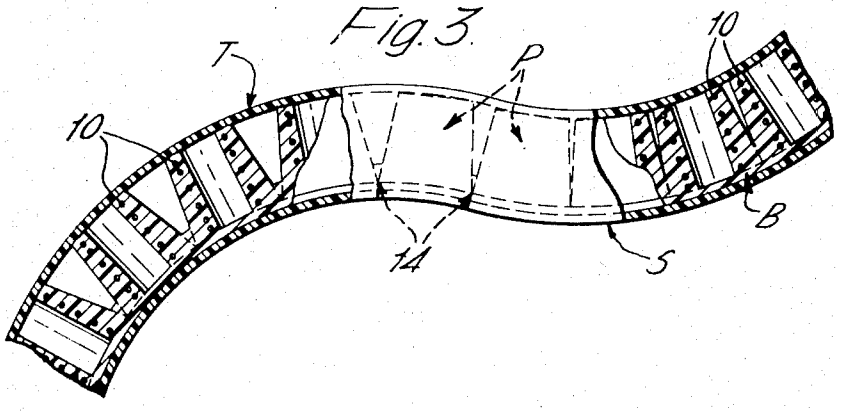


Fig. 3.



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SPRING UPHOLSTERY CUSHIONING

This application is a Continuation-in-Part of my Application Ser. No. 30,890 filed April 22, 1970 for SPRING UPHOLSTERY ASSEMBLY and the present invention relates to SPRING UPHOLSTERY CUSHIONING which is of the same general type as that disclosed in the parent application aforesaid but which is particularly suitable for upholstering furniture of sinuous form such as is sometimes incorporated in the seats, backs or sides of settees, chairs, sofas, lounges, and like type of sitting or reclining furniture. Prior art spring upholstery assemblies as used, for example, by the bedding industry in the production of mattresses and by the furniture industry in the upholstery of furniture have included interconnected coil spring assemblies wherein adjacent springs have been connected adjacent their ends and/or intermediate thereof by stringers or hog rings and have also included what have become known as "pocketed springs." In some pocketed spring assemblies adjacent springs have not been connected together by the conventional hog rings as aforesaid but have only been interconnected by interstitching between adjacent fabric pockets within which the individual springs were located.

Also known in the prior art is upholstery cushioning constructed of a foamed elastomeric material including metal coil springs more or less embedded therein. However, such cushioning did not attempt to achieve the various advantages of the pocketed spring product, which advantages have included the provision of independent spring action as between adjacent springs of the assembly. That is to say, a pocketed spring assembly generally seeks to provide a structure wherein any one spring, or group of adjacent springs, may be deformed in compression without unduly disturbing adjacent uncompressed springs of the assembly.

It is a broad object of the invention to provide spring cushioning particularly suitable for upholstering sinuous furniture in which the advantageous characteristics are retained but in which the springs are interconnected by elastomeric encapsulation serving the purpose of, and thus dispensing with, the fabric pockets of the prior art.

It is a further broad object of the present invention to provide a spring upholstery cushioning having the advantageous characteristics of a pocketed spring assembly but utilizing a foamed elastomeric encapsulation of the springs as an improved alternative to the fabric pockets of the prior art.

It is a further object of the invention to provide such cushioning wherein the encapsulating material not only serves to support and maintain the springs for action independently one of another but is able to do so without significant interference with the inherent spring characteristics. However, it is a related object of the invention to provide such a spring cushioning wherein, if desired, the inherent spring characteristics may, in fact, be modified by the encapsulating material subject to the selection of a material with appropriate characteristics, such as density, for example.

It is a yet further object of the invention to provide spring cushioning as aforesaid wherein the ends of the individual coil springs on one side of the cushioning may expediently be interconnected by the material of the encapsulating elastomer thus allowing the free spring ends a high degree of independent action.

In a preferred form of the invention, there is provided spring cushioning including a plurality of coil springs located in side-by-side co-planar relationship; each spring being encapsulated in a foamed elastomeric material by which it is also linked with adjacent springs; one end of each spring being thus linked to its neighbors while its other end is freed for independent movement relative to the ends of adjacent springs.

