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H. C. STANLEY ET AL

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PNEUMATIC CUSHION

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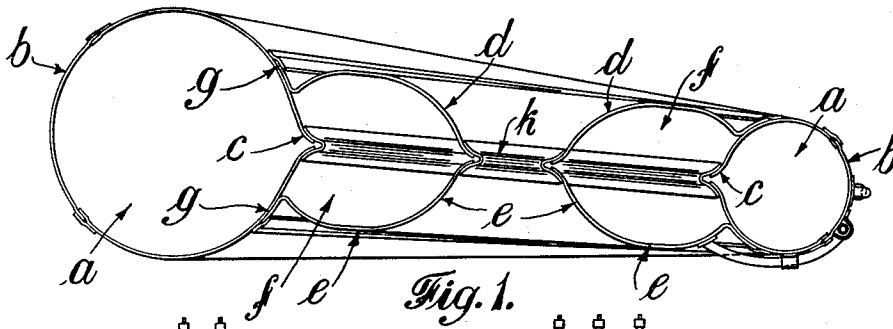


Fig. 1.

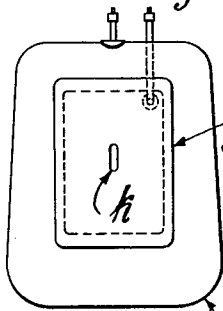


Fig. 2.

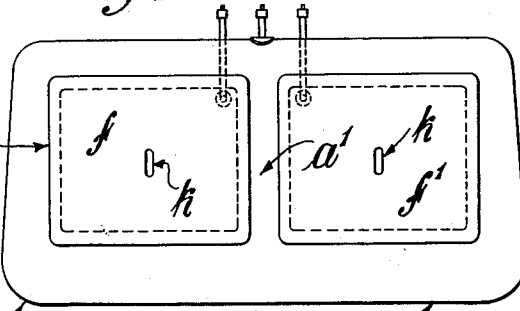


Fig. 3.

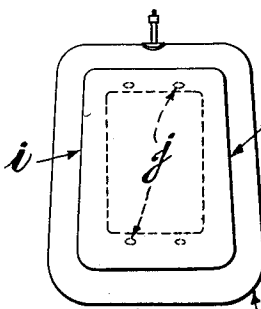


Fig. 6.

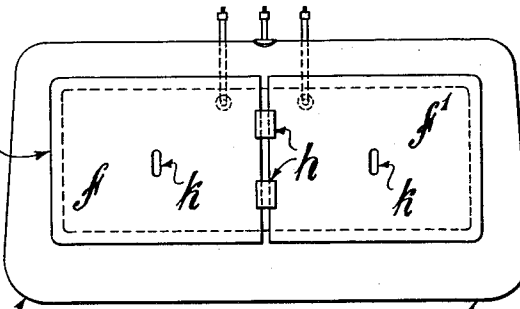


Fig. 4.

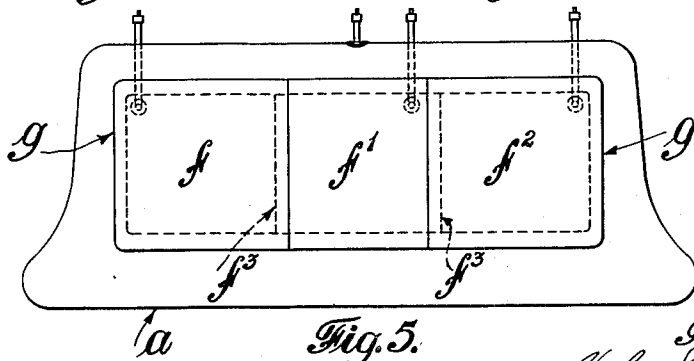


Fig. 5.

Inventors:  
H. C. Stanley  
H. A. Smith.

By their Attorney: Walter L. Loomis.

## UNITED STATES PATENT OFFICE

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## PNEUMATIC CUSHION

Henry Connah Stanley and William Henry Smith,  
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7 Claims. (Cl. 155—179)

This invention relates to pneumatic bags or cushions and more particularly to pneumatic bags or cushions for upholstery of car seats and the like.

