April 17, 1945. W. H. NEELY ET AL 2,373,775

WIRE SPRING STRUCTURES FOR SEAT AND BACK CONSTRUCTIONS

Filed April 3, 1942

FIG. 1

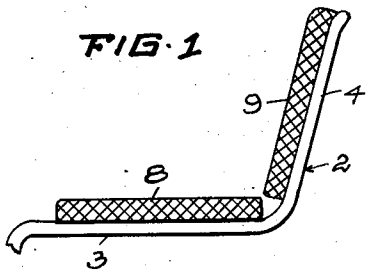


FIG. 2

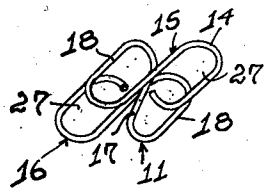


FIG. 3

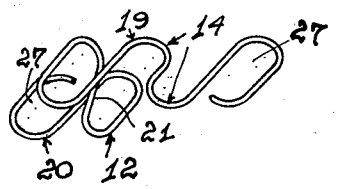


FIG. 4

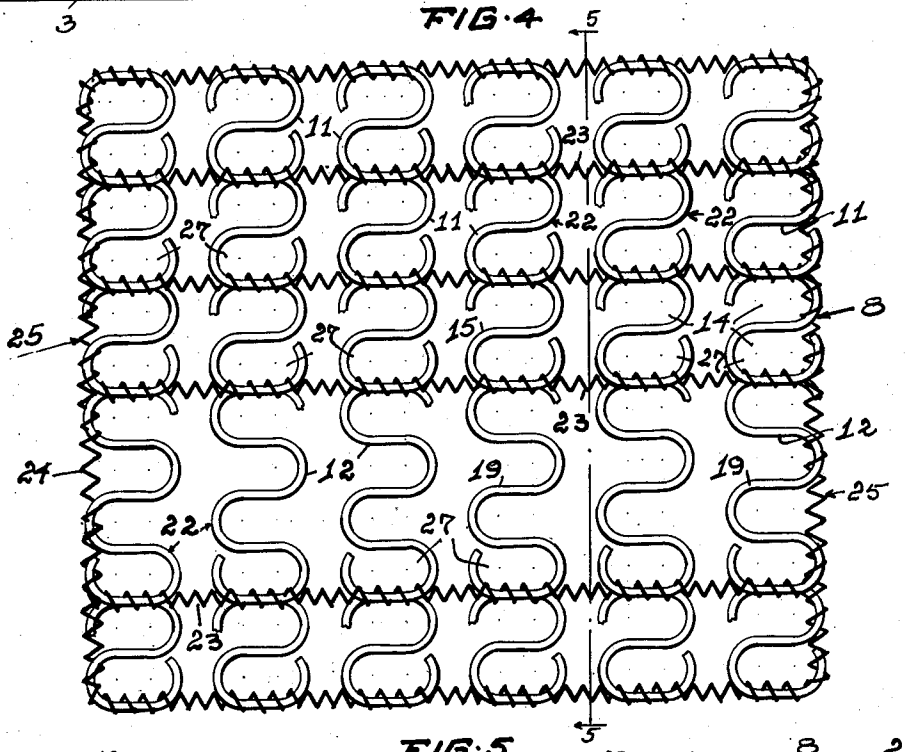


FIG. 5

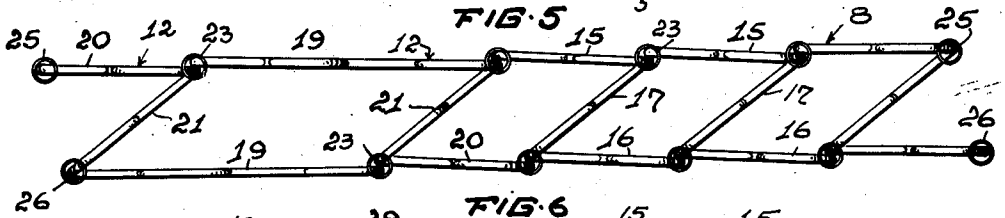
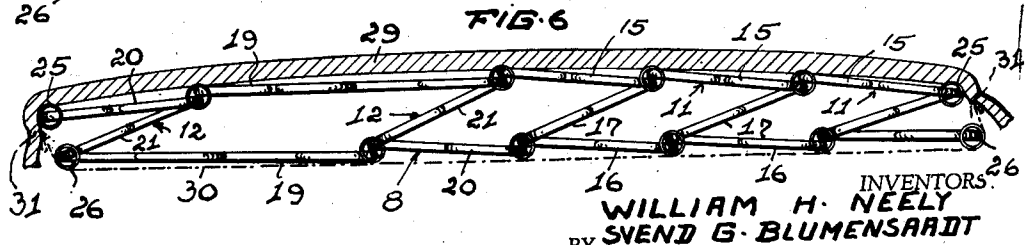


FIG. 6



INVENTORS.
WILLIAM H. NEELY
BY SVEND G. BLUMENSAADT
Gustav A. Wolff.

