Jan. 1, 1957 J. E. KUBACKA 2,775,997

TORSION SPRING SEAT-SPRING STIFFENER

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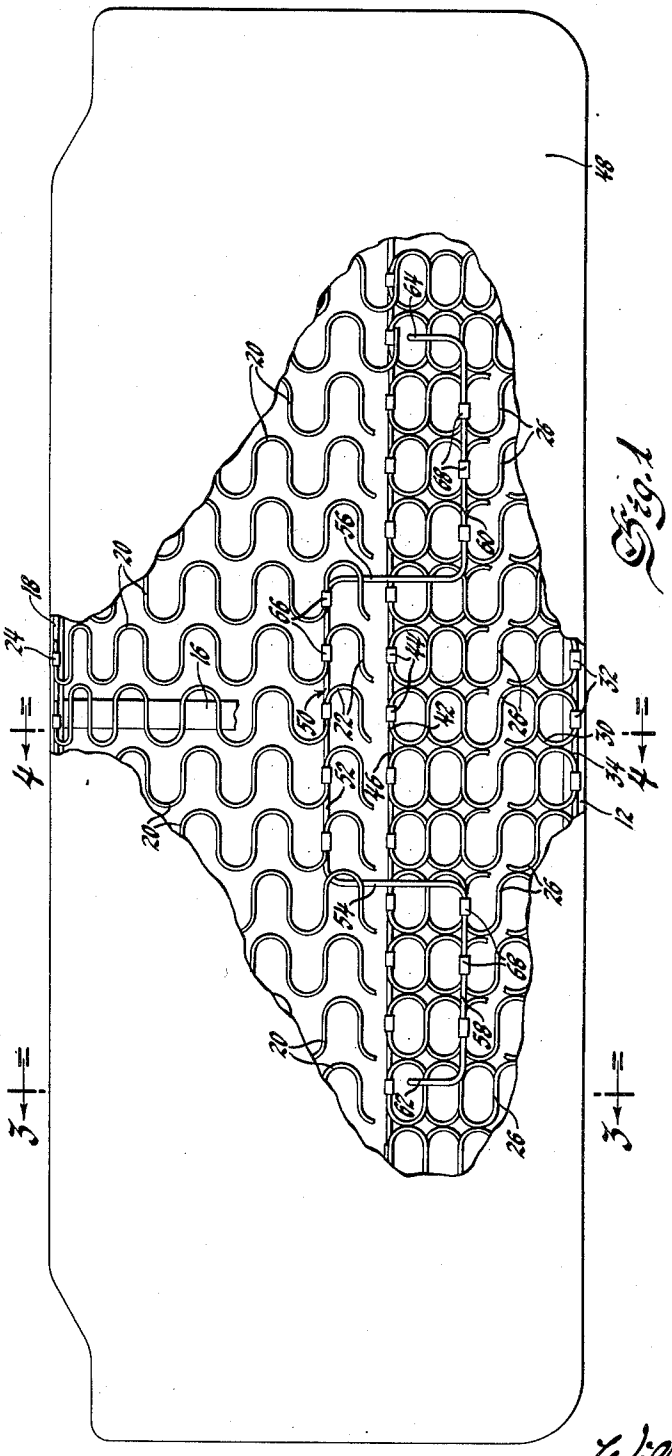