It has recently become the practice to construct such pneumatic cushions with two or more compartments which may be separately inflated, one of which forms a surround for the other or others.

The present invention is based upon an appreciation of the fact that, with an improved and simplified construction of cushion the inner wall of the surrounding compartment can be the sole, or at least, the principal, control element for maintaining the shape of the cushion and reducing "roll".

According to the invention a pneumatic cushion comprises an outer tubular ring of material impervious to air and sheets of similar material, of a shape corresponding to the space defined by said tubular ring but larger than said defined space, said sheets having outer marginal edges secured to the said outer tubular ring to form a second air compartment inwardly of said outer ring and with the said outer marginal edges overlying the said outer tubular ring and lying outside of said second air compartment and so that part of said outer ring forms a wall of the said second air compartment.

Further tie members may be provided between the top and bottom walls of the inner compartments, that is to say, in addition to the tie member which is formed by the enclosed walls of said outer ring.

In the accompanying drawing:—

Fig. 1 is a central sectional view of one example of pneumatic cushion made in accordance with the invention.

Fig. 2 is a plan of Fig. 1 to smaller scale.

Figs. 3, 4, 5 and 6 are further examples of pneumatic cushions made in accordance with the invention.

In the preferred form of the invention, as shown in Figs. 1 and 2, the cushion is made with the outer tubular ring *a* formed with the usual gusset *b* on the outside but with a knife edge *c* on its inner side. Instead of a knife edge a gusset may be provided. In all cases the sheets forming the top and bottom walls *d* and *e* of the inner or second air compartment *f* overlie and are attached to the outer tubular ring on a line *g* about  $\frac{3}{4}$  of an inch more or less from the knife edge *c* so that when the cushion is inflated such portion of the outer tubular ring between the overlying parts of attachment of the sheets of the inner or second air

compartment, including the knife edge *c*, or narrow gusset, together form a gusset or wall for the inner or second air compartment and act as a control reed for the shape of the whole cushion.

In another example of the invention, as shown in Fig. 3, for a wide or double seat cushion, the outer tubular ring *a* is made with a transverse centre limb or tube *a*<sup>1</sup> defining two separate inner or second air compartments *f* and *f*<sup>1</sup>. Alternatively, as shown in Fig. 4, two separate inner or second air compartments *f* and *f*<sup>1</sup> are provided surrounded by the one outer tubular ring *a* and with their inner and adjacent sides or edges suitably sealed over and connected together by connecting strips *h*.

As shown in Fig. 5, the cushion is constructed with three inner or second air compartments, *f*, *f*<sup>1</sup> and *f*<sup>2</sup>, the sides of the inner compartment *f*<sup>1</sup> being made with knife edges or gussets *f*<sup>3</sup> and the adjacent edges of the compartments *f* and *f*<sup>2</sup> being attached to the face of the compartment *f*<sup>1</sup> so that part of its faces, including the knife edges, forms a gusset or wall as in the preceding examples.

In yet another example of the invention, as will be seen from the plan in Fig. 6 the line of attachment of the edges of the sheets forming the inner or second compartment is substantially on the centre-line (in the plan) of the top wall of the outer compartment. The bottom wall is similarly attached. The effect of taking the line of attachment further back from the inner edge of the outer cushion is to give a more level surfaced cushion. The line of attachment of the sheets forming the top and bottom walls of the inner compartment to the outer compartment will be chosen according to the desired ultimate flat or undulating shape of the cushion. Where the gusset provided by this construction is relatively narrow and the line of attachment is taken nearer the inner edge of the outer compartment it has the effect of drawing down the outline of the inner compartment when the cushion is inflated. This method of attachment of the said sheets may be adopted in any of the examples above described and in the case of the wide or double seat cushion, where there is a transverse limb, the sheets forming the top and bottom walls of the two inner compartments may be continuous and extend across the limb without a joint, while being positively attached thereto.

