July 28, 1942. H. F. WOLFE 2,291,429

CUSHION CONSTRUCTION

Filed April 11, 1938 4 Sheets-Sheet 1

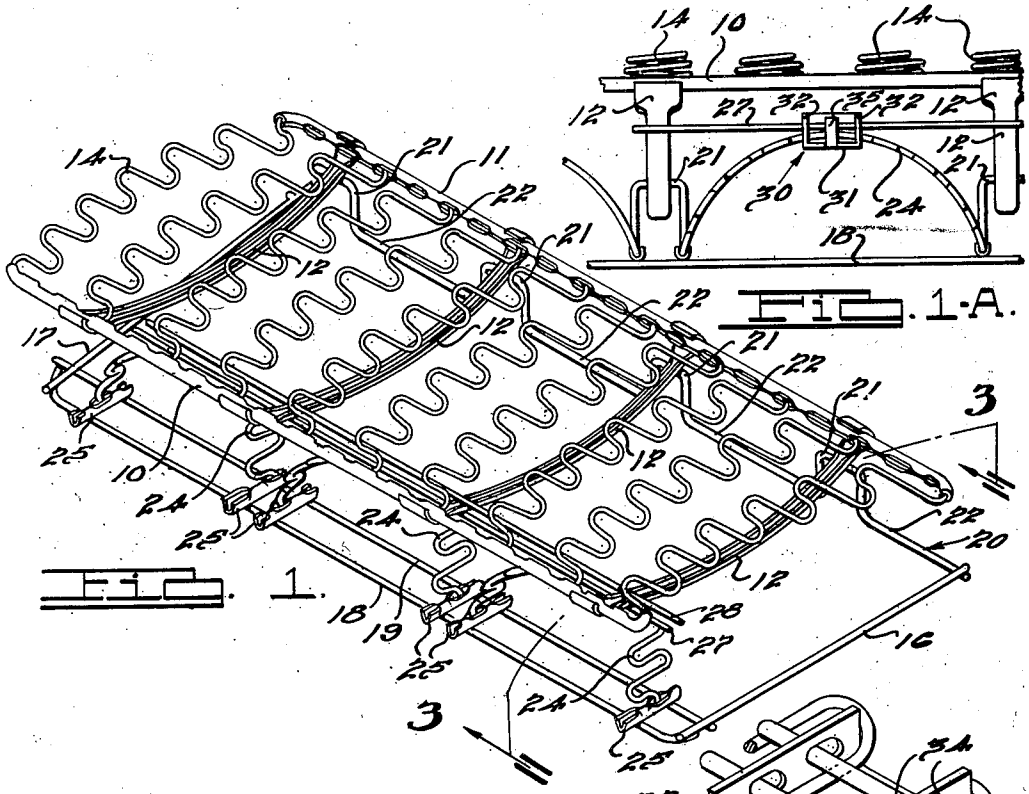


Fig. 1.

Fig. 1-A.

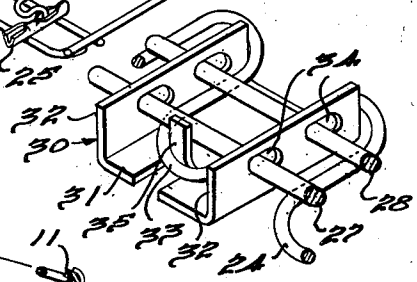


Fig. 2.

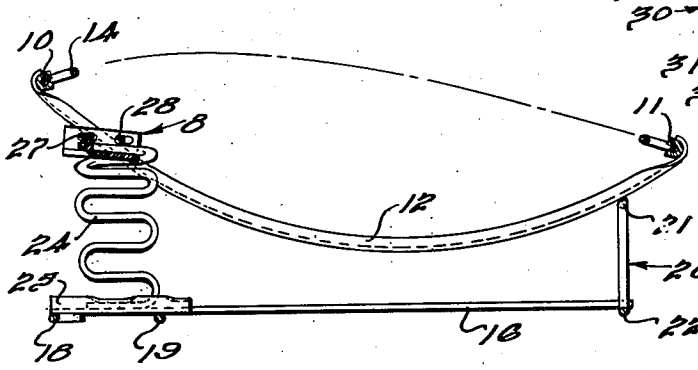


Fig. 3.