Fig. 1

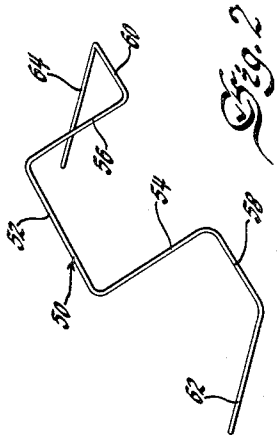


Fig. 2

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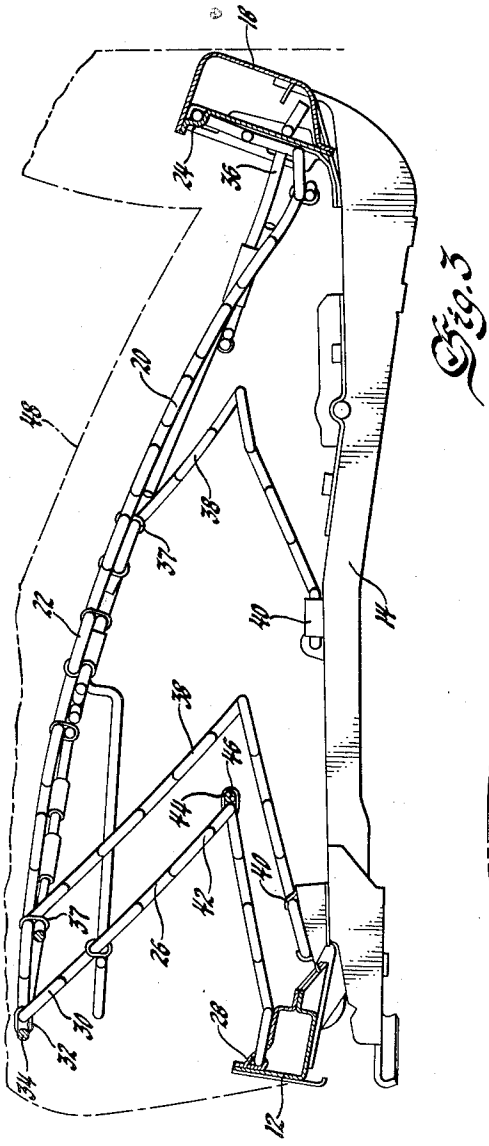


Fig. 3

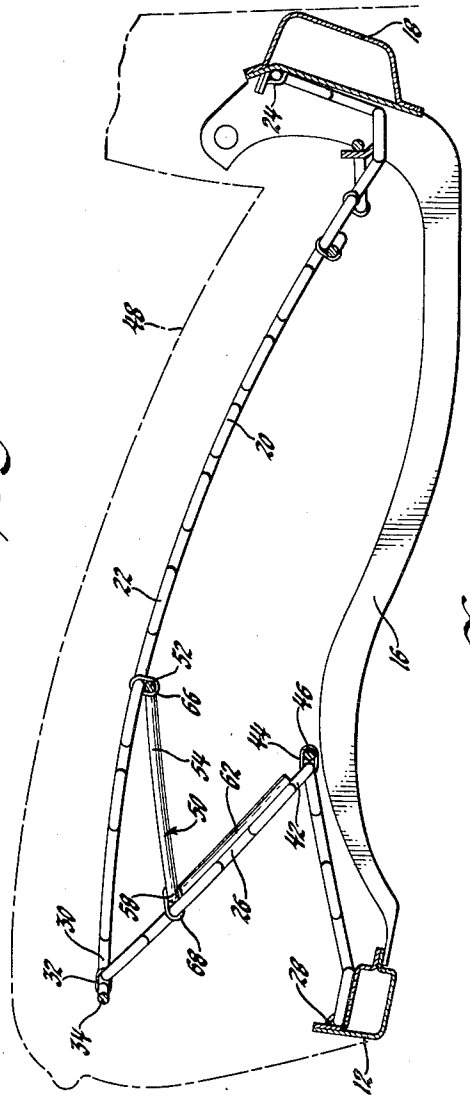


Fig. 4

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TORSION SPRING SEAT-SPRING STIFFENER

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Application January 12, 1953, Serial No. 330,650

4 Claims. (Cl. 155—179)

This invention relates to a spring seat construction, and more particularly, to a torsion spring stiffener for imparting supplemental resiliency to a localized area of the seating portion of a cushion seat construction of the type embodying flat wire springs of sinuous shape.

