Aug. 15, 1939 A. MOUW 2,169,705

SPRING DEVICE

Filed Nov. 6, 1936 2 Sheets-Sheet 1

Fig. 1.

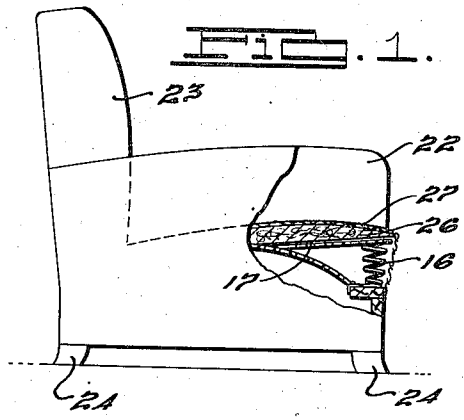
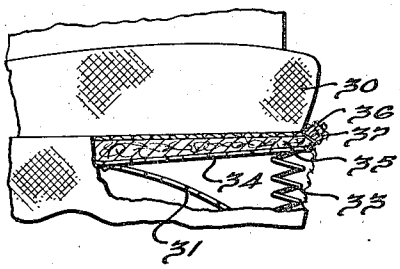


Fig. 2.



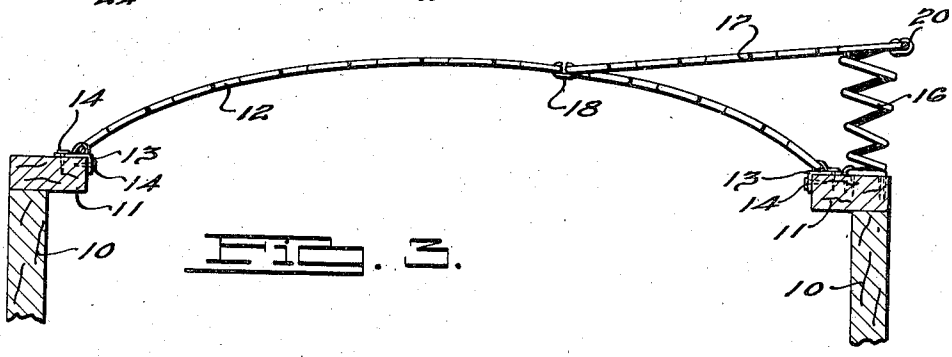
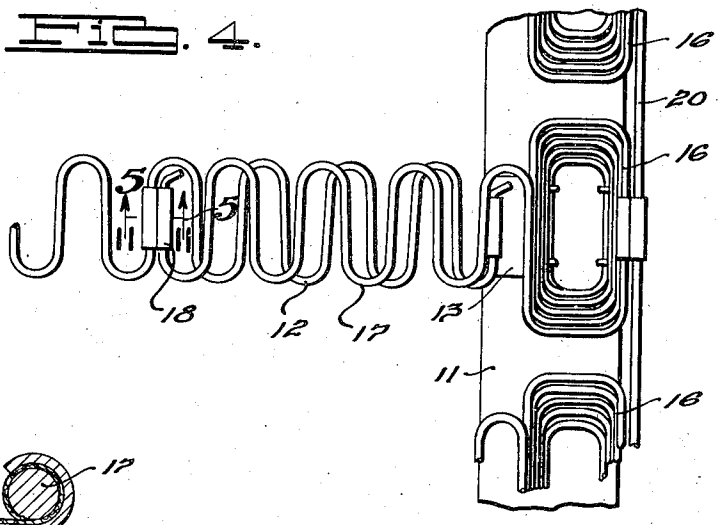


Fig. 3.

Fig. 4.



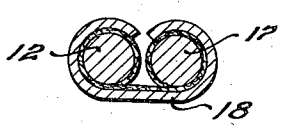


Fig. 5.