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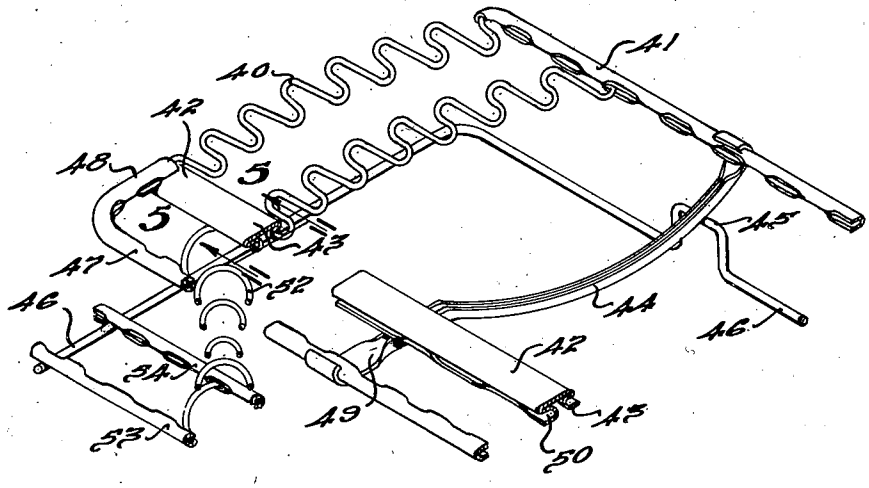


Fig. 4.

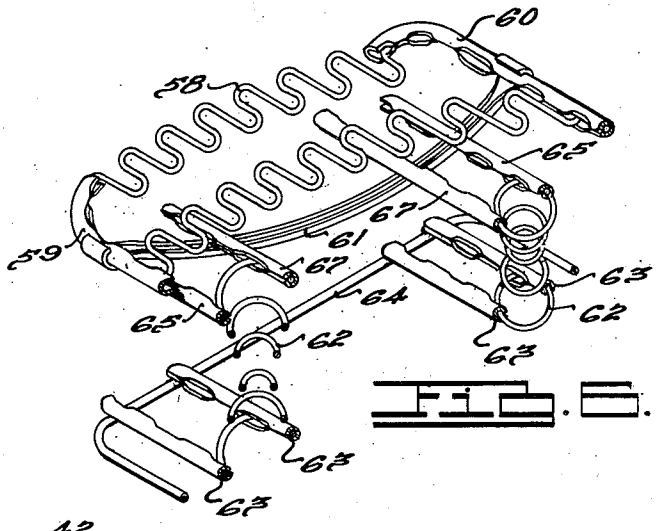


Fig. 6.

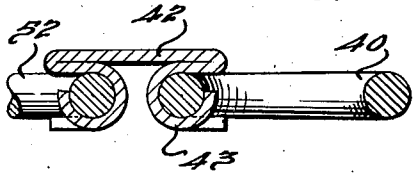


Fig. 5.

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CUSHION CONSTRUCTION

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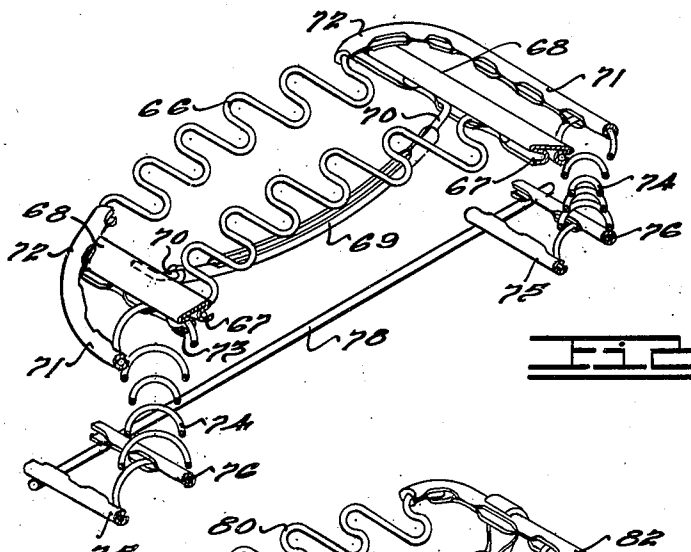


Fig. 7.

