May 12, 1959 H. C. FLINT 2,886,311

SPRING CONSTRUCTION

Filed April 28, 1955 2 Sheets-Sheet 1

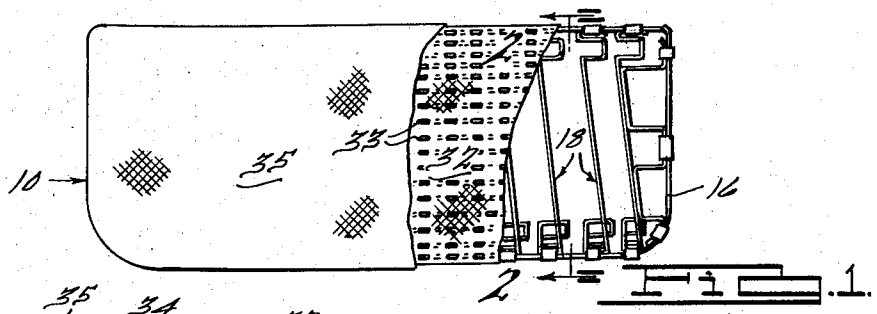


FIG. 1.

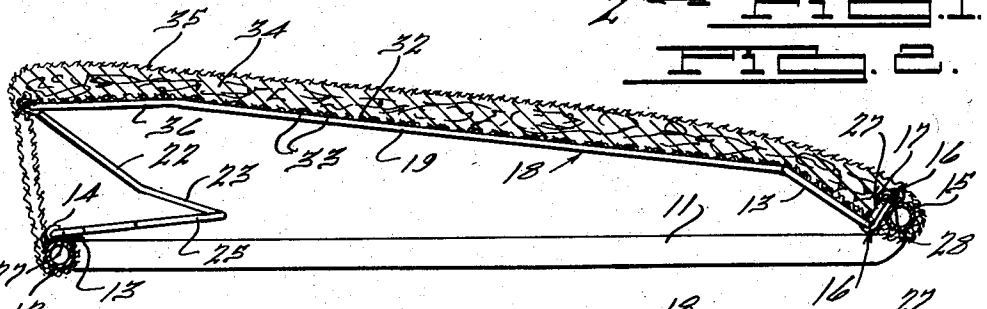


FIG. 2.

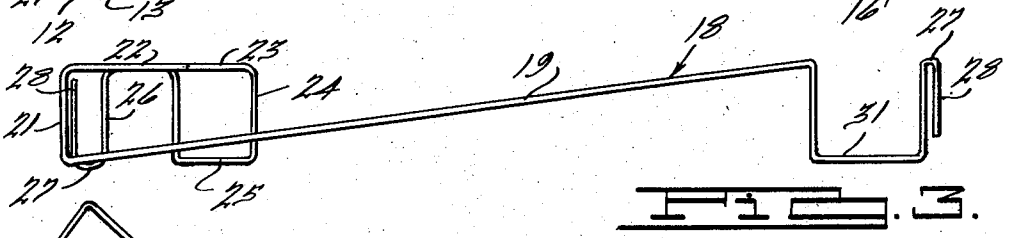


FIG. 3.

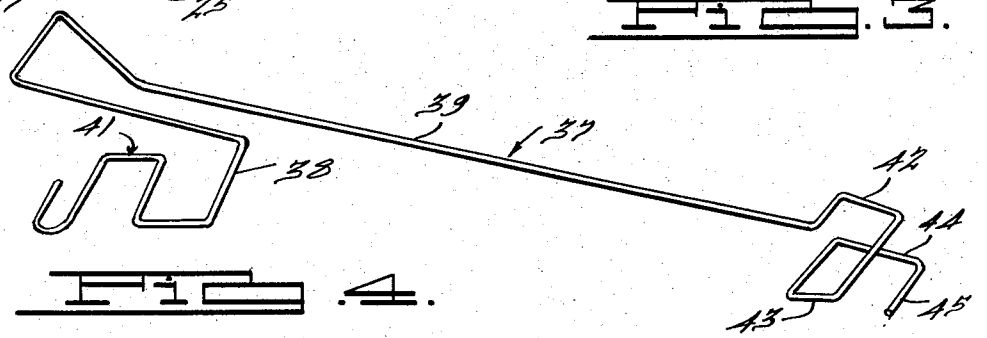


FIG. 4.

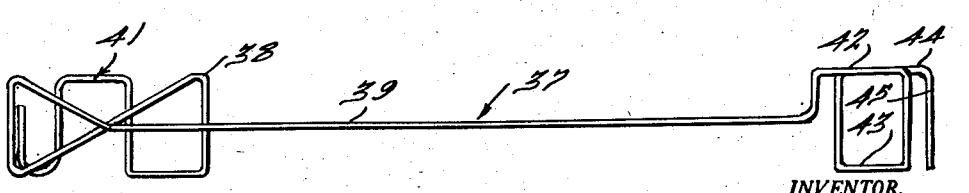


FIG. 5.

