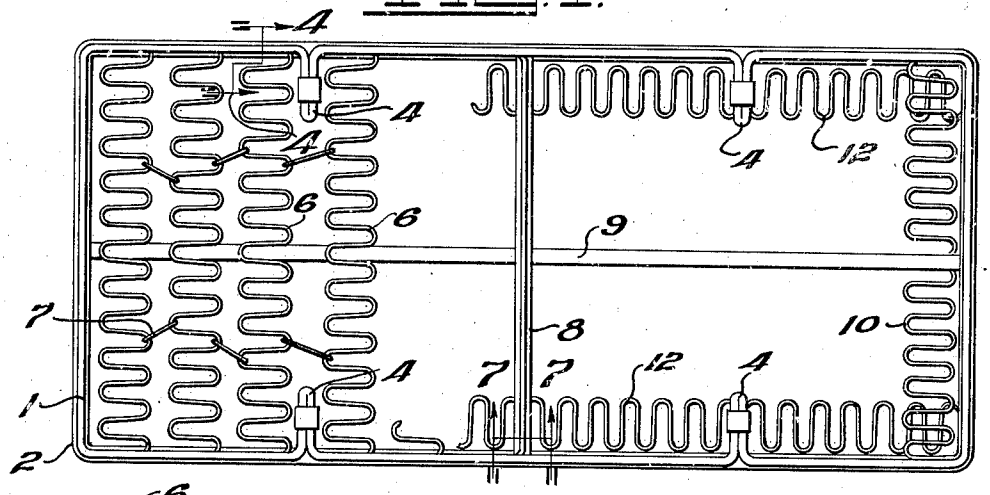
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SEAT CONSTRUCTION

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Fig. 1.



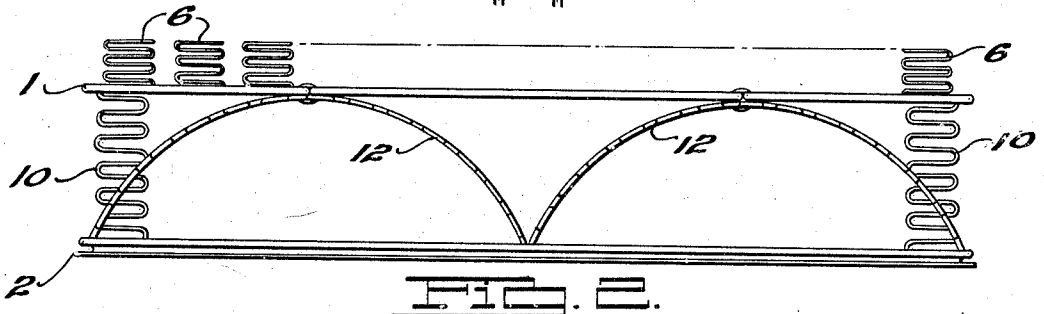


Fig. 2.

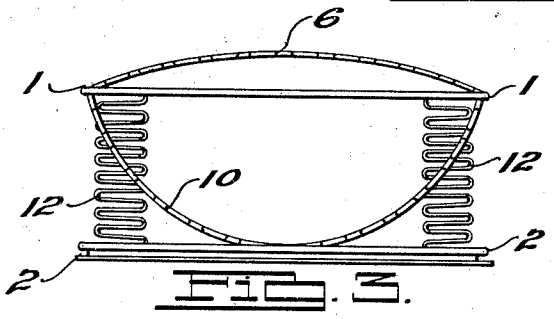


Fig. 3.

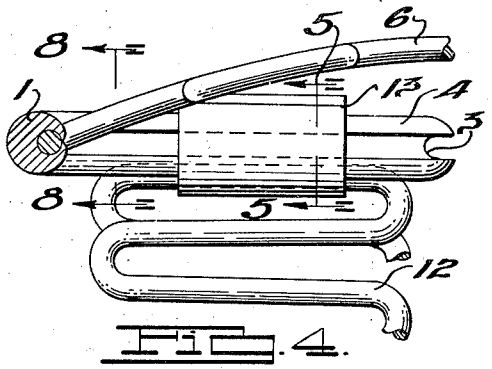


Fig. 4.

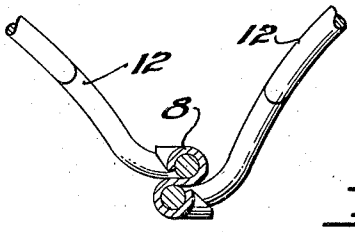


Fig. 7.