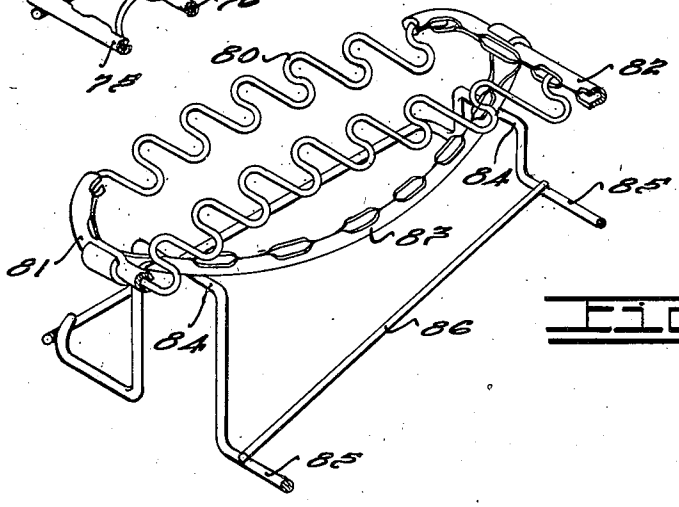


Fig. 8.

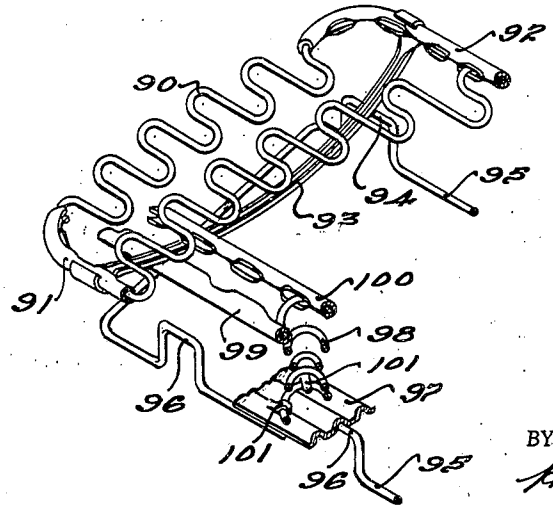


Fig. 9.

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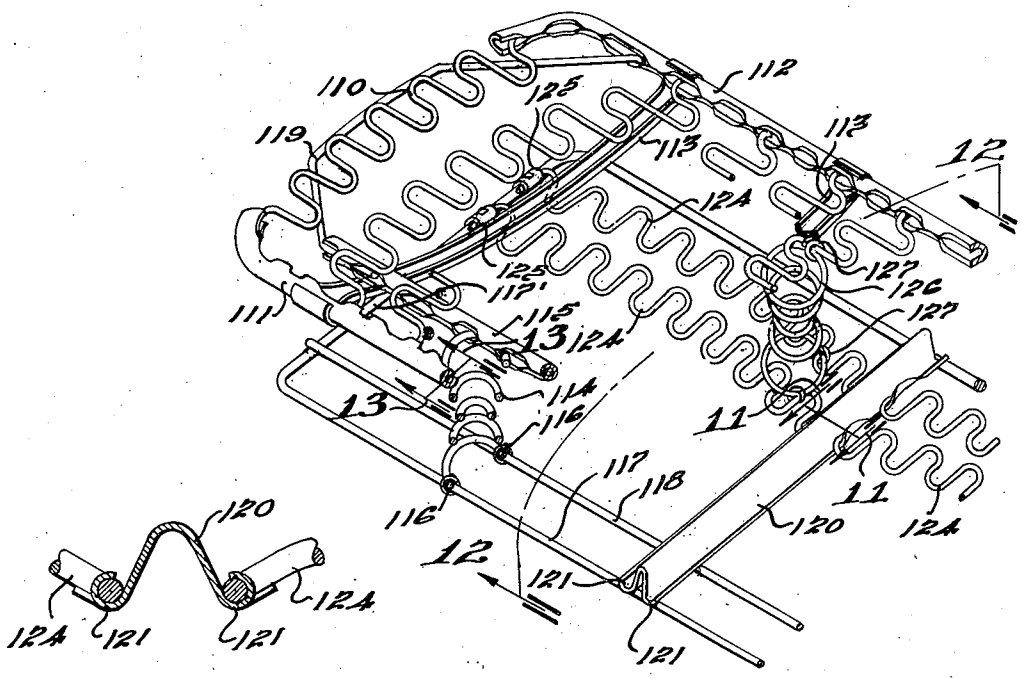


