March 14, 1939. J. N. NAULTY 2,150,747

CUSHION

Filed July 23, 1936 2 Sheets-Sheet 1

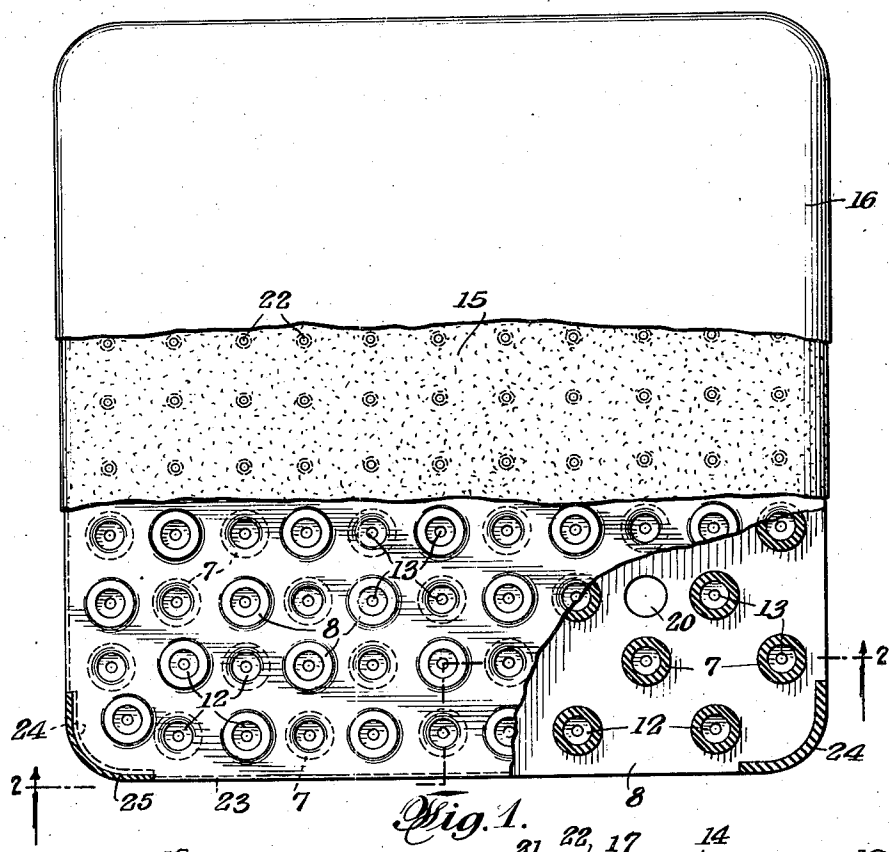


Fig. 1.

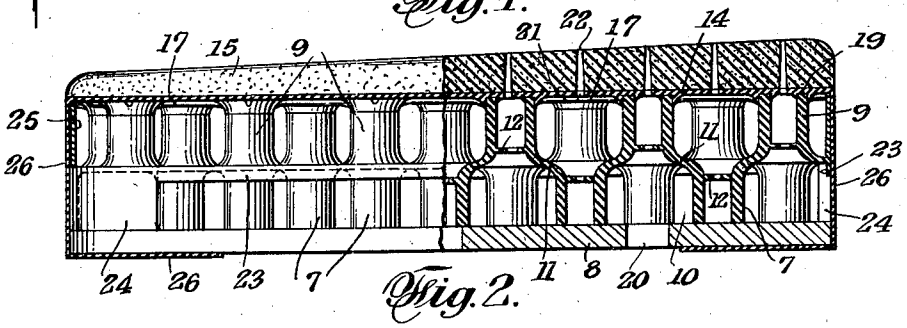


Fig. 2.

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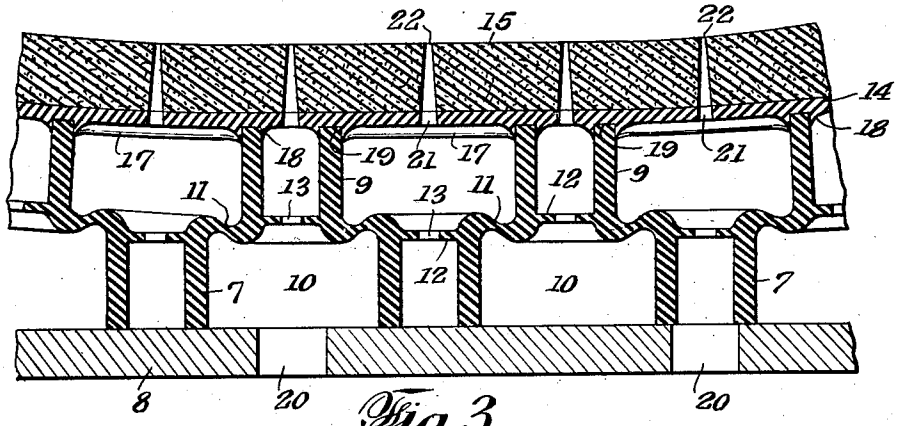


Fig. 3.