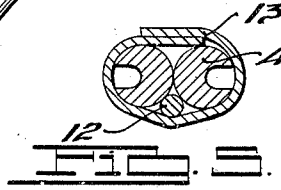


Fig. 5.

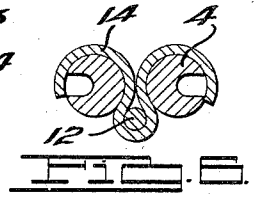


Fig. 6.

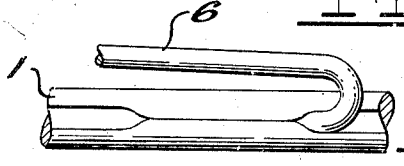


Fig. 8.

INVENTOR.
Clarence H. Menge.

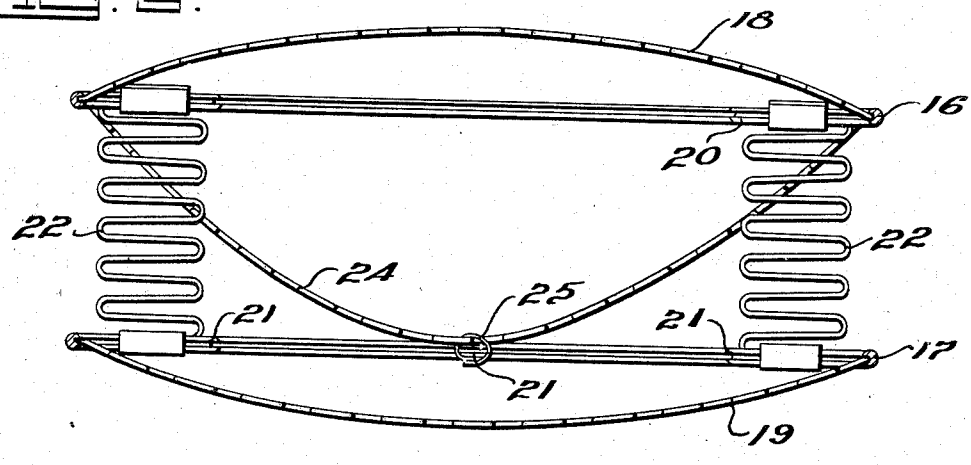
BY Harness, Dickey, Pierce & Hann.
ATTORNEYS.

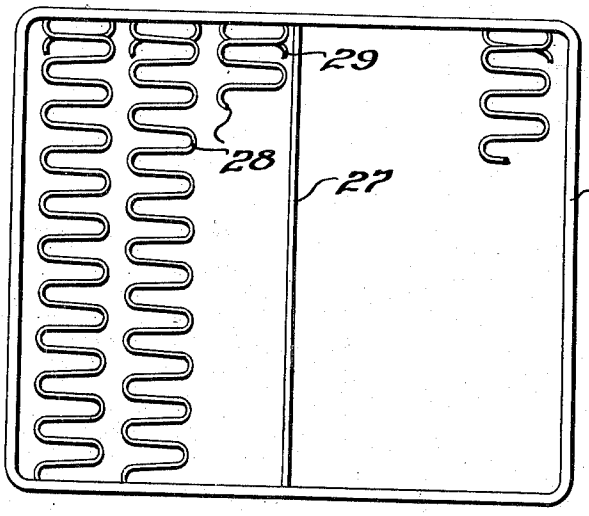
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Fig. 9.





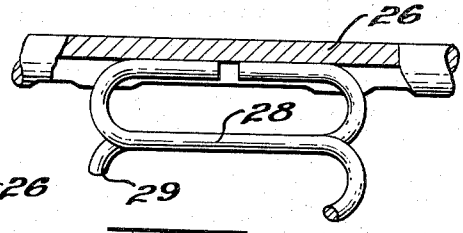


Fig. 11.

Fig. 10.

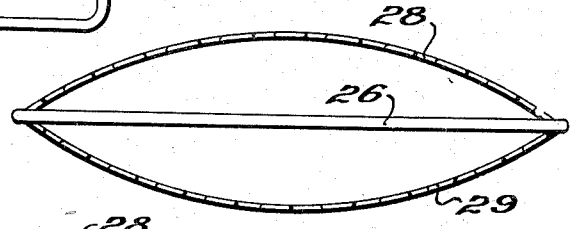


Fig. 13.