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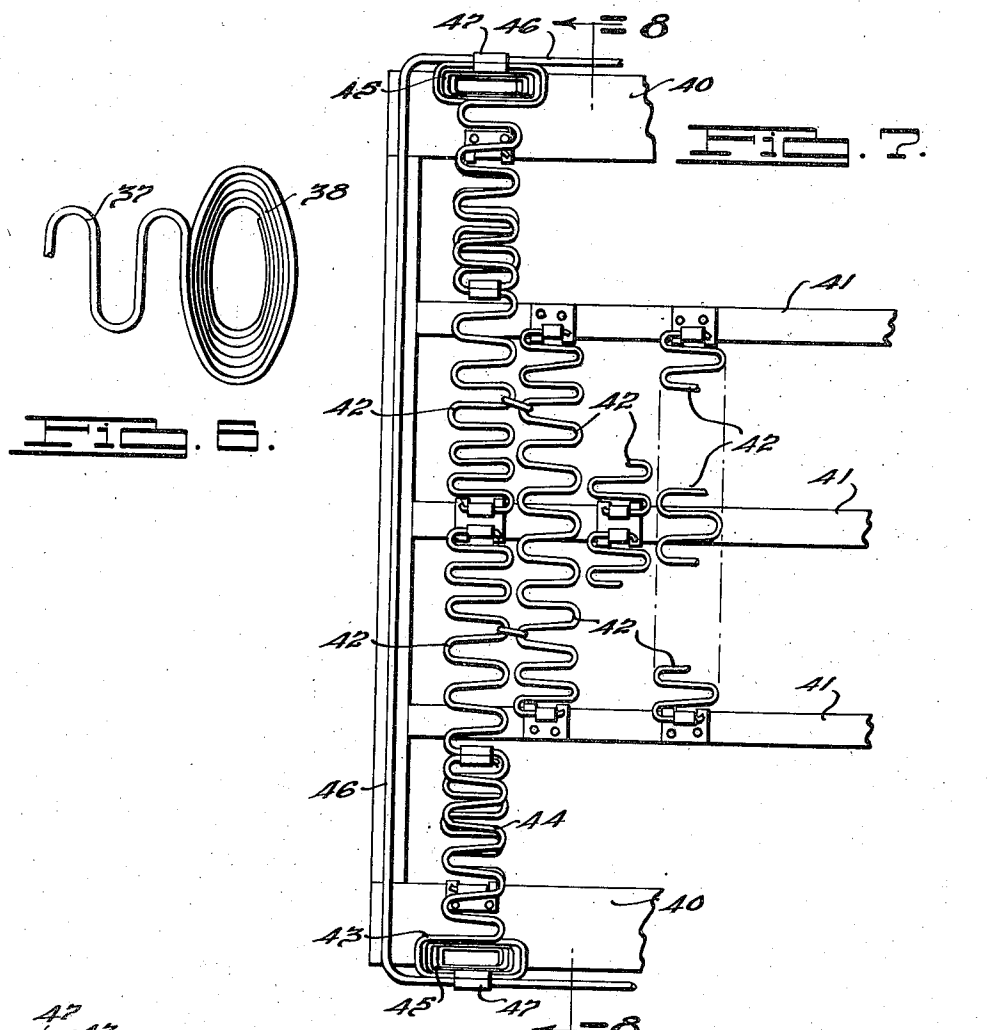

Fig. 7.

Fig. 6.

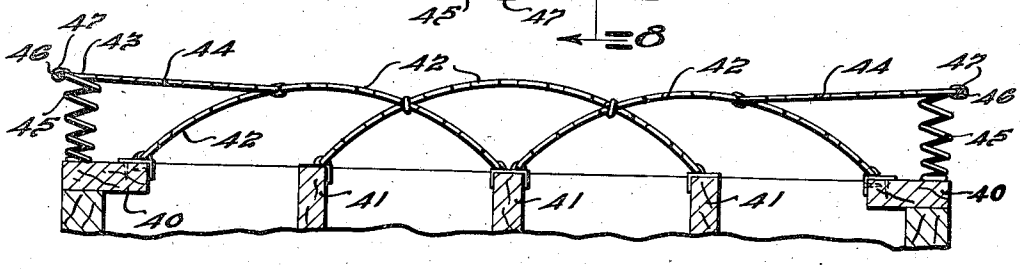

Fig. 8.