It has also been appreciated that, owing to the high degree of control obtainable by the dividing wall between the two compartments when constructed according to the invention, the said wall may be formed with one or more holes *j* (see Fig. 55

6) say  $\frac{1}{2}$  inch diameter, thus converting the cushion for single inflation for all the compartments. Such a cushion would be particularly suitable for a "squab" cushion, i. e., for the seat back upholstery. The inner compartment by its size, giving a soft feel while the outside compartment, though at the same air pressure, giving a harder feel with the required control of the whole. The advantage of such cushion would be that it would keep the upholstery in very good shape as some of the air would return to the centre compartment when the pressure of the user's back is released from it and would be driven back to the outer ring to provide the required control as soon as the user leans back against it.

In addition to the control provided by the gusset as above described, there may be provided one or more control reeds, tubes or studs *k* as shown in Figs. 1 to 4, of any known shape and arrangement in the inner or outer compartment, or in both, where further shaping or control of the shape of the cushion is required. Where such additional control is not provided the absence of the usual tie members from the inner compartment makes not only for greater comfort and better shape of the cushion, but allows the gusset-like separating walls of the outer ring to provide the sole control within the cushion itself.

It is further to be understood that the invention while primarily evolved for upholstery for car seats and the like, has other applications, as for example, for pneumatic mattresses and other uses wherein there is not the same surrounding supporting structure or framework, as the improved construction of cushion does provide a degree of control with low air pressure in the inner compartment which has hitherto been unobtainable.

What we claim is:—

1. A pneumatic cushion comprising an outer tubular ring of material impervious to air, and sheets of similar material of a shape corresponding to the space defined by said tubular ring but larger than said defined space, said sheets having outer marginal edges secured to the said outer tubular ring to form a second air compartment inwardly of said outer ring and with the said outer marginal edges overlying the said outer tubular ring and outside of said second air compartment and so that part of said outer ring forms a wall of the said second air compartment.

2. A pneumatic cushion comprising an outer tubular ring of material impervious to air and sheets of similar material having inner and outer marginal edges, said sheets being of a shape corresponding to the space defined by said tubular ring but larger than said defined space, said sheets being secured together along their inner marginal edges and having their outer marginal

edges secured to the said outer tubular ring to form a second air compartment inwardly of said outer ring, and with the said outer marginal edges overlying the said outer tubular ring and outside of said second air compartment.

3. A pneumatic cushion according to claim 1, characterized by tie members between the sheets forming the second air compartment.

4. A pneumatic cushion according to claim 1, characterized in that the outer tubular ring having at least one perforation providing communication between the interior of said outer ring and the interior of the said second compartment for simultaneous inflation of the latter from the former.

5. A pneumatic cushion comprising an outer tubular ring of material impervious to air and sheets of similar material of a shape corresponding to the space defined by said tubular ring but larger than said defined space, said sheets having outer marginal edges secured to the said outer tubular ring to form a second air compartment inwardly of said outer ring and with the said outer marginal edges overlying the said outer tubular ring, and outside of said second air compartment and so that part of said outer ring forms a wall of the said second air compartment which is narrow relative to the expanded thickness of the said outer ring.

6. A pneumatic cushion comprising an outer tubular ring of material impervious to air and sheets of similar material of a shape corresponding to the space defined by said tubular ring but larger than said defined space, said sheets having outer marginal edges secured to the said outer tubular ring to form a second air compartment inwardly of said outer ring and with the said outer marginal edges overlying the said outer tubular ring, and outside of said second air compartment and so that part of said outer ring forms a wall of the said second air compartment which is wide relative to the expanded thickness of the said outer ring.

7. A pneumatic cushion comprising an outer tubular ring of material impervious to air and sheets of similar material, of a shape corresponding to the space defined by said tubular ring but larger than said defined space, said sheets having outer marginal edges secured to the said outer tubular ring to form a second air compartment inwardly of said outer ring and with the said outer marginal edges overlying the said outer tubular ring, and outside of said second air compartment and so that part of said outer ring forms a wall of the said second air compartment, which part includes a knife-edge joint, the edges of which extend into the said second compartment.

HENRY CONNAH STANLEY.  
WILLIAM HENRY SMITH.