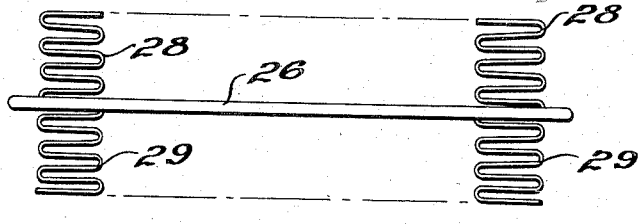


Fig. 12.

INVENTOR.
Clarence H. Menge.

BY

Harness, Dickey, Pierce & Hann.
ATTORNEYS.

Patented May 3, 1938

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UNITED STATES PATENT OFFICE

2,116,402

SEAT CONSTRUCTION

Clarence H. Menge, Detroit, Mich., assignor to The Murray Corporation of America, a corporation of Delaware

Application October 12, 1935, Serial No. 44,697

5 Claims. (Cl. 155—179)

This invention relates generally to cushion constructions. More particularly, it relates to resilient spring constructions for use in cushions.

In order to obtain a full and complete understanding of the invention disclosed herein, reference may be had to Kaden Patent No. 2,002,399, which relates specifically to the type of spring element used in connection with the present invention. Springs of the type disclosed in the Kaden patent are formed of a section of spring wire bent into a series of similar adjacent lateral convolutions all lying in substantially a single surface. In order to obtain maximum resiliency when using springs of this type, it is necessary that the element as a whole be bent on an arc of relatively small radius and normalized to this curve. When the spring element is used, the element as a whole is tensioned until the arcuate shape thereof lies in an arc of substantially greater radius than when the spring is in normal condition in order that the resilience of the adjacent convolutions of the spring element will be supplemented by the resilience of the arcuate structure as a whole.

It is a general object of the present invention to provide a spring for a cushion embodying spring elements of the type disclosed in the Kaden application referred to above.

More particularly, another object of the present invention consists in the provision of a spring construction for use in cushions or seats in which the spring elements constitute not only the surface structure for the cushion spring, but also constitute the resilient means for spacing the frames thereof.

Still further, the present invention contemplates the provision of novel means for mounting the spacing springs with respect to the frame members to which they are secured and which they serve to space.

Yet another object of the invention consists in the provision of a cushion utilizing springs of the type shown in the Kaden patent which will be reversible and which has similar resilient surfaces on both sides thereof.

Still further, the present invention contemplates the provision of a cushion structure in which a single frame element is used for supporting the springs constituting the resilient surfaces on both sides of the cushion spring construction.

Many other and further objects of the present invention will become apparent from a consideration of the following specification when taken in connection with the accompanying drawings forming a part thereof.

In the drawings:

Fig. 1 is a plan view of a cushion embodying the features of the present invention with portions broken away to show the mounting of the spacing springs and base frame.

Fig. 2 is a side elevation of the cushion spring illustrated in Fig. 1.

Fig. 3 is an end elevation of the cushion springs shown in Figs. 1 and 2.

Fig. 4 is an enlarged fragmentary view illustrating the manner in which the spacing springs are secured to the upper frame member.

Fig. 5 is a sectional view taken on the line 5—5 of Fig. 4 showing a clip for securing the spacing springs to the upper frame member.

Fig. 6 is a sectional view similar to Fig. 5 showing a modified form of clip for securing the spacing springs to the upper frame.

Fig. 7 is a sectional view taken on the line 7—7 of Fig. 1 illustrating the means by which the terminal ends of the spacing members are secured to the transverse brace on the base frame.

Fig. 8 is a fragmentary view taken on the line 8—8 of Fig. 4 illustrating the manner in which the surface springs are crimped into the border wire channel.

Fig. 9 is a transverse sectional view showing a modified form of cushion construction having resilient surfaces on both sides thereof.

Fig. 10 shows a still further modified form of the invention in which a cushion construction is provided in which a single marginal frame element is used.

Fig. 11 is an enlarged fragmentary view showing the manner in which the terminal ends of the surface springs are secured in the border wire of the cushion spring shown in Fig. 10.

Fig. 12 is a side elevation of the cushion spring construction shown in Fig. 10, and

Fig. 13 is an end elevation of the cushion spring construction shown in Fig. 10.

With more particular reference to the drawings, and with especial reference to the embodiment of the invention illustrated in Figs. 1 to 8 inclusive, the spring construction comprises upper and lower substantially rectangular frame members 1 and 2 respectively. The lower frame member may be formed of a section of sheet metal having a substantially S-shaped cross section extending completely around the base of the cushion construction and providing an inwardly and an outwardly presenting channel. The upper or auxiliary frame 1 is preferably formed of border wire which is substantially cylindrical in cross section and has a continuous channel 3 cut therein

throughout its length. The border wire element 1 is bent to a form substantially congruent with the base frame member 2 and along its side edges at suitable spaced intervals is provided with inwardly projecting portions 4 formed from the border wire bent upon itself, to provide a short, inwardly projecting portion. As will be seen from the drawings, the channel 3 in the border wire presents inwardly of the frame as a whole.