Fig. 11. Fig. 10.

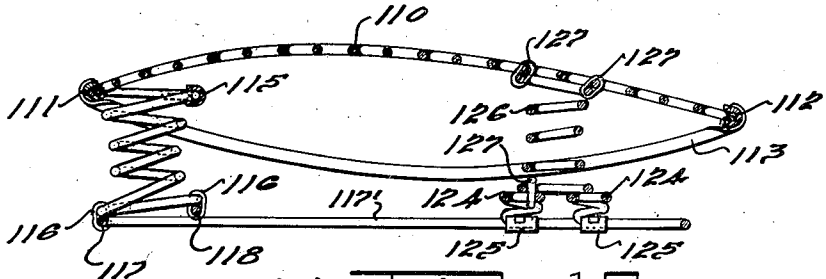


Fig. 12.

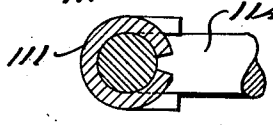


Fig. 13.

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UNITED STATES PATENT OFFICE

2,291,429

CUSHION CONSTRUCTION

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Application April 11, 1938, Serial No. 201,212

6 Claims. (Cl. 155—179)

The present invention relates to seat constructions of a type particularly adapted to be used in automobiles.

It has been found that superior spring seat cushions may be produced by the use of a plurality of specially formed sinuous spring elements extending substantially parallel to each other in a curved plane defining the seating surface and secured at their ends to a frame. Each of these spring elements in accordance with the usual practice is formed with a plurality of continuous lateral convolutions lying in a plane which is curved longitudinally of the elements. The spring elements are given an initial set causing them to tend to curl through an arc of more than 180° and are then tensioned by stretching them to a substantially flat but slightly arched condition and securing them at their ends to a frame.

It is the general object of the invention to provide an improved, simplified and inexpensive cushion frame work embodying a supporting surface of sinuous springs of the type mentioned.

More specific objects of the invention are to provide improved frame constructions for carrying the sinuous springs, improved means for supporting the sinuous spring frames and to provide a soft edge construction for spring frames of the type mentioned.

Other objects and advantages of the invention will become apparent from the following specifications and the accompanying drawings and appended claims:

In the drawings:

Figure 1 is a perspective view showing one form of the invention;

Fig. 1a is a fragmentary front elevation of the construction shown in Fig. 1;

Fig. 2 is a perspective view showing the manner in which supporting springs are secured to the spring frame;

Fig. 3 is a section taken on the line 3—3 of Fig. 1;

Fig. 4 is a fragmentary perspective view of a modified form of the invention;

Fig. 5 is an enlarged section taken on the line 5—5 of Fig. 4;

Figs. 6, 7, 8 and 9 are fragmentary perspective views of further modifications of the invention;

Fig. 10 is a fragmentary perspective view of a further modification of the invention;

Fig. 11 is a sectional view taken on the line 11—11 of Fig. 10;

Fig. 12 is a sectional view taken on the line 12—12 of Fig. 10;

Fig. 13 is an enlarged sectional view taken on the line 13—13 of Fig. 10.