The front seats of automobiles are generally constructed of a plurality of parallel sinuous flat springs that extend across between the front and rear rails of the seat frame. In a known spring seat of this type, each sinuous spring includes a crowned seating portion that is anchored at its rear end to the rear rail and at its front end to the front rail by means of an inwardly extending V-shaped front portion formed integrally with the seating portion. The seat frame is of substantially rectangular shape and includes a centrally located reinforcing member between the front and rear rails thereof. The side rails of the seat frame are substantially horizontal but the central reinforcing member is bowed upwardly to clear the accumulated heights of various items such as the drive shaft tunnel, the underseat heater crossover ducts, and the seat adjuster stabilizer rod. The sinuous spring elements are substantially identical and therefore some means must be provided to increase the load rate of the spring elements in the region above the central reinforcing member to prevent their bottoming thereon if the spring elements are to provide maximum flexibility for the left and right sides of the seat cushion.

It is accordingly an object of the invention to provide a simple stiffener for imparting supplemental resiliency to a localized area of a cushion seat construction.

The particular stiffener devised is a triple-looped square-corrugated rod with the central loop raised from the plane of the outer loops. The central loop is pivotably connected across those seating portion sinuous spring elements that lie in the region above the central frame reinforcing member. The outer loops are pivotably connected across other sinuous spring elements that lie on the sides of the central loop at the V-shaped or knee portions thereof. The central loop serves as a crank arm to torsion the outer loops when the sinuous spring elements are flexed downwardly, thereby imparting supplemental resiliency to the seat cushion in the area above the central frame reinforcing member.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings wherein a preferred form of the present invention is clearly shown.

In the drawings:

Fig. 1 is a top plan view, partially broken away, of an automobile seat structure embodying the torsion spring stiffener of the invention,

Fig. 2 is a perspective view of the torsion spring stiffener,

Fig. 3 is a vertical sectional view through the automobile seat structure taken on the plane indicated by the line 3—3 of Fig. 1, and

Fig. 4 is a vertical sectional view through the automobile seat structure taken on the plane indicated by the line 4—4 of Fig. 1.

Referring now to the drawings, the seat frame is shown as formed of hollow tubing and includes a front rail 12, side rails 14, a centrally located and upwardly bowed reinforcing member 16 and a rear rail 18. A plurality of transversely spaced springs 20 extend between the front and rear rails 12 and 18. Each spring element 20 is made of a steel wire that is sinuously bent or corrugated from one end to the other. The sinuous elements 20 form a spring unit having a crowned seating portion 22 anchored at its rear end by clips 24 to the rear rail 18 and a substantially V-shaped inwardly directed front portion 26 anchored at its front end by clips 28 to the front rail 12. The forward loops 30 of the sinuous spring elements 20 are kinked downwardly and secured by clips 32 to a U-shaped edge reinforcing rod 34 which is suitably secured at its ends 36 to the rear rail 18. The outside sinuous spring elements 20 have their loops periodically secured to the sides of the edge reinforcing rod 34 by clips 37. The clips 37 also secure the upper ends of V-shaped side edge reinforcing sinuous spring elements 38 which have their lower ends secured to the side rails 14 by clips 40. The inwardly directed apices 42 of the V-shaped portions 26 of the sinuous spring elements 20 are secured by clips 44 to a transversely extending reinforcing rod 46. The seat cushion is encased in conventional upholstery material 48 in the usual manner.

The structure thus far described is known and the invention is directed to the imparting of supplemental resiliency to the central area of the seat cushion by means of the torsion spring stiffener 50 best seen in Fig. 2.

The torsion spring stiffener 50 is a rectangularly corrugated steel rod having a central loop 52 joined by depending crank arms 54 and 56 to outer loops 58 and 60 which terminate in legs 62 and 64. The loops 58 and 60 and the legs 62 and 64 lie in a plane that intersects the plane of the loop 52 and the crankarms 54 and 56 at an acute angle. The loop 52 extends transversely beneath the seating portion 22 of five centrally located sinuous spring elements 20 and is pivotably connected thereto by clips 66. The loops 58 and 60 each lie transversely across three sinuous spring elements 20 on each side of the five centrally located sinuous spring elements 20 and are pivotably connected to the V-shaped portions 26 thereof by clips 68. The legs 62 and 64 lie longitudinally along the V-shaped portions 26 of a pair of outer spring elements 20 and bear thereon. Downward flexing of the central area of the seating portion 22 and the stiffener loop 52 rotates the stiffener crank arms 54 and 56 against the reaction of the stiffener legs 62 and 64 thereby torsioning the stiffener loops 58 and 60. The torsion rod stiffener 50 thus imparts supplemental resiliency to the five centrally located sinuous spring elements 20 to prevent their bottoming on the central reinforcing member 16 of the seat frame.

