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CUSHION CONSTRUCTION

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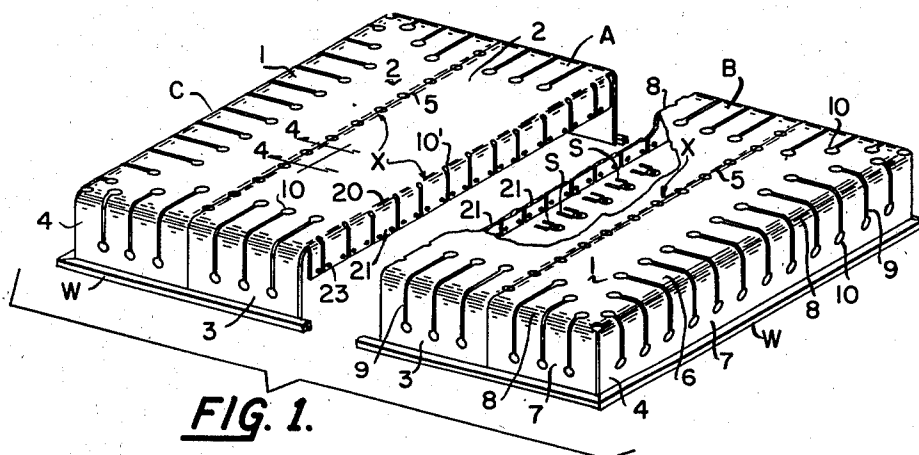


FIG. 1.

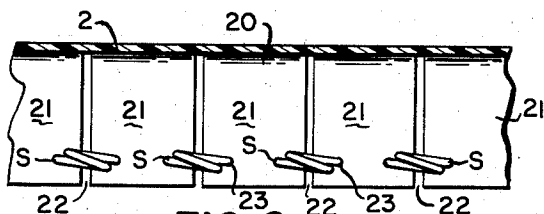


FIG. 2.

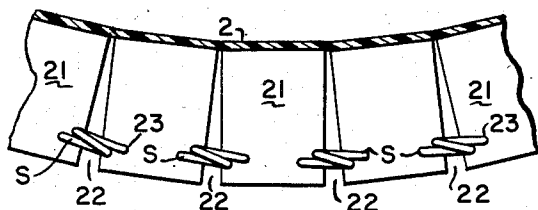


FIG. 3.

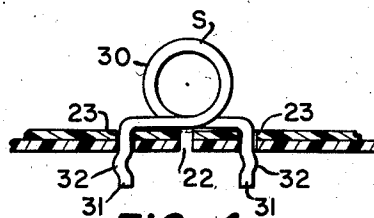


FIG. 4.

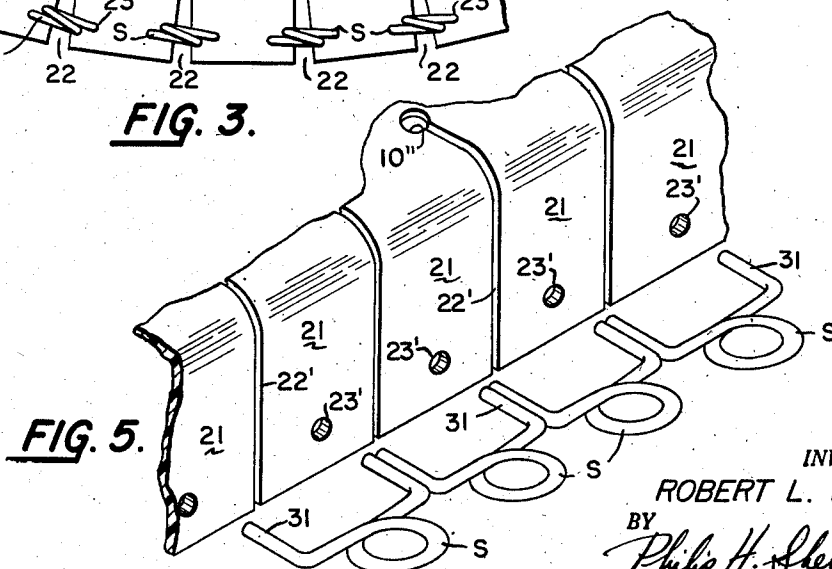


FIG. 5.