Referring to Figs. 1 to 3 of the drawings there is shown a seat frame work formed of a pair of parallel transversely extending channel members 10 and 11 rigidly secured together by a plurality of longitudinally extending frame channel members 12. Extending between channel members 10 and 11 are a plurality of sinuous springs 14 each having an end crimped in each of the channels 10 and 11. The sinuous springs have an initial set causing them to tend to curl longitudinally through an arc of more than 180° and they are stretched when secured in the channels 10 and 11 until they are only slightly arched upwardly. Accordingly the springs are under tension and will offer substantial resistance to any downwardly applied force. The convolutions of the springs lie in the same curved plane and hence provide a highly satisfactory supporting surface. As best shown in Fig. 3, the longitudinally extending frame members 12 are arched downwardly to provide clearance for springs 14.

The seat frame work includes a base frame made up of a pair of parallel longitudinally extending rods 16 and 17 connected at the forward edge of the seat by a pair of rods 18 and 19 and at the rearward edge of the seat by rod 20. The rod 20 is bent upward to form upwardly projecting inverted U-portions 21, one of which is fixedly secured, as by welding, to each of the longitudinally extending frame members 12. Rod 20 intermediate the upwardly projecting portions 21 has straight floor engaging portions 22, all lying in the same plane. The base frame and particularly rod 20 thereof being formed of relatively light weight rod material has sufficient resiliency to permit up and down movements of the forward edge of the sinuous spring frame, such movements being accommodated by a tortional distortion of rod 20.

Means are provided for resiliently supporting the forward edge of the spring frame. This means comprises a plurality of arched sinuous springs 24 similar in construction to the springs 14 previously described. The ends of springs 24 are crimped in short channel elements 25 which are welded or otherwise fixedly secured to the transverse frame members 18 and 19 in such a manner that the intermediate portions of sinuous springs 24 arch upwardly towards the upper spring frame. Springs 24 at their midpoints are connected to a pair of transversely extending rods 27 and 28 which are rigidly secured, as by welding, to the longitudinally ex-

tending frame members 12. As is best shown in Fig. 3, transverse rod 27 is secured to the under side of each member 12 while rod 28 is secured to the upper side of the members 12 in order to locate the rods 27 and 28 in the same plane.

The connection between each of the springs 24 and the rods 27 and 28 is effected by means of a channel element 30 shown best in Fig. 2. The channel element 30 has a base portion 31 lying parallel to the plane of the mid-portion of the springs 24 and below the same. A pair of parallel upstanding leg portions 32 on the channel 30 project upwardly on opposite sides of the central convolution 33 of springs 24. The leg portions 32 of the channel are each provided with apertures 34 through which project the rods 27 and 28 of the frame. The central convolution 33 of the springs 24 is received and held between the base 31 of the channel and rods 27 and 28. A tongue 35 is struck upwardly from the base of the channel within the convolution 33 of the springs and between it and the rod 27 in order to prevent displacement of the springs from the channel in a direction transversely of the springs. The springs 24 provide a resilient cushion support for the forward edge of the spring frame. Since they are initially tensioned in the manner described in connection with springs 14, they offer substantial resistance to compression and will sustain the weight of the occupants of the seat.

The form of the invention just described, while exceedingly simple and inexpensive to manufacture, provides a rugged and comfortable seat cushion construction. Not only is the weight of an occupant resiliently supported by the sinuous spring 14 but one edge of the spring frame carrying springs 14 is itself resiliently supported and therefore cushioned in respect to the base frame. It is advantageous to fixedly secure one end of the frame carrying springs 14 to the base frame as in this form of the invention in that such an arrangement prevents all relative movement between the frames in a horizontal plane. As a general rule, it is desirable to have the forward edge of the seat of a softer construction than the rear and accordingly it is preferred to utilize the edge defined by channel member 10 as the front of the seat cushion. However, the opposite edge may form the front of the seat cushion and the desirable soft front edge characteristically imparted by the use of additional thicknesses of padding at that edge of the frame. Such an arrangement provides a more resilient support for the principal weight of the occupants.