While the preferred embodiment of the invention has been described fully in order to explain the principles of the invention, it is to be understood that modification in structure may be made by the exercise of skill in the art within the scope of the invention, which is not to be regarded as limited by the detailed description of the preferred embodiment.

I claim:

1. A seat cushion comprising a supporting frame having front and rear rails, a spring unit including a plurality of sinuous spring elements extending across said frame between said front and rear rails thereof, said spring unit including a seating portion anchored at its

rear end to said rear rail and a substantially V-shaped front portion anchored at its front end to said front rail, and a torsion spring stiffener for imparting supplemental resiliency to the central area of said seating portion comprising a rod having an intermediate transverse section pivotably connected across the seating portion of a central group of said elements, a pair of transverse outer sections pivotably connected across the V-shaped portion of a pair of outer groups of said elements, a pair of terminal sections extending transversely from said outer sections and longitudinally along the V-shaped portion of a pair of outer elements and bearing thereon, and a pair of depending sections connecting said intermediate and said outer sections so that downward flexing of said central area of said seating portion torsions said side sections.

2. A seat cushion comprising a supporting frame having front and rear rails, a spring unit including a plurality of sinuous spring elements extending across said frame between said front and rear rails thereof, said spring unit including a seating portion anchored at its rear end to said rear rail and a subtantially V-shaped front portion anchored at its front end to said front rail, and a torsion spring stiffener for imparting supplemental resiliency to the central area of said seating portion comprising a rectangularly corrugated rod having an intermediate section pivotably connected to the central portion of said seating portion, a pair of outer sections pivotably connected to outer portions of said V-shaped portion, a pair of depending crank arms connecting said intermediate section with said outer sections, and a pair of legs securing the extremities of said outer sections against rotation so that downward flexing of said seating portion will torsion said outer sections.

3. A spring cushion assembly comprising a supporting frame having a pair of spaced rails, a spring unit including a plurality of sinuous spring elements extending across said frame between said rails and including an

upper portion anchored to one of said rails and a V-shaped underlying portion anchored to the other of said rails, and a torsion spring stiffener for imparting supplemental resiliency to said upper portion comprising a rod having a section connected to said upper portion and a pair of loops depending downwardly therefrom and connected to said V-shaped portion so that downward flexing of said upper portion torsions said loops.

4. A spring cushion assembly comprising a supporting frame having a pair of spaced rails, a spring unit including a plurality of sinuous spring elements extending across said frame between said rails and including an upper portion anchored at its end to one of said rails and a V-shaped underlying portion anchored at its end to the other of said rails, and a torsion spring stiffener for imparting supplemental resiliency to said upper portion comprising a rectangularly corrugated rod having an intermediate section connected to said upper portion, a pair of other sections connected to said V-shaped portion, a pair of depending crank arms connecting said intermediate section with said other sections, and a pair of legs securing the extremities of said other sections against rotation so that downward flexing of said upper portion will torsion said other sections.

References Cited in the file of this patent

UNITED STATES PATENTS

815,436	Knorzer et al.	Mar. 20, 1906
1,369,441	Josephson	Feb. 22, 1921
2,029,076	Leeman	Jan. 28, 1936
2,145,408	Taylor	Jan. 31, 1939
2,260,190	Neely	Oct. 21, 1941
2,526,183	Williams et al.	Oct. 17, 1950
2,551,800	Hopkes	May 8, 1951
2,629,430	Flint	Feb. 24, 1953
2,643,705	Neely	June 30, 1953
2,669,292	Asaro et al.	Feb. 16, 1954
2,684,844	Flint et al.	July 27, 1954