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2,827,952

CUSHION CONSTRUCTION

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10 Claims. (Cl. 155—179)

This invention relates generally to cushion constructions and particularly to an improved article of manufacture that may replace large cushion bodies in general such as seats, sofas, mattresses and the like where springs or resilient material such as foam rubber are employed as the cushioning medium for a load force such as that of a human. Specifically, this invention is an improvement over that disclosed and claimed in my co-pending U. S. patent application Serial No. 517,510, filed June 23, 1955 and entitled "Cushion Construction" in that it is designed for use in connection with large and bulky cushion construction such as a mattress or sofa.

It is well known that springs as the flexible or resilient medium in prior art seat and furniture constructions have many defects. For example, such increases the cost of the article and often necessitates periodic repair to maintain the effectiveness of the springs. Furthermore, upholstering is quite a problem when springs are employed and the latter are believed to result in considerable damage to the upholstering and other material used. Foam rubber or other similar materials have, to some extent, replaced springs as the cushioning medium, but here again the element of cost is considerable and there are difficulties in upholstering and maintaining the cushioning medium effective. The present invention, as well as my co-pending application, is believed to overcome a great many such defects but the cushion construction of the said co-pending application is only entirely practical to a certain extent dictated by the size of the construction, while the present invention provides a remedy in making such invention fully practical for large as well as small bodies. Thus, an important object of this invention is to provide in a cushion construction incorporating the teachings of said application means for controlling the distortion and/or deformation of the load receiving portion at localized areas throughout said portion.

It is an object of this invention to provide a cushion construction composed of a plurality of interconnected sections, each section comprising a somewhat rigid and hollow body having resilient characteristics and including a support portion for receiving a load directly, downwardly directed skirt means depending from the support portion, spaced apart slits extending in at least a part of the support portion and the skirt means and through the edge means in each section except at the area of connection of the sections in order to control distortion of the support portion when a load is applied, the support portion of each section being combined to form a relatively flat and continuous load receiving portion, and means for connecting the sections together whereby the connecting means controls the distortion at the point of connection.

A further object of the invention is to provide a cushion construction of the type described in the preceding paragraph wherein the sections are connected together by spring clips which control the amount of distortion or

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deformation at localized areas of the construction when a load is applied.

It is also an object to provide a construction as defined in the preceding paragraph wherein at the area of connection of the sections there is provided spaced apart slits in said skirt means from adjacent the top to the bottom thereof, thus forming skirt segments and said segments having spaced apertures therein for receiving a spring-like clip member to connect a pair of segments on each side of a slit to a corresponding pair of segments of another section.

Yet another object of this invention is to provide a cushion construction of the type described, including a plurality of interconnected sections wherein the distortion and/or deformation of the construction along the peripheral edge thereof is controlled by spaced apart slits and wherein the distortion and/or deformation centrally of the construction at connection points at and adjacent localized areas of the sections is controlled by spring action forming the connecting means for said sections.

Finally, it is an object of this invention to provide a cushion construction composed of a plurality of interconnected sections, each section comprising a somewhat rigid and hollow body having resilient characteristics and including a support portion for receiving a load directly, downwardly directed skirt means extending from the support portion, spaced apart slits extending in at least a part of the support portion and in the skirt means and through the edge means in each section in order to control distortion and/or deformation of the support portion when a load is applied, the slits at one continuous area of each section extending through the skirt means to form a plurality of segments and means for connecting the sections together at the segments whereby the connecting means further controls at localized areas the distortion at and adjacent the point of connection of sections.