In Fig. 4 is shown a modified form of the invention in which the sinuous springs 40 are secured in a channel member 41 at one end and at their opposite ends in a member 42 having a channel 43 at one edge thereof. Channel 41 and member 42 are connected by a plurality of longitudinally extending frame members 44 as in the previous modification, each of which members is secured by welding to an upward projection 45 on a base frame wire 46. A channel member 47 having its ends 48 bent rearwardly is welded at its ends to member 42 and also secured to forward projections 49 on longitudinal members 44. The member 42 is provided with a second channel 50 facing towards the channel member 47 and a plurality of coiled springs 52 are crimped in channel 50 of member 42 and in the channel member 47. Springs 52 at their lower ends are crimped in a pair of transversely extending channel members 53 and 54 secured to the base frame wire 46. It will be observed that this form of the invention is similar to that shown in Figs. 1 to 3 inclusive, except for a slightly different form of sinuous spring frame and for a different form of resilient support for the edge of the spring frame.

In Fig. 6 is shown a further modification embodying a different form of connection between coiled supporting springs and sinuous spring frame. In this form the sinuous springs 58 are secured at their ends in channel members 59 and 60 which are rigidly connected by a plurality of longitudinally extending frame members 61 as in the form of the invention shown in Fig. 1. Coiled supporting springs 62 for the sinuous spring frame are secured at their lower ends in transverse channel members 63 carried by a base frame 64 formed of a bent rod. The upper ends of coiled springs 62 are crimped in a pair of transverse channel members 65 and 67 which are welded to the longitudinally extending frame member 61. It will be noted that the outermost channel members 65 are secured to the under side of frame member 61 while the inner channel members 67 are secured to the upper side of frame member 61 with the result that channel members 65 and 67 lie in the same plane.

In the form of the invention shown in Fig. 6, both edges of the sinuous spring frame are resiliently supported by coiled springs but it will be understood that the coiled springs at either edge may be replaced by the non-resilient form of support shown in Fig. 1.

In Fig. 7 is shown a further modification of the invention in which a soft edge construction is provided by independently pivoted edge portions on the supporting frame for the sinuous springs. The sinuous springs 66 are secured at their ends in channels 67 formed at the inner edges of a pair of spaced parallel frame members 68. The supporting frame members 68, instead of being rigidly connected as in prior forms of the invention, are resiliently connected to a plurality of longitudinally extending frame members 69 by means of relatively stiff spring wires 70, having their ends crimped in frame members 68 and 69 respectively. As a result of this arrrangement frame members 68 are held in spaced relation and thus maintain the sinuous springs 66 in stretched condition but each of the members 68 may pivot or rotate slightly relative to the connecting frame member 69, such relative pivotal movements being accompanied by distortion of the spring wires 70. At each end of the seat frame a transverse channel element 71, having inwardly bent ends 72, is rigidly secured to the adjacent transverse frame members 68 by welding with the result that the members 68 and 71 may act as an auxiliary frame member resiliently pivoted relative to the main sinuous springs.

The outer edges of transverse frame members 68 are provided with outwardly opening channel member 73 and a plurality of coiled springs 74 have their upper ends crimped in channels 73 and in channel members 71. The lower ends of coiled springs 74 are crimped in a pair of transversely extending channel members 75 and 76 carried by a rod 78 forming the ends of the base frame.

In the form of the invention shown in Fig. 7, it will be noted that the coiled springs 74 sustain the entire weight of the sinuous spring frame but permit angular movements of the edge structures 68 and 71 relative to the main plane of the sinuous spring frame. This arrangement gives a soft edge construction. While both edges of the

frame shown in Fig. 7 are shown provided with a soft edge construction and a coiled spring support, it will be understood that one edge of the frame may be constructed and supported in the manner best shown in Figs. 1 to 3 inclusive at the right hand side of Fig. 3. Moreover, while the ends of spring elements 70 are preferably crimped in channels 67, it will be apparent that they may be journaled for rotation therein, if desired.