Patented Apr. 17, 1945 2,373,775

UNITED STATES PATENT OFFICE

2,373,775

WIRE SPRING STRUCTURE FOR SEAT AND BACK CONSTRUCTIONS

William H. Neely, Cleveland, and Svend G. Blumensaadt, East Cleveland, Ohio, assignors, by mesne assignments, to The Universal Wire Spring Company, Cleveland, Ohio, a corporation of Ohio

Application April 3, 1942, Serial No. 437,550

8 Claims. (Cl. 155—179)

This invention relates in general to wire spring constructions for cushioned seat and back structures in vehicles and the like, and more particularly to spring constructions embodying individual spring elements interconnected with each other to form readily yielding spring units.

The general object of the present invention is the provision of a simplified spring unit of the type referred to above which embodies a plurality of short, zigzag-shaped corrugated wire springs coupled with each other to form a spring structure with substantially parallel, yielding top and bottom surfaces yieldingly spaced from each other by inclined yielding portions of the springs.

Another object of the invention is the provision of a spring unit of the type referred to above which embodies a plurality of short, zigzag-shaped corrugated wire springs with substantially parallel top and bottom portions pivotally connected to each other to form a spring structure with substantially parallel, yielding top and bottom surfaces yieldingly spaced from each other by inclined, yielding web portions of the springs.

A further object of the invention is the provision of a spring unit which embodies a plurality of short, Z-shaped corrugated wire springs coupled with each other to form a spring construction with substantially parallelly arranged, yieldingly spaced top and bottom surfaces, in which construction the top and bottom portions of some of the springs differ in length and in which such springs are placed in inverted positions with respect to each other to control the load resistance of the top and bottom surfaces by proper positioning of the inclined yielding supporting portions of the springs which space said top and bottom surfaces from each other.

Still another object of the invention is the provision of a spring unit in which a plurality of individual, short, Z-shaped, corrugated wire springs are connected with each other in such a fashion that the free ends of the top and bottom portions of the springs rest upon and are coupled with the ends of the inclined portions of adjoining springs for proper load resistance of the top portions of the springs of the unit without excessive stress on the means connecting the springs with each other.

A still further object of the invention is the provision of a spring unit which embodies a plurality of individual, short, zigzag-shaped, corrugated wire springs pivotally coupled with each other by means of wire spirals, the wire spirals having a pitch proportionated to the size and shape of the corrugations of the springs to effect interlocking engagement of the wire spirals with such corrugations and prevent lateral shifting of the springs coupled with each other.

In addition, the invention has certain other marked superiorities which radically distinguish it from presently known structures. These improvements or superiorities embodying certain novel features of construction are clearly set forth in the following specification and the appended claims; and several preferred forms of embodiments of the invention are hereinafter shown with reference to the accompanying drawing forming part of the specification.

In the drawing:

Fig. 1 is a sectional view through a front seat structure of a military car embodying a spring seat structure and a spring back structure constructed in accordance with the invention.

Fig. 2 is a perspective view of one of the wire springs used in the assembly of the spring seat structure shown in Fig. 1; and

Fig. 3 is a perspective view of the other one of the wire springs used in the assembly of the spring seat structure shown in Fig. 1.

Fig. 4 is a plan-view of the assembled spring seat structure.

Fig. 5 is a sectional view on line 5—5 of Fig. 4; and

Fig. 6 is a sectional view similar to Fig. 5, with the spring seat structure pretensioned and covered with a layer of felt.

Referring now in detail to the drawing, Fig. 1 shows the frame structure 2 of a front seat of a military car. This frame, which embodies a seat portion 3 and a back rest 4, supports and mounts spring structures 8 and 9 of substantially the same construction which are preferably covered with felt, as will be later described. Seat spring structure 8 embodies Z-shaped corrugated wire springs 11 and 12 of steel wire bent to sinuous shape so that their loops 14 extend in substantially parallel relationship with respect to each other. The wire springs 11 include parallel top and bottom portions 15 and 16 of a length of two loops 14, which portions are integrally interconnected with each other by inclined corrugated spacer and supporting portions 17 of a length of two loops 14. Springs 11 are formed to Z-shape by twisting a corrugated wire of a length of six loops 14 in definite areas which are defined by straight wire portions 18 arranged between adjoining loops 14 so that any deformations of the straight top, bottom and supporting portions of springs 11 are avoided. The wire springs 12 are constructed similar to springs 11, with the excep-

tion that top and bottom portions 19 and 20 of springs 12 differ in length, one of said portions having a length of four loops 14 and the other one a length of two of such loops, that is, a length equal to the length of the inclined corrugated spacer and supporting portions 21 of springs 12. This arrangement permits of different distribution of spacer and supporting portions in spring structures by combining springs 11 and 12 in any desirable manner, as will best be understood from inspection of Figs. 4 through 6, showing a spring unit in which the spacer and supporting portions 17 and 21 are differently spaced from each other at the front and rear of the unit.