When encapsulated as aforesaid, each spring becomes part of a resilient pod which is preferably tapered with a widened zone at one of its ends by which it is interconnected to and with adjacent pods and it is also preferred that the interior of each encapsulated spring or pod be hollow. Furthermore, it is preferred that the complete encapsulated spring assembly be cast or molded as a unit from a foam plastic material such as flexible urethane.

Other objects of the invention will become apparent from the hereinafter following description of the elements, parts and principles thereof given herein solely by way of example with reference to the accompanying drawings wherein like reference numerals refer to like parts throughout the several views and wherein:

FIG. 1 is a partly sectioned top plan view of cushioning incorporating the spring upholstery assembly of the invention;

FIG. 2 is a side elevational view, partly in section, of a row of encapsulated springs of the instant spring assembly, and

FIG. 3 is a side elevation, partly in section, of the instant spring assembly in sinuous form such as it might assume in use on a contoured chair of a well known type.

Spring cushioning in accordance with the invention may take the form illustrated herein in the accompanying drawings wherein the desired resilience and support is primarily imparted thereto by a plurality of side-by-side metal coil springs **10** respectively encapsulated in a resilient elastomeric material **12** which pockets the springs in pods P and which are resiliently interconnected together as by web **14** in such manner as to support one another and whereby each pod P and the spring **10** contained thereby may act substantially independently of its or their immediate neighbors.

In the parent application aforesaid, the pods P or their equivalents are interconnected by their intermediate portions so that their ends are freed for independent movement on each side — i.e., the top and bottom — of the resulting spring assembly. In the present instance, however, the web **14** interconnects the co-planar spring ends on only one side of the spring cushioning as shown in the drawing.

It is worth noting at this juncture that the elastomeric material **12**, which is preferably a flexible foamed urethane, may be of such low density that, despite the encapsulation of the springs **10**, it will not significantly affect or contribute to the actual spring action. That is to say, the inherent characteristics of the springs **10** may be substantially unimpaired by the encapsulating material **12** of pods P but, since it is expedient that the resilient web **14** be comprised of the same encapsulating material so as to be integral therewith, it should be realized that the said material must be of sufficient density to maintain the podded springs **10** in side-by-side relation to their desired upstanding position relative to one another.

It is still worth noting that springs **10** and their encapsulating pods P become integrated so as to be incapable of movement independently of each other. Thus subsequent reference herein to pod P may include the encapsulated spring **10** and vice versa when the context so requires.

Of course, the foregoing remarks concerning the influence of pods P on the spring resilience do not preclude the possibility of selecting a density for the pod material **12** which is greater or lesser as between different types of spring cushioning so that it can, in fact, add significantly to the effective resilience of the spring **10** which it encapsulates.

Thus in spring cushioning, according to the invention, variations in resilience of the individual pocketed springs as between one such assembly and another may conveniently be accomplished by selecting springs of appropriate characteristics. For example, the springs **10** illustrated herein may be chosen to be heavy duty springs (as represented at **10***a* in the drawing) whereby the resilience of each pocketed spring is stiffened providing a firmer support as compared with the lighter gauge springs illustrated at **10**.

As illustrated herein, each spring acts independently of its neighbors in the general manner of a pocketed spring of the prior art by virtue of the fact that adjacent pods P are interconnected by their co-planar ends only thus denying these ends the free independent movement which is retained by their other ends which are unattached and, hence, free to move. Such independent action as aforesaid is obtained, in the embodiment illustrated herein, by encapsulating each spring to form a pod P of truncated cone shape with its widest diameter integrated with web **14**; there being no further interconnection between pods P although the height or thickness of web **14** between adjacent pods P may also be varied as shown in the drawing to influence the resilience of the latter.

At the right-hand end of FIG. **2** there is shown a somewhat modified construction of the cushioning wherein an integral base B of foamed elastomeric material is formed integrally with the pods P; closing off the bottom of the interior pods or spring cavity C. Such construction is of great advantage in a contoured upholstery situation as in FIG. **3** which contemplates the use of the instant cushioning in a chair or lounge having a sinuous seat and back portion wherein the base B of the cushioning is installed upon the rigid sinuous support S and conformed to the contour thereof. As will be seen from FIG. **2** the individual springs **10** and pods P tend to spread away from one another at the convex bend in the cushioning at the left-hand end of this view while closing towards one another at the concave bend at the right-hand end thereof; the resilient elements, namely, the encapsulated springs **10**, being effectively hinged on the web **14** and base B, thus enabling the valleys between adjacent conoid resilient elements respectively to narrow and widen as required to impart the rounded contour to the cushion assembly illustrated in FIG. **3**.