In Fig. 8 is shown a further modification of the invention in which both edges of sinuous spring frame have a non-resilient support. In this form the sinuous springs 80 are secured at their ends in a pair of channel members 81 and 82 which are rigidly connected by a plurality of longitudinally extending frame members 83, which in turn are welded to upward projections 84 on a bent rod 85 forming the base frame. Suitable reinforcing rods 86 may be provided for connecting the rods 85 at opposite edges of the base frame.

In Fig. 9 of the drawings is shown a further form of the invention similar to that shown in Fig. 1 except for a different form of resilient support for one edge of the sinuous spring frame. In this form of the invention the sinuous springs 90 are crimped at their ends in a pair of transverse channel members 91 and 92 which are rigidly connected by a plurality of longitudinally extending frame channel members 93. The longitudinally extending members 93 are welded adjacent one edge of the frame to upward projections 94 on a base frame rod 95 in the manner described in connection with Fig. 1. The base frame rod 95 at the opposite edge of the seat is similarly provided with upwardly projecting portions 96 which form a fulcrum support, a transversely extending horizontal plate 97 which extends entirely across the frame beneath the edge defined by channel member 91. A plurality of coiled springs 98 seat upon plate 97 and are crimped at their upper ends in a pair of transversely extending channel members 99 and 100 which are secured to the longitudinally extending frame members 93 below and above the latter respectively. The lower ends of coiled springs 98 are secured to plate 97 by tangs 101 struck upwardly from the plate.

In Figs. 10 to 13 inclusively is shown a further modification of the invention. In this form the sinuous springs 110 are crimped at their ends in channel members 111 and 112 which in turn are rigidly connected by a plurality of longitudinally extending frame members 113 as in the form shown in Fig. 1. One of the novel features of this form resides in the fact that one edge of the sinuous spring frame is resiliently supported by coiled springs 114 having their upper ends crimped in channel member 111 and in an auxiliary channel member 115 which is secured inwardly of channel 111 to the upper surface of the longitudinally extending frame members 113. It will be noted that, since the sinuous springs 110 and the coiled springs 114 are both crimped in the channel members 111, the coiled springs 114 must be positioned intermediate the sinuous springs. Any desired number of coiled springs 114 may be used. The lower ends of the coiled springs 114 are secured by hog rings 116 to the base frame rods 117 and 118. A relatively heavy spring wire 119 is secured at its ends in channel members 112 and 115 and has its intermediate portion lying along the side of the outermost spring 110 to provide an edge stiffening effect and to prevent transverse displacement of the outermost spring 110. If desired, the outermost spring 110 and the wire 119 may be secured together by hog rings.

Another feature of the construction shown in Figs. 10 to 13 inclusive resides in the provision of auxiliary supporting springs cooperating with the sinuous springs 110 to support the weight of occupants of the seat and this structure will now be described. The base frame of the seat is provided intermediate its ends with a longitudinally extending sheet metal element 120 of generally inverted V-form having channels 121 formed on its edges. A pair of transversely extending sinuous spring elements 124, similar in construction and arrangement to the sinuous spring elements 110, are each secured at one end by a clip 125 to the base frame 117' at the end of the base frame and at the opposite end crimped in one of the channels 121 on member 120, in the manner best shown in Fig. 11. In this form of the invention it is intended that the front edge of the seat will be that defined by channel member 111 and the transverse sinuous springs 124 are so positioned as to fall beneath that portion of the sinuous spring frame which receives the maximum load, this area being adjacent but spaced inwardly from the edge of the seat cushion. A plurality of coiled springs 126 are secured to and between transverse sinuous springs 124 and longitudinally extending sinuous springs 110 by means of hog rings 127. It will be noted that transverse sinuous springs 124 arch upwardly to a slight extent and accordingly, since all of the coiled springs 126 are of the same initial length, a slightly greater upward force will be exerted upon the sinuous springs 110 located above the central portion of sinuous springs 124 at which point the maximum load upon the seat cushion is concentrated. It will be understood that the seat cushion shown in Figs. 1 to 3 is designed to accommodate two occupants and is identical in construction on opposite sides of its longitudinal center line.