Fig. 4.

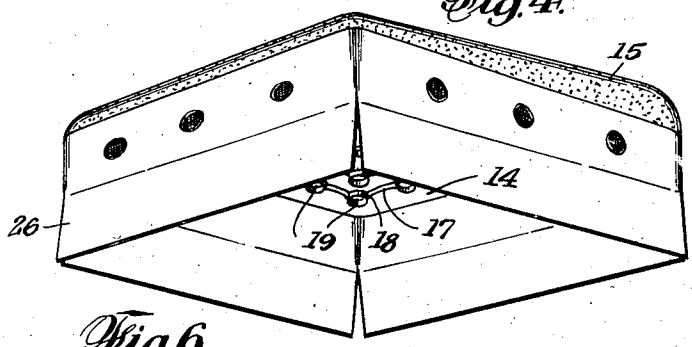


Fig. 6.

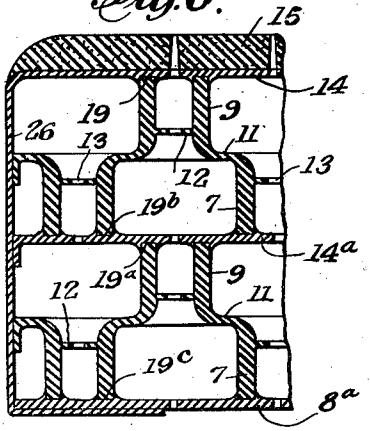
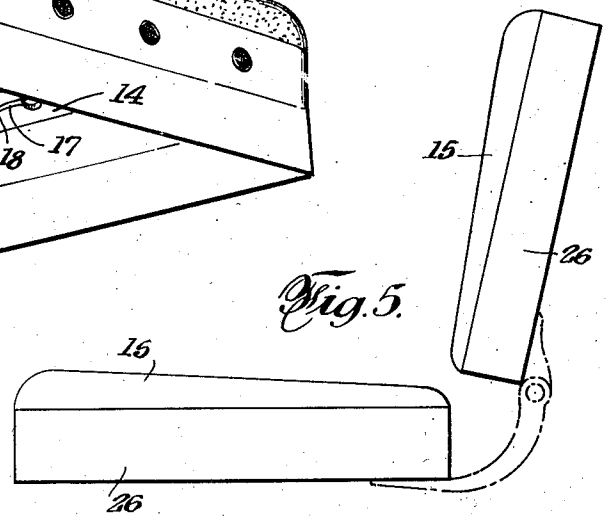


Fig. 5.



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CUSHION

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Application July 23, 1936, Serial No. 92,077

11 Claims. (Cl. 155—179)

This invention relates to cushions generally and in particular to seat cushions for buses and the like.

Important objects of the invention are to provide a cushion structure which will have the desired resiliency and which will retain such resiliency practically indefinitely.

Other objects of the invention are to provide a cushion structure having the characteristics mentioned, which may be readily manufactured, at low cost and which will be useful for a great variety of purposes.

The foregoing and other desirable objects are attained in this invention by the novel features of construction, combinations and relations of parts hereinafter described, illustrated in the accompanying drawings and broadly covered in the claims.

The drawings accompanying and forming part of the specification illustrated one practical embodiment of the invention, but it is to be understood that the structure may be modified or changed in various ways all within the true intent and broad scope of the invention.

Fig. 1 is a plan and broken sectional view of a seat cushion embodying the features of the invention;

Fig. 2 is a broken and partly sectional view as on substantially the plane of line 2—2 of Fig. 1;

Fig. 3 is a broken sectional detail on an enlarged scale illustrating the yielding operation of the cushion;

Fig. 4 is a broken perspective view of the top pad and cover portion of the cushion;

Fig. 5 is a side view of a seat having back and bottom cushions of the structure first shown. Fig. 6 is a broken, sectional detail of a modification.