Springs 11 and 12 are placed in alignment to form a plurality of elongated spring rows 22 which are laterally spaced from each other and extend from the front to the rear of spring structure 8. When so placed, the springs have the free ends of their top portions 15 and 19 respectively rested upon the upper ends of inclined spacer and supporting portions 17 and 21 of adjacent springs, an arrangement which insures proper load resistance of the supporting surface of spring structure 8. Springs 11 and 12 and the spring rows 22 formed therefrom are connected with each other and locked against lateral movement with respect to each other by elongated wire spirals 23 which encircle the overlapping portions of adjoining springs and extend across all spring rows 22. These spiral wires have a pitch proportionated to the shape and dimension of the corrugations of the springs and connect the top and bottom portions of all springs and spring rows to a spring unit 8 which preferably is encircled by wire spirals 24 threaded upon the front and sides of the springs adjacent to the edges of spring structure 8 to provide same with top and bottom edge wires 25 and 26. Interlocking of the springs with wire spirals 23 and 24 is facilitated by partly closed end loops 27. The springs 11 and 12 in spring rows 22 of the spring structure 8 control the load resistance of such structure, the front part of which has lower load resistance than its rear part, as spring rows 22 include at their front portions two invertedly arranged springs 12 and as the rear portions of such rows are assembled from springs 11, the short, equally sized top and bottom portions 15 and 16 of which bring about a larger number of supporting and spacing portions in the rear portions of the rows 22. Spring structure 8 is preferably covered with a layer of felt 29 held in position by a burlap or similar lining 30 which is sewed to felt 29 at 31.

The partly closed end loops 27 of the top and bottom portions of the springs used in the assembly of spring structures described herein, are coupled with adjoining springs by wire spirals with a pitch proportionate to size and shape of the corrugations of the springs, so that the spirals contact the outside of the curved portions of loops 14 and prevent relative movements between the springs and spirals which are dimensioned to permit of their free threading upon superposed wires of adjoining springs and the curved portions of the loops of such springs.

Having thus described my invention what I claim is:

1. A wire spring construction embodying a plurality of sinuously corrugated wire springs having substantially parallel top and bottom portions and inclined connecting portions lying in substantially the same plane throughout their extent, connecting said top and bottom portions, and means coupling said springs in axial alignment with each other to elongated spring structures having parallelly arranged top and bottom surfaces yieldingly spaced from each other by the inclined connecting portions of said wire springs.

2. A wire spring construction embodying a plurality of sinuously corrugated, Z-shaped wire springs with substantially parallel top and bottom portions of equal length connected by inclined portions, a plurality of other corrugated Z-shaped wire springs with substantially parallel top and bottom portions of different length connected by inclined portions equal in length to the inclined portions of said first springs, and means coupling said springs in axial alignment with each other to form elongated spring structures, said spring structures having some of the other corrugated Z-shaped wire springs arranged in reversed position to provide continuous, parallel top and bottom surfaces yieldingly spaced from each other by parallel inclined differently spaced connecting and supporting portions.

3. A wire spring construction embodying a plurality of sinuously corrugated, Z-shaped wire springs having substantially parallel top and bottom portions and inclined portions integrally extended from said top and bottom portions connecting same in spaced relation with respect to each other, and means coupling said springs in axial alignment with each other to form elongated spring structures, said coupling means connecting the end loops of said top and bottom portions with the ends of the inclined portions of adjoining springs.

4. A wire spring construction embodying a plurality of sinuously corrugated, Z-shaped wire springs having substantially parallel top and bottom portions and inclined portions integrally extended from said top and bottom portions connecting same in spaced relation with respect to each other, and means pivotally coupling said springs in axial alignment with each other so that their inclined portions are arranged substantially parallel to each other, said coupling means connecting the end loops of said top and bottom portions with the ends of the inclined portions of adjoining springs.

5. A wire spring construction embodying a plurality of corrugated Z-shaped wire springs having substantially parallel top and bottom portions and inclined portions connecting said top and bottom portions, and wire spirals coupling the end loops of said top and bottom portions with the end loops of the inclined portions of adjoining springs, said wire spirals being threaded upon the outer wires of said end loops, and the outer wires of said end loops being superposed upon each other to rest the outer wires of the end loops of said top and bottom portions upon the outer wires of the end loops of said connecting portions and facilitate threading of the spiral wire upon such outer wires.

6. A wire spring for wire spring structures with parallel top and bottom surfaces comprising a sinuously corrugated wire bent to Z-shape, said wire spring including substantially parallel top and bottom portions and a supporting and spacing member connecting said top and bottom portions and inclined with respect thereto, said top and bottom portions at their free ends being formed with partly closed end loops.

7. A wire spring for wire spring structures comprising a sinuously corrugated wire bent to

form a spring with substantially parallel top and bottom portions, and an inclined, substantially straight supporting and spacing portion connecting said top and bottom portions with each other and inclined with respect thereto.

8. A wire spring for wire spring structures comprising a sinuously corrugated wire bent to form a spring with substantially parallel top and bottom portions, and a single, substantially straight supporting and spacing portion connecting diagonally opposed ends of said top and bottom portions.

WILLIAM H. NEELY.
SVEND G. BLUMENSAADT.