The structure shown in Figs. 10 to 13 inclusive, may to advantage be turned around so that the forward edge is that defined by channel member 112 since in that event the portion of the sinuous spring frame which overhangs the transverse sinuous springs 124 and coiled springs 126 will provide a soft front edge construction. In this event the opposite edge of the frame, now that defined by channel member 111, may if desired be supported in the manner in which the edge defined by channel member 11 in Fig. 1 is supported.

It is apparent that in accordance with the present application a number of highly advantageous forms of seat frame constructions are provided. It will be understood, however, that other forms of construction are available within the spirit of the invention and within the scope of the appended claims.

What is claimed is:

1. A frame work for an upholstered seat comprising a frame having a pair of spaced parallel transversely extending channel elements, longitudinal frame members connecting said channel elements, a transversely extending member secured to said longitudinal frame members intermediate said channel elements and extending parallel thereto, said transverse member having a pair of channels opening toward said channel elements respectively, a plurality of sinuous springs each having one end crimped in one of

said channel elements and the other end crimped in one of the channels of said transverse member, means for supporting the edge of said frame defined by said one channel element, and coil springs for supporting the opposite edge of said frame, each of said coil springs having its upper coil crimped in the other channel element and in the other channel of said transverse member.

2. A seat frame work including a frame having a pair of spaced parallel transverse frame elements, longitudinally extending frame members connecting said transverse elements, arched sinuous springs connected at their ends to and extending between said transverse frame elements, a transverse frame member rigidly connected to the forward transverse frame element and spaced outwardly thereof at the forward edge of the frame, means for supporting the rear edge of frame, and resilient means connected to said transverse frame member and to said forward transverse frame element for supporting the forward edge of the frame.

3. A seat frame work including a frame having a pair of spaced parallel transverse frame elements, rigid longitudinally extending frame members each connected at one end to the rear transverse frame element and having a resilient connection at the other end with the forward transverse frame element, arched sinuous springs connected at their ends to and extending between said transverse frame elements, a transverse frame member rigidly connected to the forward transverse frame element and spaced outwardly thereof at the forward edge of the frame, means for supporting the rear edge of frame, and resilient means connected to said transverse frame member and to said forward transverse frame element for supporting the forward edge of the frame.

4. A seat frame work including a frame having a pair of spaced parallel transverse elements, rigid longitudinal members each connected at its rear end to the rear transverse element and pivotally connected at its forward end to the forward transverse element, a plurality of arched sinuous springs connected at their ends to and extending between said transverse elements, means for supporting the rear of said frame, and resilient means engaging said forward transverse element for supporting the forward edge of the frame, said forward transverse element being of substantial width whereby it may tilt under load relative to the plane of said elements and thereby provide a soft edge for the seat.

5. A seat frame work including a frame having a pair of spaced parallel transverse channel elements opening toward each other, a transverse member extending parallel to said elements intermediate the same and rigidly connected to the forward channel element, said transverse member having a pair of channels formed therein and opening toward said channel elements respectively, longitudinal frame members connecting said transverse member with the rearward transverse element, arched sinuous springs each having one end crimped in a channel in said transverse member and its opposite end crimped in said rear channel element, and springs for supporting the forward end of said frame, said springs having their upper portions crimped in said forward channel element and in the other channel of said transverse member.

6. In a seat construction, three parallel border elements, comprising a rear and intermediate border element spaced a material distance apart and a front border element disposed in proximity to the intermediate border element, spring strips interconnecting the intermediate border element and the rear border element forming the load supporting portion of the seat, coil springs having the top convolutions joining the front border element to the intermediate border element forming a soft front edge for the seat, and a base structure on which the coil springs and the rear border element are secured.

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