The seat cushion form of invention shown in Figs. 1, 2 and 3, comprises a lower, supporting layer of laterally spaced, tubular, resilient column elements 7, resting on a suitable backing 8, an upper layer of tubular, resilient column elements 9 in line with and designed to operate in the spaces 10 between the lower columns and elastic webbing 11 connecting the relatively offset adjoining ends of the two sets of columns. These upper and lower relatively staggered columns and the elastic connecting web 11 may all be molded in one piece of live, gum rubber with the walls of the columns sufficiently thick to form slightly compressible supports and the connecting webbing somewhat thinner and more elastic to permit the posts of one set to work down past the posts of the other set substantially as indicated in Figure 3. In such operation the connected ends of the posts will be stretched open more or less, under the pull of the connecting web, so that said posts serve as elastic tension, as well as compression members. Under extreme loading conditions the posts 9 may actually "bottom" against the cushion backing or support 8, preventing stretching of the elastic webbing beyond the point of elastic limit.

To control and more or less limit the belling out of the connected ends of the columns, they may be reinforced as by means of internal integral diaphragms 12, which for air circulation purposes and regulation of tension may be perforated as indicated at 13.

The top portion of the cushion is shown as a layer of live rubber 14 supported on the upper ends of the upper columns and carrying a pad of sponge rubber 15. An outer cover 16 is indicated in Fig. 1 applied over this sponge rubber pad.

The top member 14 is shown in the several views as a layer of gum rubber molded with oppositely extending fillets 17, 18 forming annular grooves or seats 19 on the underface of the same to receive the ends of the tubular column elements 9. Suitable cement may be employed to secure the columns in these seats.

To afford desired ventilation, openings 20 may be provided in the backboard 8 in line with the openings 13 in the control diaphragms and in line with the openings 21, 22 in the top layer 14 and paid 15, respectively.

The elastic web connecting the columns is shown as having a dependent flange 23 about the side of the cushion and this flange is indicated as thickened at the corners of the cushion to form an arcuate, resilient corner-shaping brace and support 24, which may rest upon the backing 8. Similarly, the top layer 14 may be formed with dependent arcuate corner walls 25 in engagement with the rim portion of the connecting web above the lower arcuate corner pieces 24. The sides of the cushion may be closed in by flexible and more or less resilient skirt portions 26 (Figs. 2 and 3) dependent from or forming part of the top layer 14. As appears in Fig. 2, this skirt portion may be brought down over the curved corner pieces 25, 24 and be adhesively secured thereto and thence be turned under and secured beneath the backing 8.

The construction disclosed provides a high degree of resiliency and makes use of the elasticity of the rubber both in compression and in tension. The location of the upper posts or columns

in the spaces between the lower posts or columns allows a maximum of cushioning movement, limited only by the stretch of the webbing and connected end portions of the posts and the diaphragms in the posts or tubes. The structure can be produced inexpensively by simple molding operations and while shown as a seat cushion, it will be realized that it may be used wherever and for whatever purposes a cushioning effect is desired. The structure is relatively light in weight and may be readily built up in the shapes required for different forms of cushions. The stretching and compressing forces are distributed and proportioned through the body of the cushion so that undue strains are avoided and the cushion will retain its elasticity and usefulness for the life of the rubber of which it is composed. The connected layers of resilient columns form a unit sufficient for ordinary cushioning purposes, but, if a deeper or more resilient structure is required, a second unit of this type may be placed on top of the first, as in Fig. 6, with the posts of such unit located in line with the spaces between the columns of the first unit. In such case an intermediate connecting layer 14*a* may be provided having the seats 19*a* in its underside for the tops of the columns of the lower unit and seats 19*b* in its upper side for the bottom of the columns of the upper unit. In this same view the bottom or backing 8*a* is shown as provided with positioning seats 19*c* for the columns of the lowermost unit.

The flared end portions of the columns are shown as tapered down to the lesser thickness of and to form in effect actually the connecting web, the colums retaining their general characteristics as slightly compressible supports. The internal diaphragms 12 may be located at the beginning of the tapered portions of the columns so as to hold the heavier or main supporting portions of the columns generally in shape while permitting the outward stretching of the tapered end portions which merge into and may in fact form the connecting web. Sufficient openings may be provided throughout the cushion, as indicated, to prevent the cushion from becoming "air-bound" in any way.