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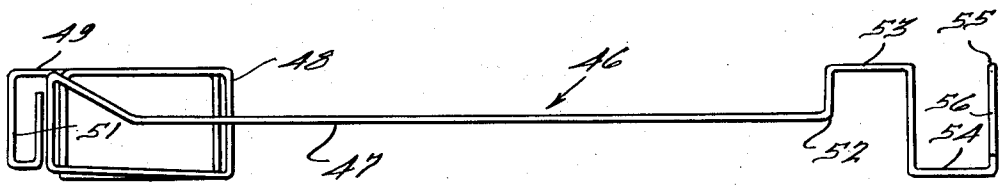


Fig. 6.

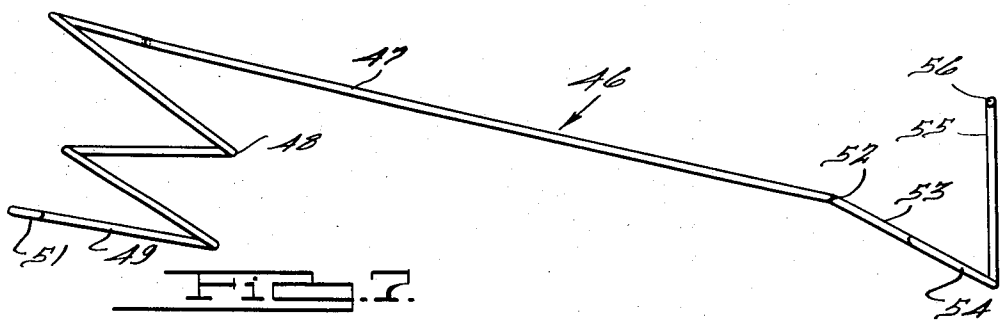


Fig. 7.

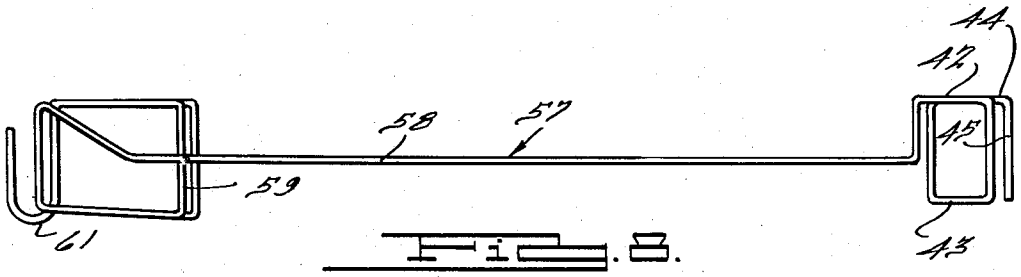


Fig. 8.

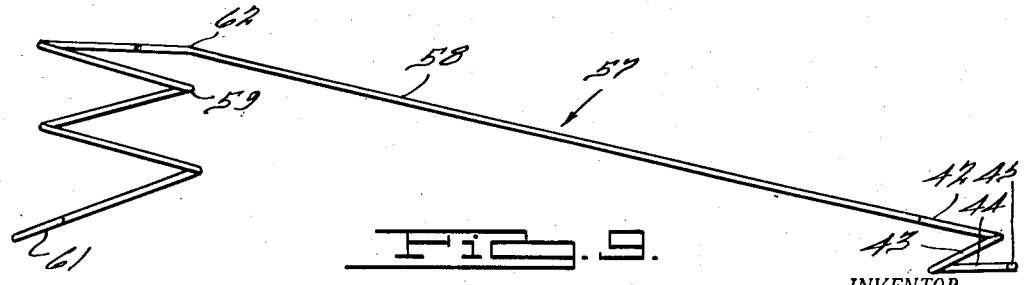


Fig. 9.

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United States Patent Office 2,886,311
Patented May 12, 1959

2,886,311

SPRING CONSTRUCTION

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Application April 28, 1955, Serial No. 504,627

8 Claims. (Cl. 267—1)

This invention relates to spring elements, and particularly to a spring element having a straight central wire portion and attaching end portions.

