April 19, 1960 D. I. LEVINE 2,932,832

SPRING ASSEMBLY AND EDGE STIFFENER COMPONENT THEREFOR

Filed June 10, 1958 2 Sheets-Sheet 1

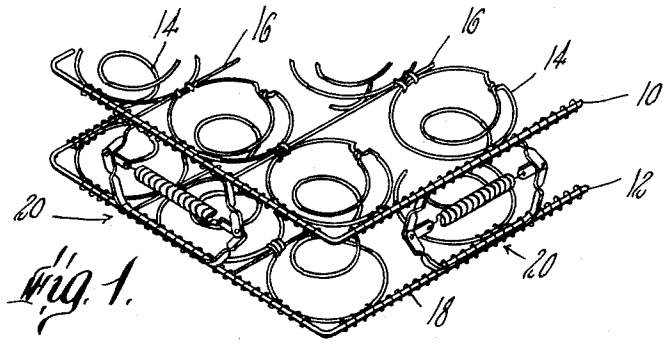

Fig. 1.

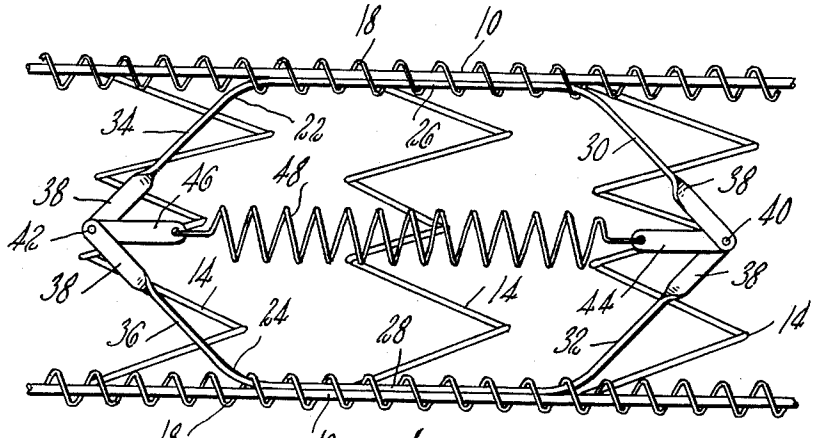

Fig. 2.

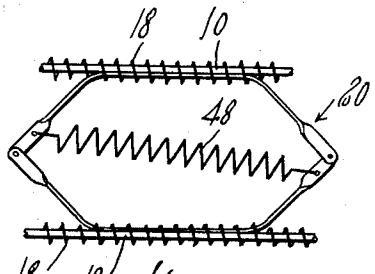

Fig. 3.

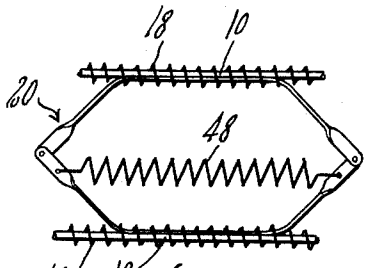

Fig. 4.

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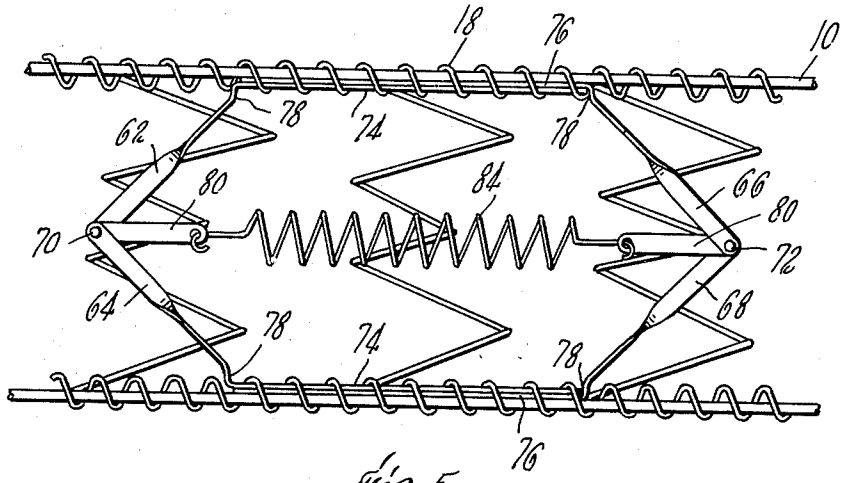

Fig. 5.