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UNITED STATES PATENT OFFICE

2,169,705

SPRING DEVICE

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Application November 6, 1936, Serial No. 109,424

5 Claims. (Cl. 155—179)

This invention relates to spring devices and particularly to an improved form of spring construction adapted primarily for forming seat bottoms and similar resilient seat surfaces.

It is a primary object of the present invention to provide a construction utilizing sinuous arcuately tensioned spring elements and at the same time to provide in combination with such sinuous spring elements, auxiliary spring elements which cooperate therewith to form a resilient edge construction for the cushion as a whole.

In the past, considerable difficulty has been experienced in the formation of cushion construction in providing an edge which is sufficiently rigid to maintain the cushion construction in substantially the predetermined desired form yet at the same time obtain the necessary characteristics comparable to the body portion of the spring as a whole, and to provide a soft edge construction.

The present invention contemplates the utilization of sinuous spring elements which are tensioned to lie on arcs of substantially greater radius than which they would normally assume and in view of this, it is necessary that these arcuately disposed spring elements be firmly anchored at their opposite ends to provide the proper tension thereto. The present invention contemplates the provision of a spring unit adapted to be associated with these elements. The spring unit comprises a section of spring wire bent to provide a plurality of helical convolutions at one of its ends and the remainder of the wire being bent into a series of similar adjacent lateral convolutions. One end of this helical spring member thus formed is mounted adjacent to the edge of the cushion construction to be formed and the opposite end of the wire is secured to one of the arcuately tensioned spring elements thus providing a resilient edge having the desired characteristics.

Many other and further objects, advantages, and features of this spring construction illustrated herein will become apparent from the following description when considered in connection with the accompanying drawings forming a part thereof, wherein:

Figure 1 is a side elevational view of a chair with portions broken away illustrating in detail one form of the improved spring construction;

Fig. 2 is an enlarged fragmentary elevational view similar to Fig. 1, illustrating a modified form of the invention;

Fig. 3 is an enlarged transverse sectional view through a cushion construction illustrating the improved spring device associated with an arcuately tensioned sinuous spring;

Fig. 4 is a fragmentary plan view of the structure illustrated in Fig. 3;

Fig. 5 is an enlarged fragmentary sectional view taken substantially on the line 5—5 of Fig. 4, illustrating the manner in which the spring device is secured to one of the arcuate sinuous spring elements;

Fig. 6 is a fragmentary plan view of a modified form of the spring device;

Fig. 7 is a fragmentary plan view of a mattress or bed bottom construction embodying the features of the present invention, and

Fig. 8 is a sectional view taken substantially on the line 8—8 of Fig. 7, illustrating in detail the construction of this modified form of the invention.

While it will be readily appreciated from the following description that the improvements of the present invention are susceptible of many and various different applications, the specific embodiment of the invention illustrated in Fig. 1 shows the spring device utilized for the purpose of forming a resilient marginal edge of a seat cushion in an upholstered chair. The specific manner in which the spring construction is disposed with respect to the frame of the chair is clearly illustrated in Figs. 1, 3, 4, and 5.

In constructions of this general character, the chair includes a generally rectangular frame 10 which may be formed of wood or any other suitable material. The base of the cushion is formed from a rectangular frame 11 of wood or suitable similar material which may be rigidly secured to and permanently mounted upon the frame 10 of the chair proper. The main body portion of the cushion of the chair is constructed of a plurality of arcuate sinuous spring elements 12 which are anchored at their ends to opposite sides of the frame 11. While any suitable means may be utilized for the purpose of anchoring these spring elements therein, it has been found preferable to utilize sheet metal clips 13 which may be permanently secured to the frame 11 by screws 14. The clips are provided with a portion adapted to engage the last lateral convolution of the arcuate spring element 12. The spring element 12 may be formed and tensioned in accordance with the method suggested in the patent to Karl Kayden, issued May 21, 1935, No. 2,002,399, in which is disclosed an arcuate spring element made of spring wire bent to form a plurality of adjacent lateral convolutions. During or after the formation of the spring wire, it is set on an