Spring strips of various types have been employed heretofore in the art for seating. More recently sinuous strips were employed made of wire bent back and forth providing uniform loops joined by straight portions. While such types of spring strips provided satisfactory support in seat and back cushions, the present type of spring element substantially reduces the length of wire required in its construction. A wire is formed at the front end to provide an attaching end having a desirable degree of resiliency and depth as required for leg support adjacent to the knees. From the front supporting end a straight section of wire extends rearwardly, forming a main load supporting portion. The rear end is formed in a manner to provide a desired degree of resiliency and an attaching end constructed in such manner as to relieve the straight section and prevent any set occurring therein. The wires forming the load supporting portion are spaced a substantial distance apart when the elements are mounted on a frame, leaving wide openings therebetween. The feel of such wires when a cushion is occupied is eliminated by the use of an insulator made up of parallel wires which are placed thereover to extend transversely of the straight sections of the spring elements. On top of the insulator, padding which may be cotton, felt, sponge rubber or the like, is added before the trim material is applied to complete the cushion thus constructed.

Accordingly, the main objects of the invention are: to provide a spring element having a central load bearing portion of straight wire section terminating at each end with a resilient portion having attaching means; to form a spring element of wire having a straight section the front end of which extends downwardly and is formed into a resilient supporting portion of substantial height having an attaching end, with the rear end formed as a loop terminating in an attaching end; to provide a spring element having a straight central wire portion which terminates at the front and rear ends in a downwardly and inwardly extending formed portion providing resiliency to the spring element, and, in general, to provide a spring element made from a minimum length of wire which is simple in construction and economical of manufacture.

Other objects and features of novelty of the invention will be specifically pointed out or will become apparent when referring, for a better understanding of the invention, to the following description taken in conjunction with the accompanying drawings, wherein:

Figure 1 is a plan view of a seat cushion having spring strips therein which embody features of the present invention;

Fig. 2 is an enlarged sectional view of the structure illustrated in Fig. 1, taken on the line 2—2 thereof;

Fig. 3 is a plan view of the spring illustrated in the cushion of Figs. 1 and 2;

Fig. 4 is a perspective view of the spring, similar to that illustrated in Fig. 3, showing a modified form thereof;

Fig. 5 is a plan view of the structure illustrated in Fig. 4;

Fig. 6 is a view of structure, similar to that illustrated in Fig. 3, showing a further form which the invention may assume;

Fig. 7 is a side view of the spring strip illustrated in Fig. 6;

Fig. 8 is a view of a spring strip having a front end as illustrated in the spring of Fig. 6 and a rear end as illustrated in the spring of Fig. 5, and

Fig. 9 is a side view in elevation of the spring strip illustrated in Fig. 8.

Referring to the drawings, a cushion **10** is illustrated in Figs. 1 and 2 embodying a rectangular frame **11**, on the front transverse member **12** of which a securing strip **13** is mounted having a plurality of tubular portions **14** thereon. The rear transverse frame member **15** has a strip **16** thereon containing elongated tunnels **17** for rigidly supporting the rear end of a spring element. The spring element **18**, as illustrated in Figs. 1 to 4, is made of a wire having a diagonal straight central section **19** which is the load bearing portion of the element. At the front end, the wire of the section **19** terminates in a transverse bar **21** from which the wire slopes downwardly at **22** at a predetermined angle and is extended at a greater angle at **23**. The wire is further extended in a reverse direction to form a bar **24** and then reversely extended to form loops **25** and **26** which terminate in an arcuate loop **27** and a securing end **28**. The end **28** is anchored in a tubular portion **14**, with the loop **27** resting upon a flange of the strip **13** to prevent the loop portions **25** and **26** from pivoting downwardly. The fixing of the loops **25** and **26** against downward deflection provides strength to the forward portion of the section **19** and limits its deflection in accordance with the weight applied thereto. The deflection is further controlled after the portion **23** rests upon the loop **25**, both of which become inactivated so that thereafter the load is applied directly through the portion **22** and the loop **26**.

At the rear end, the section **19** is offset downwardly and laterally to form a loop **31** which permits the supported portion of the spring to be extended lengthwise to relieve the section **19** from direct strain which would cause a set therein. The end of the loop **31** terminates in an arcuate loop **27** and straight portion **28** which is employed for securing the loop end **31** of the spring to the transverse frame member **15**. The loop **27** slides within the elongated tubular portion **17** and fixes the end of the loop against pivoting either upwardly or downwardly. A plurality of the spring strips are secured across the transverse frame members **12** and **15**, after which an insulator **32** is applied thereover, the insulator embodying a plurality of wires **33** which span the sections **19** and thereby provide a supporting surface above the spaced wire sections **19** of the strips. A pad **34** is applied to the insulator **33** and trim material **35** is applied over the pad in the conventional manner. The section **19** may have a kink **36** therein adjacent to the forward edge to provide a desired arc to the resulting seat construction.