The construction designed to carry out the invention will be hereinafter described, together with other features thereof, and will be more readily understood from a reading of the following specification and by reference to the accompanying drawing forming a part thereof and wherein an example of the invention is shown and

wherein:
Figure 1 is a perspective view illustrating application of this invention in connection with a cushion-like structure, namely, a mattress, shown partly broken away to more clearly depict the invention;

Figure 2 is a view illustrating the principles of this invention when no load is applied;

Figure 3 is an elevational view illustrating the principles of the invention when a load is applied;

Figure 4 is a sectional detail view taken along the line 4—4 of Figure 1; and

Figure 5 is an elevational view of a portion of a slightly modified embodiment.

Perhaps it should be stated at the outset that the invention is by no means limited to the application thereof as a mattress structure, the latter forming the basis of this disclosure only for convenience in illustrating the principles of the invention. Accordingly, it should be clearly understood and apparent that the present invention is equally directed to the construction of other articles, such as automobile seats and fairly sizable cushion bodies in general where in the past springs or resilient mediums, such as foam rubber, have been employed as the cushioning medium. Individuals skilled in and familiar with the furniture art and other fields where a load or weight is to be supported by a medium having cushioning effects could well be expected to apply the principles of the hereinafter detailed and specific disclosure to said other bodies

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without requiring the exercise of invention and, therefore, the scope of this invention is intended to cover such bodies in general. Also, the phraseology and terminology employed herein is for the purpose of description and not of limitation. For example, the term "cushion" in the specification and claims is intended to encompass the said bodies in general.

Now referring to the drawing in detail and particularly to Figure 1, numeral 1 represents substantially rectangular-shaped sheets made of a plastic-like material having somewhat flexible, resilient and elastic characteristics, but being relatively rigid in the illustrated formed or fabricated shape. For example, a material of high impact polystyrene of a thickness from $\frac{1}{32}$ to $\frac{1}{4}$ of an inch or a material known in the trade as "Royalite," such including a plastic copolymer and synthetic rubber, have proved satisfactory but, of course, the material may be made of other synthetic combinations which provide the desired qualities. Numerous other materials having the above characteristics may be employed satisfactorily and it is conceivable, although by no means preferred, that each sheet 1 could be made of a special metal or metal alloy or even plywood.

In my said co-pending application there is described a cushion construction comprising a body that is somewhat rigid and hollow including a relatively flat and continuous support portion for receiving a load directly, said portion having an edge means, downwardly directed side skirt means depending from said edge means, and spaced apart slits throughout a substantial part of the body, each slit extending in at least a part of the support portion and skirt means through the edge means whereby when the load is applied the body is distorted and the edge means is altered in shape under substantial control of the slits and when the load is removed the body resumes its original shape. As indicated previously, such a type of cushion construction is only completely practical to a certain extent, such being dictated by the size of the construction. In other words, assuming a large mattress is made in accordance with the teachings of said application, then it is doubtful that the slits would control distortion of the body, especially at the central area of the load receiving portion, and this is so because this area would be just too far separated or spaced from the slit control. Of course, such could be remedied by extending the slits further into the body portion, but it is believed preferable when large cushion constructions are made to incorporate the teachings of the present invention in order to insure proper deformation control, especially at localized areas throughout and centrally of the support portion of the unit which receives the load directly.

There is shown in Figure 1 a cushion construction C incorporating the teachings of this invention as well as that of my co-pending application, said cushion construction taking the form of a large mattress and being, as stated, formed by the shaped sheets 1. Said construction is composed of a plurality of interconnected sections 2, these being further defined by intermediate sections 3 and end sections 4. Two of the sections 3 are shown separated in diagrammatic form to illustrate the principles of this invention and these two sections still further identified as A and B will be utilized to describe the manner of connecting same, but it is to be understood that each point or area of connection 5 of the sections 3 and 4 is identical.

Considering an end section 4, such is made, as should be obvious, in a manner practically identical with the procedure set forth in my co-pending application in that said section includes a body or load support portion 6, downwardly directed skirt means 7, edge means 8, spaced slits 9 extending through the edge means into the support portion and the skirt means and circular-like recesses 10 at the end of the slits to prevent cracking or tearing.