The surface structure of the cushion springs is composed of a plurality of sinuous spring elements 6 formed in the manner taught by the Kaden application referred to above. These spring elements 6 are tensioned in order that the arc along which they lie will be of relatively greater radius than that in which they have a normal tendency to lie, and each has its last lateral convolution at each end crimped into the channel 3 of the border wire element 1, as shown in detail in Fig. 8. These spring elements preferably extend transversely of the cushion and lie in substantially parallel relation. In order to eliminate undesirable excess relative movement between the adjacent arcuate spring elements 6, they are interconnected at suitable points by means of links 7 which serve to interconnect the vertices of adjacent convolutions and create a substantially unitary spring surface construction.

It will be seen from the foregoing that a relatively continuous, resilient spring surface construction is provided for the cushion which is supported wholly by the upper frame member 1.

The lower frame member is braced both transversely and longitudinally by means of S-shaped cross section grace elements 8 and 9 respectively. The upper or auxiliary frame 1 is supported on the base frame 2, at each of its ends, by means of arcuate, sinuous spring elements 10 of substantially the same general construction as the elements 6 described above. These spring elements 10 have their ends crimped into the channel border wire 1, in the same manner as the terminal ends of the spring 6 were crimped therein, and have their lower terminal ends crimped into the channels in the longitudinal brace member 9 by deforming the metal of the channel therearound.

The upper frame 1 is supported on the lower frame along its side portions by means of arcuate spring elements 12. Each of the elements 12 has one of its ends crimped into the inwardly presenting channel of the base frame 2 and has its opposite end crimped into one of the channels of the transverse cross brace member 8. The securement of these supporting springs 12 in the cross brace channel 8 is shown in the detailed sectional view Fig. 7.

It will be apparent from the foregoing that the mid points of these arcuate supporting springs 12 lie closely adjacent to the inwardly projecting portions 4 of the auxiliary frame 1. One of the lateral convolutions of the arcuate spring members 12 adjacent the center thereof is secured to each of the inwardly projecting portions 4 of the upper projecting frame by means of a sheet metal clip 13 extending around the central lateral convolution and around the inwardly projecting section 4, of border wire.

A modified manner of securing the mid point of the springs 12 to the auxiliary frame 1 is shown in detail in the sectional view Fig. 6, in which a clip 14 substantially surrounds the central lateral convolution of the spring 12 and has two wing portions passing upwardly between the adjacent runs of border wire 1 forming the inward projection 4, and has these wings each bent around one of the sections of border wire in order to lock the central portion of the spring element 12 closely in engagement with the inwardly projecting portion 4.

It will be seen from the foregoing that the cushion construction described above comprises upper and lower substantially rectangular frame members, the lower or base frame constituting a reinforced solid support on which the cushion may rest, and the auxiliary frame which wholly carries the surface springs 1 is resiliently mounted on the base frame by means of a plurality of arcuate spring elements. It will be apparent that the inherent resilience of the arcuate form of these spring elements, together with the resilience provided due to their sinuous form, provides an extremely resilient and, at the same time, simple mounting for the upper frame with respect to the base frame.

A modified form of the invention is illustrated in Fig. 9 in which both the upper and lower frame members are formed of border wires 16 and 17 respectively, similar in construction to the frame 1 described in connection with the form of the invention shown in Figs. 1 to 8 inclusive. As will be apparent by reference to this figure, arcuate spring elements 18 have their terminal ends anchored in the channel of the border wire 16 on opposite sides thereof, and provide an upper surface to the cushion of resilient form, similar in construction to the upper surface formed by the arcuate spring elements 6 described in connection with the previous modification. A lower spring surface is formed in order to make the cushion of this modification reversible and having both sides resilient. The lower spring surface is formed of a plurality of arcuate spring elements 19, similar in construction and mounting to the spring elements 18. Both the spring elements 18 and 19, as was the case with the spring elements 6, are tensioned in order that the arcs along which they lie will be of substantially greater radius than the curvature which the spring elements would normally assume prior to tensioning.