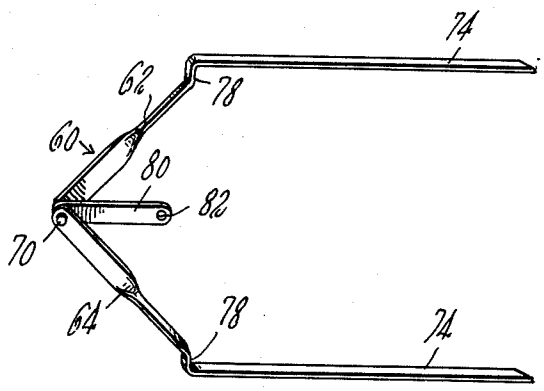

Fig. 6.

United States Patent Office 2,932,832 Patented Apr. 19, 1960

2,932,832

SPRING ASSEMBLY AND EDGE STIFFENER COMPONENT THEREFOR

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Application June 10, 1958, Serial No. 741,066

12 Claims. (Cl. 5—261)

This invention relates to a spring assembly construction and pertains more specifically to such a construction comprising a pair of frame members resiliently maintained in spaced-apart parallel relation by a plurality of coil springs and provided with one or more collapsible edge stiffeners.

In coil spring assemblies, such as those used in mattresses, seat cushions and the like, it is frequently necessary to employ, in addition to the main coil springs, supplemental stiffeners along the edges of the assembly to resist the unusually high concentration of stresses which occurs at the edges of the assembly in use and to enable the finished article to maintain its shape to the desired extent. However, the manufacture of spring assemblies of the type described and the covering or upholstering of such assemblies to form a finished mattress, seat cushion or the like have long been separate operations carried out by different manufacturers in different factories. Consequently shipping of the completed spring assembly from the location at which it is produced to the upholsterer or mattress manufacturer has been necessary. Shipment of the bulky spring assembly, in order to be economically feasible, has necessitated compression of the assemblies to a very small fraction of their normal uncompressed thickness and baling of the assemblies in this compressed condition. The presence of edge stiffeners makes the bailing operation very difficult or impossible to carry out, both because of the increased resistance to compression which the edge stiffeners display over and above that displayed by the coil springs and because of the impossibility in many cases of compressing the edge stiffeners to the same extent as conventional coil springs. While this problem can be solved by leaving the edge stiffeners out of the assembly and shipping them separately to the mattress or cushion manufacturer for insertion into the assembly immediately prior to covering, this solution has in the past not proved entirely satisfactory because it has necessitated the acquisition and use of special tools and/or machinery by the mattress or cushion manufacturer in order to secure the edge stiffener firmly and permanently in its proper location in the assembly. Moreover, the edge stiffeners commonly employed in the past have tended to bend or warp out of the desired vertical plane during compression, leading to bulging or sagging of the edge of the finished article in use.

One object of the present invention is to provide an edge stiffener which can be permanently installed in the spring assembly by the manufacturer, but which can readily be rendered inoperative so as to permit the assembly to be compressed and baled for shipment and which then can be rendered operative by the customer without the necessity for the use of any special tools or machinery.

Another object is to provide a spring assembly of the type described containing a plurality of edge stiffeners which are rendered readily collapsible by removal of a single part, which part may be replaced to activate the stiffener without the necessity for using any special tools or skill. A further object is to provide a modified form

of edge stiffener which may readily be inserted by a mattress manufacturer without the use of any special tools or machinery.

Still another object is to provide a spring assembly of the type described having an edge stiffener which lies essentially in a single plane and which remains in that plane without warping during compression.

Other and further objects will be apparent from the drawing and from the description which follows.