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When a load is applied to the support portion 6 the distortion and/or deformation of the hollow body 4 is controlled by the slits in the manner described in said co-pending application. At one continuous area of the edge 8, each section 4 is connected to a section 3. The sections 3, except at the area where they are connected to adjacent sections, are also formed exactly in accordance with the procedure of my co-pending application in that they include skirt means 7, slits 9, edge means 8 and recesses 10.

Assuming for the moment that sections A and B are not shown separated but are connected as at 5, then it should be apparent that the deformation in such a large cushion construction when a load is applied at any localized area X would probably not be under the control of slits 9 along the periphery of the construction C. This could be partially remedied by extending the slits 9 further into the load portions 6 which form a combined relatively flat and continuous load receiving portion, but such is not desirable for various reasons.

Thus, control of the distortion and/or deformation of body C at localized areas X is preferably controlled by applying the principles of the present invention. Again referring to Figure 1 and particularly to sections A and B, there is represented edge means 8, further identified at 20, along one continuous area thereof. Depending from edge means 20 are downwardly directed skirt means in the nature of segments 21 formed by relatively narrow spaces or slits 22 terminating at the edge means 20 in circular recesses 10' having the same purpose as recesses 10. The segments 21 formed in all sections 3 and 4 are identical and the segments 21 are provided with apertures 23, more clearly shown in Figure 4, for receiving spring clips S. The apertures 23 are so formed and positioned that a spring clip S, as shown in Figure 4, may be inserted therethrough to connect a pair of segments 21 on each side of a slit 22 of a section 3 to a corresponding pair of segments of another section 3 or 4.

Considering the preferred type of resilient or spring means S, it includes a looped portion 30 having legs 31 adapted to be inserted in the aligned holes 23 as shown and provided with bent portions 32 to prevent removal thereof after insertion. Of course, in place of the bent portions 32, the end of legs 31 could be provided with threads for receiving nuts or the like to hold the clips S in place.

Now assuming that the clips S for joining sections A and B have been inserted within apertures 23 in the manner shown in Figure 4 and that the rest of the connected areas 5 of the several sections 3 and 4 have been similarly joined, when no load is applied to the combined load receiving portion formed by portions 6, then the joints 5 will appear as depicted in Figure 2. However, when a load is applied, especially in and around the localized areas X, then the combined load portion formed by support portions 6 will deform in the areas and the joints will take the form illustrated in Figure 3 and in so doing the loop 30 of each spring contracts to permit the segments 23 adjacent the bottom thereof to separate further apart. The areas adjacent recesses 10' generally remain the same and the control of deformation is caused by the amount of contraction permitted by loop 30 of each spring. Preferably, the loop 30 is designed so that the amount of contraction or tension applied thereby varies in proportion to the load with greater contraction allowed at first and gradually tapering off as the load increases.

To eliminate a pair of apertures 23 in each segment 21, the segments 21 may take the form shown in Figure 5 where there is only one aperture 23' in each segment, in which event, as shown, two ears 31 are received and positioned in each aperture 23'.

If desired, the slits 22 may be modified as shown in Figure 5 whereby the slit 22' extends through edge means

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20 into support portion 6 and terminates in the recess 10". In this instance the control of deformation at the points of connection 5 would be in a manner much similar to the control by slits 9, although it would be supplemented by spring action S and thus there would be dual control of deformation at the points of connections 5.

It is to be understood that the body C, shown as rectangular in Figure 1, is hollow throughout except for the skirt means formed by the segments 21. As in my said application, preferably a rectangular frame W of wood or other suitable material is integrally and rigidly secured by any suitable means to the terminating ends of side walls or skirts 7 to maintain such in a completely stable or static condition and in operation under load to prevent the skirts 7 from spreading apart.

Of course, there are many factors of design and construction that control the amount of spring action permitted by the clips S and segments 21 at the localized areas X, namely (1) the type and thickness of segments 21, (2) the length of the segments 21, (3) the position of apertures 23 in the segments, and (4) the type and construction of the spring means utilized.