arc of relative small radius. Suitable lengths of this sinuous spring wire are cut off and tensioned to lie along arcs of substantially greater radius than that which the sinuous element would normally assume thus materially adding to the resiliency of the spring as a whole. The spring device of the present invention includes sections of spring wire 17 which have one end of each bent to provide a plurality of helical convolutions thus forming generally helical springs 16. The upper ends of the sections of wire are bent into sinuous form to provide a plurality of similar adjacent lateral convolutions all of which lie in substantially the same plane thus providing a resilient extension 17 to the spring 16 which may be connected to one of the lateral convolutions of the spring 12 at a point near the midsection thereof. While this spring extension 17 may be secured to the arcuate sinuous spring element 12 in any suitable manner, it has been found preferable to utilize sheet metal clips such as 18 to lock these members in engagement. A strip of felt, paper, or other material is provided on the inner surface of the clip 18 to prevent squeaks from occurring when the elements are moved relative to each other.

The base of the helical spring 16 is preferably anchored in any suitable manner to the forward marginal edge of the spring 11 and it will consequently be clearly apparent that these helical springs serve to provide a soft resilient forward marginal edge for the cushion as a whole. It has been found preferable to associate one of the combined extension and helical spring units with each of the arcuate sinuous elements 12 to provide a substantially continuous uniformly resilient front edge to the cushion construction as a whole. In order that these springs may be operated substantially in unison, the uppermost convolution of the helical spring element 16 may each be clipped to a section of border wire 20 common to all of the springs to insure a substantially simultaneous operation thereof and a flexible interconnection therebetween.

It has been found particularly desirable to form the helical portion of the spring device in such manner that the convolutions thereof are of progressively increasing magnitude from the base of the spring upwardly, consequently the resistance of the spring to compression gradually increases the more it is deflected thus providing the desired resilient characteristics of the spring construction as a whole. The convolutions are rectangular in shape to provide a straight front edge which is substantially continuous throughout the length of the seat.

In the specific form of the invention illustrated in Figs. 1, and 3 to 5 inclusive, it will be appreciated that the assembly of springs is utilized for the purpose of providing a cushion which is substantially integral with and forms a part of the chair illustrated. This chair may include a pair of arms 22 and a seat back cushion 23 which may be of conventional construction secured to the frame 10 of the chair. In addition, the chair, as is conventional in the art, may be provided with suitable legs 24. It will be seen that after the springs have been assembled as described above, the resilient surface thus provided may be covered with a suitable layer of padding material 26 and the cushion thus formed covered with a section of fabric finish material 27, the forward marginal edge of which may be secured to the frame 10 after the fabric material is tightly stretched over the padding 27 to provide the desired attractive appearance for the seat cushion as a whole.

In the modified form of the invention as illustrated in Fig. 2, a seat construction is shown having a removable cushion 30. The seat may be of any suitable conventional construction and the improvements of the present invention are utilized for the purpose of providing a resilient box spring construction serving to resiliently support the cushion 30. In this form of the invention, a plurality of arcuate sinuous spring elements 31 may be tensioned between frame members in substantially the same manner as has been described in connection with the preferred embodiment of the invention. These spring devices may be mounted in substantially the same manner as has been outlined above and the cushion construction as a whole covered with a layer of padding 35 over which is stretched a layer of fabric finish material 36. This fabric finish material may be secured around a beaded or corded edge 37 to provide an upstanding ledge to retain the cushion 30 in position.

In Fig. 6, is illustrated an enlarged fragmentary view of a spring unit which may be substituted for the spring units described above and which includes sinuous body portion 37 which is integrally connected to a helical coil spring 38, the coils of which are generally elliptical in form and increase in size toward the top of the spring. This spring may be utilized in the manner described above and with substantially the same results. The elliptical form lends itself more readily to quantity production than the rectangular shape of spring portion 16 above mentioned.