In the drawings:

Fig. 1 is an isometric view, partly broken away, showing one embodiment of the present invention;

Fig. 2 is a view in side elevation on an enlarged scale, partly broken away, showing the embodiment of Fig. 1;

Fig. 3 is a view in side elevation, partly broken away and with parts omitted, of another embodiment of the invention;

Fig. 4 is a view in side elevation, partly broken away and with parts omitted, of still a further embodiment of the invention;

Fig. 5 is a view in side elevation, partly broken away, showing a modified embodiment of the invention; and

Fig. 6 is an isometric view showing one component of the embodiment of Fig. 5.

In the embodiment shown in Figs. 1 and 2 of the drawing, the device comprises a pair of frame members **10, 12** of heavy gauge wire stock which are resiliently maintained in spaced-apart parallel relation by an array of a plurality of coil springs **14, 14** held in position by suitable tie wires **16** in the conventional manner. Helical connectors **18** are employed to secure the array of coil springs to frame members **10, 12.**

Along the edges of the soil spring assembly a plurality of edge stiffeners indicated generally by the numeral **20** are provided, each edge stiffener lying substantially in a single plane which coincides with the plane defined by the two opposing marginal portions of the frame members **10, 12.** Each edge stiffener comprises a pair of oppositely disposed bow members **22, 24** formed of flat spring wire having their midportions **26, 28** secured to opposing marginal portions of the frame members **10, 12** by means of helical connectors **18, 18.** The end portions **30, 32, 34, 36** of the respective bow members extend toward each other, being twisted through 90° at their ends **38, 38** and pivotally joined to each other at their junctures **40, 42** to provide a pair of angularly disposed toggle arms having their free ends secured to opposing marginal portions of the frame members. This arrangement provides in effect a pair of oppositely outwardly extending toggle joints spaced from each other and lying in the plane defined by frame members **10, 12.** In the embodiment shown in Figs. 1 and 2 a pair of supplemental connecting elements **44, 46** are provided which are pivotally connected to joints **40, 42** respectively. Connected between the ends of said supplemental connecting elements **44, 46** is a tension coil spring **48** having its ends hooked through suitable holes in the supplemental connecting elements. By choice of a tension spring of suitable length and strength, the midportions **26, 28** of bow members **22, 24** may be urged apart with the desired force to provide the necessary stiffening for the edge of the assembly.

In order to compress and bale the spring assembly for shipment, tension spring members **48** are simply removed by disengaging the ends from supplemental connecting elements **44, 46.** This permits complete compression of the two bow members **22, 24** to substantially the same ultimate thickness as the coil springs themselves. Upon receipt of the compressed assembly by the customer and its removal from the bale, the tension springs **48,** which may be shipped separately, are readily inserted in place

manually without the necessity for any special tools or skill so that the device is immediately rendered operative.

In another embodiment of the device as shown in Fig. 3, supplemental connecting elements **44**, **46** are omitted, tension springs **48** being connected directly between the terminal portions of the bow members adjacent the joints, the tension spring in this embodiment being connected between one end of one bow member and the other end of the other bow member. In the embodiment shown in Fig. 4, on the other hand, the tension spring is connected directly between opposite ends of the same bow member. All three embodiments provide essentially the same results and may be used in the same way.

In the modified embodiment shown in Figs. 5 and 6 each edge stiffener takes the form of a pair of separate components **60**, each of which consists of a pair of toggle arms **62**, **64** and **66**, **68**. Each pair of toggle arms is pivotally joined together to provide joints **70**, **72**, and each arm is constructed of flat wire which is twisted so that the flat faces, adjacent the free ends of the arms, are disposed at right angles to the plane defined by the pair of arms, i.e. the plane in which the arms move.

The end portions **74**, **74**, **76**, **76** of each arm form an obtuse angle with the portions adjacent the pivotal joint. Each arm is provided with an offset **78** at the junction of the two angularly disposed portions. Each component **60** also includes a third arm **80** pivotally joined to the toggle arms at the pivotal joint and provided with a hole **82** near its free end serving to engage one end of a tension spring **84**.