In Figs. 4 and 5 a further form of spring element **37** is illustrated having the front end portion **38** the same as that of the spring element **18**, with the load bearing wire section **39** disposed centrally of the front end portion **38** through the provision of a formed portion **41** which embodies the portions **25**, **26**, **27** and **28** of the structure illustrated in Fig. 3. At the rear end the section **39** is formed into a loop **42** and extended downwardly at **43** from which a loop **44** is formed having a laterally extending attaching end portion **45**. In this arrangement, a V-shaped end portion in profile is provided on the spring strip which not only permits the longitudinal

extension of the wire portion **39** to avoid set, but also permits the end of the loop **42** to deflect downwardly relative to the supporting end **45**.

A further form of spring element **46** is illustrated in Figs. 6 and 7, that wherein the straight central section **47** has the front end **48** rectangularly coiled and angularly disposed to be of **W** shape in profile, with the end arm **49** formed into a U-shaped attaching end **51**. The opposite end of the section **47** is sloped downwardly from the point **52** and further shaped to provide oppositely disposed loops **53** and **54**. The loop **54** has the end thereof extended upwardly at **55** and extended outwardly at **56** to form an attaching end. The attaching end **56** and the extended portion **55** function as a hanger for the end of loops **53** and **54** at the rear end of the element, permitting the portion **55** to pivot forwardly when the main load bearing section **47** is occupied.

A further form of spring element **57** is illustrated in Figs. 8 and 9, that wherein the straight central section **58** terminates in a coiled front portion **59** which is substantially of **W** shape in profile having a U-shaped attaching end portion **61**. The section **58** is bent at **62** to slope downwardly and the rear end is provided with loops **42** and **44** the same as the rear end of the spring element **37**, providing a **Z**-shaped end which permits downward and forward movement to the rear end of the wire section **58** of the spring element.

All of the spring elements herein illustrated have a central load bearing section which is a straight wire portion disposed between two end formed portions which provide support and resiliency thereto. At the forward end of the section, the wire is extended downwardly and inwardly and formed to provide depth and resiliency to the resulting supporting portion. The rear end of the section has the wire formed into loops to permit the longitudinal extension of the load bearing section, which loops may be formed into **Z** shape in profile to permit the rear end of the section to deflect downwardly. The resiliency at the ends of the straight central load bearing section prevents overstressing and the setting thereof under load so that the section will at all times maintain a desired contour to the cushion.

What is claimed is:

1. A spring element made of wire having a straight wire section forming the load supporting portion of the element, a formed portion beneath the forward end of the section having substantial depth which provides resiliency to the forward end of the section, and a laterally extending loop at the rear of the section providing resiliency longitudinally of the section, said loop having a laterally extending torsion bar portion.

2. A spring element made of wire having a straight wire section forming the load supporting portion of the element, a formed portion beneath the forward end of the section having substantial depth which provides resiliency to the forward end of the section, a laterally extending loop at the rear of the section providing resiliency longitudinally of the section, said loop having a laterally extending torsion bar portion, and attaching end portions on the forward formed portion and on the rear torsion bar.

3. A spring strip element made of wire having a central straight wire section with resilient end portions thereon, the forward end portions being coiled into a rectangular spring extending downwardly in a **W** shape in profile the center of which is aligned with said section and the end of which terminates in an attaching portion.

4. A spring strip element made of wire having a central straight wire section with resilient end portions thereon, the forward end portion being coiled into a rectangular spring extending downwardly in a **W** shape in profile the center of which is aligned with said section and the end of which terminates in an attaching portion, the rear section of said spring being formed of oppositely presenting U-shaped loops which slope downwardly from said section and terminate in an attaching end.

5. A spring strip made of wire having a central straight section with resilient end portions thereon, the forward end portion being coiled into a rectangular spring of **W** shape in profile the center of which is aligned with said section and the end of which terminates in an attaching portion, the rear section of said spring being formed of oppositely presenting U-shaped loops which slope downwardly from said section and terminate in an attaching end, said attaching end extending upwardly at least to the height of said downwardly sloping U-shaped loops.

6. The subject matter as claimed in claim 1 wherein said straight wire section has a bend therein interjacent its ends to provide an upwardly extending arch within the length thereof.

7. The subject matter as claimed in claim 6 wherein said straight wire section extends on the center line of said front and rear formed supporting portions.

8. The subject matter as claimed in claim 1 wherein said formed portion beneath the forward end of said straight wire section is wound into loops extending downwardly in a **W** shape in profile, and including a formed portion beneath the rear end of said straight wire section and connected to said laterally extending torsion bar portion to provide resiliency to the rear end of the straight wire section said rear formed portion being wound into loops extending downwardly in a **Z** shape in profile.

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