The upper frame member 16 is provided with inward projections 20 similar to the inward projection 4, described in connection with Fig. 1, and preferably similarly formed of integral portions of the marginal border wire 16. The lower frame member is provided with a plurality of inwardly projecting portions 21 at substantially the mid points of the various sides thereof. Arcuate spring elements 22 serve to interconnect the side edges of the upper and lower frame. Each of the elements 22 preferably has its end crimped into the lower border wire element 17, one end of each of the arcuate spring elements 22 on each side being secured into the end section of the border wire elements, and the opposite end of the spring elements being secured to channel of the central inwardly projecting portion 21.

The ends of the upper and lower frame members 16 and 17 are supported by means of arcuate spring elements 24, which have their ends crimped into the channel of the upper frame member on either side thereof, and have the central lateral convolution secured to the inwardly projecting portion 21, centrally of each of the end members of the lower frame element by means of a clip 25 which may take the form of the clips 13 or 14, described in connection with Figs. 5 and 6.

In this form of the invention, it will be seen that a resilient cushion spring construction is provided which has both upper and lower resilient

surface springs. It will be further appreciated that the springs forming the upper and lower surfaces are each supported wholly by their respective frames, and that these frames are spaced from each other by means of similar arcuate sinuous spring elements which add to the resiliency of the surface spring elements, and create a relatively simple and highly resilient cushion spring construction.

In Figs. 10 to 13 inclusive is shown a further modified form of the invention in which a cushion is provided with a single marginal border wire element **26** of a cross sectional configuration similar to the border wire element **1** described in connection with the preceding figures. This border wire element **26** preferably extends completely around and defines the marginal edge of the cushion construction. In order to maintain its rectangular form and rigidity, the border wire frame member **26** is preferably supported by a brace element **27** preferably formed of relatively small gauge wire, and having its ends bent laterally and crimped into the channel of the border wire **26** on each side of the frame. A plurality of arcuate spring elements **28** have one-half of their last lateral convolutions crimped into the inwardly presenting channel of the border wire element **26**. These springs **28** constitute an arcuate spring surface on one side of the cushion and a similar arcuate spring surface is provided on the other side of the cushion by means of a similar series of arcuate, sinuous spring elements **29**, which each also have one-half of their last lateral convolution similarly crimped into the same inwardly presenting channel of the border wire **26**. This is shown in detail in Fig. 11.

This cushion construction is relatively simple to manufacture, and is highly resilient, due to the arcuate form of the spring elements **28** and **29**. As was the case in connection with the modifications described above, the spring elements **29** are preferably formed when manufactured, to a curvature of relatively small radius. At the time they are inserted into the border wire **26**, they are tensioned to arcs of substantially greater radius in order that their inherent resiliency will thus be materially increased.

It will be appreciated that the modifications herein illustrated are merely representative of some of the many forms which the generic inventive concept taught herein may take. Many other and further objects and advantages of the invention will be apparent to those skilled in the art.

What is claimed is:

1. A cushion spring construction comprising a pair of spaced frame members, one of said frame members having a channel formed therein, and arcuate, sinuous spring elements serving to resiliently interconnect said frame members, the last lateral convolution of each end of said arcuate spring elements being secured in the channel of one of said frame members and said spring element being secured at an intermediate point to the other of said frame members to mount said frames in resiliently spaced relation.

2. A cushion spring construction comprising a pair of spaced frame members having a channel therein, arcuate, sinuous spring elements having their ends secured in the channel of one of said frame members and constituting a resilient surface for said cushion spring and additional arcuate sinuous spring elements having their ends secured in the channel of one of said frame members and a convolution intermediate their ends secured to said other frame member to mount said frames resiliently with respect to each other.

3. In a cushion spring construction, a pair of spaced frames, each of said frames having a series of sinuous arcuate spring elements mounted thereon, said elements being tensioned to lie along arcs of greater radius than that which they would assume when in repose, and additional similar arcuate spring elements serving to resiliently interconnect said frames, the ends of said last mentioned spring elements being connected to one of said frames and the mid points connected to the other of said frames.

4. In a cushion construction comprising a pair of spaced frames, arcuate sinuous spring elements serving to resiliently interconnect said frames, one of said frames having a channel therein adapted to receive and anchor the ends of said spring elements, and clips for securing the mid points of said spring elements to the other of said frames.

5. In a cushion construction comprising a pair of spaced frames, arcuate, sinuous spring elements serving to resiliently interconnect said frames, one of said frames having a channel therein adapted to receive and anchor the ends of said spring elements, and clips for securing the midpoints of said spring elements to the other frame, said spring elements being tensioned to lie along arcs of greater radius than they would normally assume when in repose.

CLARENCE H. MENGE.