In the embodiment of the invention selected for the purposes of this invention, the pods P have a high density — i.e., they are spaced very close to each other — in accordance with superior practices. Their density, or "spring count" as it is known in the trade, may, however, be reduced for the sake of economy, for example, as is done with ordinary springs in the prior art.

It should be observed, accordingly, that the specific taper imparted to the respective pods P is also variable in direct proportion to the spring count. That is to say, when the count is high, the pods P are necessarily closer together in the cushioning and appropriately tapered to afford the pods sufficient room for independent movement. Conversely, when the springs are more sparse, they are spaced further apart and hence free to move with little or virtually no taper.

Also as illustrated in FIG. **3** the spring cushioning may also include a top pad T which may be formed of a foamed elastomeric material similar to the investing material **12** and is bonded to the free ends of the pods P after the assembly has been manufactured; it being obvious that the top pad T need not detract from the independent action of the free spring ends as contemplated by the invention since it may be formed of an extremely low density foam and, hence, stretchable to minimize restraint on the mobility of the free spring ends as contemplated by the invention.

In the embodiment described and illustrated herein it is desired that each spring **10** be fully supported by its pod P for which purpose it is expedient that each spring **10** be completely invested by the pod material **12** from one of its ends to the other. In addition, the said material **12** should also enter between the convolutions of spring **10** and encapsulate them both internally and externally of cavity C.

The pods P and the web **14** which interconnects them thus provide an armature for a plurality of springs **10**, holding them in spaced apart, cushion, formation in a manner which endows each said spring **10** with the freedom to function independently of the others to a limited but sufficient extent.

As has been said, the material **12** which forms pods P and web **14** may be made more or less dense and may also be proportioned according to the degree, if any, to which it is required to modify the inherent resilience of the associated springs **10**. In appropriate instances as shown in FIG. **3**, the same material may also form a lower pad or base B for the cushioning comprised of pods P.

It is further noteworthy that the thickness of web **14** and the level to which it interconnects pods P may also be varied to suit particular requirements.

Moreover, by interconnecting pods P at their ends on one side of the spring cushioning, their other ends become endowed with increased flexibility which make cushioning thus constructed especially useful for upholstering curved surfaces as shown in FIG. **3**.

The invention thus discloses spring cushioning with all of the fundamental advantages of pocketed springs plus the further advantages of a construction which is not only simple and versatile but provides better upholstery for furniture of the described type which is ordinarily quite difficult to upholster.

What I claim is:

1. Spring cushioning including:

a plurality of helical upholstery springs assembled in axially erect, side-by-side relation with one another and forming a two-sided assembly, the respective spring ends on each side of the assembly being co-planar with each other;

a pod of resilient material investing each said spring from one end to the other thereof and forming therewith an integrated resilient element which is hollow over a major portion of its height, at least, and

a resilient web interconnecting and merging with the said pods at one side only of said assembly and retaining them in said assembly, the other ends of said pods being detached from each other and free to move relative thereto; the said resilient elements being shaped to permit such movement and the resilience of the investment being insufficient to prevent compression of said free pod ends independently of one another under normal load but being sufficient nevertheless to resist deflection of said pod ends out of the erect side-by-side relation aforesaid under said normal load.

2. Spring cushioning as set forth in claim **1** wherein:

said resilient elements are tapered providing widened zones below their tops and valleys therebetween; said resilient elements being interconnected with said resilient web by their widest zones.

3. Spring cushioning as set forth in claim **2** wherein:

said web is integral with said pods;

said web and pods being formed of an elastomer.

4. Spring cushioning as set forth in claim **3** including:

a pad integral with said pods and web.

5. Spring cushioning as set forth in claim **4**;

said pods and web being formed of an elastomer.

6. Spring cushioning as set forth in claim **4**;

said pods and web being formed of polyurethane foam.

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