In the form of the invention illustrated in Figs. 7 and 8, the improved spring units are utilized in combination with arcuately tensioned sinuous spring elements to form a bed bottom or box spring construction having the desired resilient soft edges and a substantially plain surface on which a conventional mattress may be disposed.

In this form of the invention, the frame of the box spring includes a rectangular border member 40 which may be formed of wood or similar suitable material and a plurality of longitudinally extending bridging members 41 which extend longitudinally of the frame at spaced intervals. The main surface of the box spring construction is made up of a plurality of sinuous arcuate spring members 42 which are tensioned to lie along arcs of substantially greater radius than that which they would normally assume and these spring members are anchored at their terminal ends to either the bridging members 41 or the marginal frame of the box spring. The arcuate sinuous spring elements 42 are preferably so arranged with respect to each other that they break join, that is, each arcuate sinuous spring element bridges one of the longitudinally extending spring members and is secured to alternate bridging or frame members. The next adjacent arcuate spring element is secured to an adjacent bridging member 41 and extends over the central member 41 thus providing a substantially level continuous relatively flat surface for the construction as a whole. The arcuate sinuous spring element 42 which has a terminal end secured to the marginal frame of the box spring, has secured thereto spring units generally indicated as 43 which include a relatively flat sinuous portion 44 which is attached at its terminal end to an arcuate spring element with which it is associated. The outer end of this sinuous portion is con-

structed to provide a helical vertically disposed coil spring 45 which has its base secured to the marginal frame of the box spring. It will be seen that this spring unit functions in substantially the manner described above to provide a resilient edge for the construction as a whole.

Due to the fact that the arcuate sinuous spring elements 42 are disposed in such a manner that they break join, only alternate members thereof will be secured to one of the marginal edges of the frame and consequently these elements which are secured to one of the marginal edges of the frame will be spaced substantially from one another leaving ample room for the helical spring portion of the spring units 43. This row of helical coil springs along the marginal edge of the mattress is substantially continuous and the helical springs may be secured together by a border wire 46 which may be secured to the uppermost convolution by means of suitable spring clips 47. If desired, this border frame element may be continued around the ends of the box spring construction to form a neat attractive terminal edge at this point.

The box spring as shown may be used without the necessity of additional covering and a mattress may be placed directly upon the surface of the box spring or the spring may be covered in any suitable manner such as is well known in the art.

It will be readily appreciated that the specific embodiments of the invention illustrated in the drawings and described above are merely illustrative of certain specific uses to which the springs of the present invention may be put.

Many other and further modifications and uses for the spring devices of the present invention, falling within the scope of subjoined claims, will be apparent to those skilled in the art.

What is claimed is:

1. A cushion construction including a relatively rigid base frame, a plurality of arcuately disposed sinuous spring elements extending from side to side of said frame, and a plurality of resilient elements of zig-zag formation having depending portions, the ends of said portions being mounted on said frame, the other ends of said elements being connected to said sinuous elements at a point intermediate its ends.

2. A spring element adapted for use in cushion constructions comprising a section of spring wire, a portion of which is bent to provide a plurality of similar adjacent lateral convolutions and a portion of which is bent to form a coil spring having a vertical axis and of rectangular shape of greater lateral dimension than the lateral dimension of said convolutions.

3. A spring element constructed from a wire bent into sinuous form to provide a rectangular surface and coiled downwardly therefrom at one end to form a helical spring.

4. A cushion construction comprising a pair of support members disposed in spaced relation, sinuous spring elements extending between said members, and auxiliary spring elements comprising a section of spring wire, a portion of which is sinuously bent and secured to said sinuous spring elements, and a portion helically bent and secured to one of said support members.

5. A cushion construction including a relatively rigid base frame, a plurality of arcuately disposed sinuous spring elements extending from side to side of said frame, and a plurality of resilient elements constructed from wires bent into sinuous form to provide rectangular surfaces and coiled downwardly therefrom at one end to form helical springs, the ends of said helical springs being secured to said frame, the ends of said rectangular surface portions being secured to said spring elements.

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