I claim:

1. A cushion comprising a layer of relatively spaced tubular resilient column elements, a superposed layer of tubular resilient column elements in line with and operable in the spaces between said first column elements, said column elements having flared ends and tapering in thickness and connected together and forming a webbing extending only from the edge of column elements of one layer to the edge of adjacent column elements of the other layer and having sufficient stretch to enable the columns of one layer to work past the relatively offset columns of the other layer.

2. A cushion comprising a layer of relatively spaced tubular resilient column elements, a superposed layer of tubular resilient column elements in line with and operable in the spaces between said first column elements, and elastic webbing connecting the adjoining relatively offset ends of the columns of the two layers and having sufficient stretch to enable the columns of one layer to work past the relatively offset columns of the other layer, and elastic diaphragms within said adjoining ends of said column elements for restraining the radial expansion of said column elements occasioned by the lateral pull of said connecting webbing.

3. A cushion comprising a layer of relatively spaced tubular resilient column elements, a superposed layer of tubular resilient column elements in line with and operable in the spaces between said first column elements, and elastic webbing connecting the adjoining relatively offset ends of the columns of the two layers and having sufficient stretch to enable the columns of one layer to work past the relatively offset columns of the other layer, and elastic reinforcements at the said adjoining ends of said column elements for limiting the radial expansion of the same under the pull of said elastic webbing.

4. As an article of manufacture, a unit for cushion structures comprising two layers of relatively spaced, tubular, resilient columns arranged with the columns of one layer in line with the spaces between the columns of the other layer and the adjoining relatively offset ends of the columns connected by elastic webbing consisting of connected thinned end portions of the columns of tapering thickness.

5. A cushion comprising a support, spaced tubular resilient columns resting with their lower ends on said support, spaced tubular, resilient columns above and in line with the spaces between the first-mentioned tubular columns, elastic webbing connecting the adjoining, relatively offset ends of the two sets of columns and extending only from the edges of columns of one layer to the edges of adjacent columns of the other layer and reinforcing means for the edge portions of said connecting webbing.

6. A cushion comprising a support, spaced tubular resilient columns resting with their lower ends on said support, spaced tubular, resilient columns above and in line with the spaces between the first-mentioned tubular columns, elastic webbing connecting the adjoining, relatively offset ends of the two sets of columns and reinforcing means for the edge portions of said connecting webbing, including curved corner walls resting on said support.

7. A cushion comprising a support, spaced tubular resilient columns resting with their lower ends on said support, spaced tubular, resilient columns above and in line with the spaces between the first-mentioned tubular columns, elastic webbing connecting the adjoining, relatively offset ends of the two sets of columns and extending only from the edges of the columns of one layer to the edges of adjacent columns of the other layer and reinforcing means for the edge portions of said connecting webbing, including a flange about the edge of said webbing.

8. A cushion comprising tubular, resilient compression columns in spaced substantially parallel relation, a second set of tubular resilient compression columns spaced in substantially parallel relation in line with the spaces between the first-mentioned compression columns and elastic connecting webbing between the adjoining, relatively offset ends of the two sets of columns, said connected ends of the columns being of tapered form and merging into said connecting webbing, and said webbing being of lesser thickness than the main wall portions of said tubular compression columns.

9. A cushion comprising tubular, resilient compression columns in spaced substantially parallel relation, a second set of tubular resilient compression columns spaced in substantially parallel relation in line with the spaces between the first-mentioned compression columns and elastic connecting webbing between the adjoining, relatively offset ends of the two sets of columns,

said connected ends of the columns being of tapered form and merging into said connecting webbing, and said webbing being of lesser thickness than the main wall portions of said tubular compression columns, and internal diaphragms within said compression columns, substantially at the beginning of said tapered end portions.

10. A cushion comprising tubular, resilient compression columns spaced in substantially parallel relation, a second set of tubular resilient compression columns spaced in substantially parallel relation and located in line with the spaces between the first set of compression columns and elastic connecting webbing between the adjoining, relatively offset ends of the two sets of columns and of lesser thickness and greater elasticity than the walls of said compression columns.

11. A cushion comprising tubular resilient compression columns spaced in substantially parallel relation, a second set of tubular resilient compression columns spaced in substantially parallel relation and located in line with and above the spaces between the first set of compression columns, said tubular columns having flaring ends tapering in thickness and connected together in the form of an elastic webbing between the adjoining relatively offset ends of the two sets of columns, means for confining the edge portions of said connecting webbing and a pad of sponge rubber supported by the upper set of tubular columns.

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