In the claims the term "relatively thin" is meant to include a thickness of sheet 1 along the lines mentioned, but this would vary, depending upon the material employed, the only limitations being that the material may not be so thin as to prevent abutting of the walls of the slits, nor too thick to prevent the action described. Incidentally, in connection with all of the slits shown and described, it is apparent that they extend completely through the sheet material. As to the expression "relatively flat" in the claims, this is intended to cover variances from an entirely horizontal surface such as a supporting surface that is slightly concave, and furthermore the term "cushion" is means to have the same meaning in the claims as in said copending application. Finally, it is to be understood that the frame W may be dispensed with in some instances and that in place of this frame other means may be employed to prevent spreading and to provide stability.

As many alterations may be made of the invention without departing from the scope thereof, it is to be understood that all matter herein set forth or shown in the drawing is to be interpreted as illustrative and not in a limiting sense. For example, the type of clip S may be varied considerably as long as it includes means for attaching pairs of segments 21 and means, comparable to loop 30 or other part designed to have its tension effect varied in accordance with load application, for controlling the spacing of segments 21 when a load is applied.

What is claimed is:

1. A hollow cushion construction having spring-like cushioning characteristics composed of at least two interconnected sections, each section being formed of relatively thin sheet material having flexible and resilient characteristics and including a relatively flat and continuous support portion for receiving a load directly, said portion having edge means, downwardly directed side skirt means depending from said edge means except at one continuous area thereof, spaced apart slits, except at the one continuous area thereof passing completely through the material and extending in at least a part of the support portion and the skirt means and through the edge means whereby when a load is applied to the support portion adjacent the slits the portion is distorted and the edge means is altered in shape under substantial control of the slits and when the load is removed the support portion assumes its original shape, means for connecting

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the sections together whereby the support portions form a combined continuous load receiving portion comprising downwardly directed skirt segments depending from the edge means at each continuous area, each segment of a section being spaced from one another a predetermined amount to form narrow spaces between segments, and spring means connecting a pair of segments of one section on each side of a narrow space to a corresponding pair of segments of the other section whereby when load is applied to the construction adjacent the connecting means the combined support portion adjacent thereto is altered in shape under control of said spring means.

2. A hollow cushion construction as defined in claim 1 wherein the narrow spaces at each continuous area extend through the edge means into a part of the support portion.

3. A hollow cushion construction as defined in claim 1 wherein the narrow spaces terminate in circular-like recesses in the edge means at the continuous areas.

4. A hollow cushion construction as defined in claim 1 wherein the spring means includes a part designed to have its tension varied in accordance with the amount of load applied.

5. A hollow cushion construction as defined in claim 4 wherein each segment has at least one aperture and the spring means comprises a clip-like member having a loop adapted to be contracted and legs extending therefrom and received in the segment apertures.

6. In a hollow cushion construction having spring-like cushioning characteristics composed of at least two interconnected sections, each section being formed of relatively thin sheet material having flexible and resilient characteristics and including a relatively flat support portion for receiving a load directly, said portion having edge means, means for connecting the sections together at continuous areas of their edge means whereby the support portions form a combined load receiving portion comprising downwardly directed skirt segments depending from the edge means at each continuous area, each segment of a section being spaced from one another a predetermined amount to form narrow slits between segments, and resilient means connecting a pair of segments of one section on each side of a narrow slit to a corresponding pair of segments of the other section whereby when load is applied to the construction adjacent the connecting means the combined support portion adjacent thereto is altered in shape under control of said resilient means.

7. A hollow cushion construction as defined in claim 6 wherein the narrow slits at each continuous area extend through the edge means into a part of the support portion.

8. A hollow cushion construction as defined in claim 6 wherein the narrow slits terminate in circular-like recesses in the edge means at the continuous areas.

9. A hollow cushion construction as defined in claim 6 wherein the resilient means includes a part designed to have its tension varied in accordance with the amount of load applied.

10. A hollow cushion construction as defined in claim 6 wherein each segment has at least one aperture and the resilient means comprises a clip-like member having a loop adapted to be contracted and legs extending therefrom and received in the segment apertures.

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