In use, one component **60** is mounted on a spring assembly by inserting the free ends of its toggle arms endwise into helical connector **18** which has previously been applied to the marginal portion of the frame. Either at the same time or subsequently a second component is mounted on the assembly spaced from the first with its toggle joint extending outwardly in a direction opposite to the first, as shown in Fig. 5. The free end portions **74**, **74** of one pair of toggle arms overlap the free end portions **76**, **76** of the other pair of toggle arms adjacent the marginal portions of the frame, while the ends of arms **74**, **74** abut against the offset shoulder portions **78**, **78** of the other pair of arms **76**, **76**. Tension spring **84** is then connected between the arms **80**, **80** to urge the toggle arms of both components to expanded position. Offset portions **78** serve as abutments both to prevent toggle arms **74**, **76** from riding over each other lengthwise under the influence of tension spring **84** and to engage the adjacent turns of helical connector **18** and thus maintain each component in its desired position between the frames. Furthermore, the abutment of the ends of arms **74** against offsets **78**, **78** of arms **76** ensures that joints **70**, **72** are maintained spaced apart by a predetermined distance so that a uniform degree of stiffness is provided by the tension of spring **84**.

It will be understood that, as in the case of the embodiments shown in Figs. 3 and 4, the arms **80**, **80** of the components shown in Figs. 5 and 6 may be replaced by a direct connection of spring **84** to the toggle arms adjacent their pivotal joint.

The components shown in Figs. 5 and 6 may be omitted from the spring assembly, thus permitting the assembly to be readily compressed for baling and shipping. After the spring assemblies have been removed from the bale and allowed to expand the components may be mounted in place as described above without the necessity for any special tools or machinery to provide the desired edge stiffeners.

This application is a continuation-in-part of my copending application Ser. No. 720,683, filed March 11, 1958, now abandoned.

Although specific embodiments of the invention have been described herein, it is not intended to limit the invention solely thereto, but to include all of the obvious variations and modifications within the spirit and scope of the appended claims.

What is claimed is:

1. A spring assembly comprising in combination a pair of frame members resiliently maintained in spaced parallel relation by a plurality of coil springs interposed therebetween and a plurality of collapsible edge stiffeners, each edge stiffener comprising a first pair of angularly disposed toggle arms pivotally joined at their juncture and having their free ends secured to opposing marginal portions of said frame members, a second pair of angularly disposed toggle arms pivotally joined at their juncture and having their free ends secured to opposing marginal portions of said frame members, said first and second pairs being spaced from each other and lying in a single plane with the angularly disposed arms of each pair extending outwardly away from the angularly disposed arms of the other, and a tension spring removably connected between the pivotal joints of each pair to urge said frame members apart, said edge stiffeners being readily collapsible upon removal of said springs.

2. A spring assembly as defined in claim 1 in which each pair of toggle arms is removable as a unit from said assembly, the free ends of each pair of toggle arms overlapping the free ends of the opposing pair of toggle arms.

3. A spring assembly as defined in claim 2 in which each toggle arm is made of flat wire, the flat faces of the wire in the overlapping ends being disposed at right angles to the plane defined by said arms, each toggle arm is provided with a shoulder at its juncture with the marginal portion of said frame members and the inner one of each overlapping set of toggle arms has its free end abutting against the shoulder of the overlapping arm.

4. A spring assembly as defined in claim 3 comprising a helical wire connector connecting each set of overlapping toggle arms to the marginal portion of the frame member.

5. A spring assembly comprising in combination a pair of frame members resiliently maintained in spaced parallel relation by a plurality of coil springs interposed therebetween and a plurality of collapsible edge stiffeners, each edge stiffener comprising a pair of oppositely disposed bow members, said bow members having their midportions secured to opposing marginal portions of said frame members and their ends pivotally connected to each other to provide a pair of oppositely outwardly extending toggle joints lying in a single plane, and a tension spring removably connected between said pair of toggle joints to urge said frame members apart, said edge stiffeners being readily collapsible upon removal of said springs.

6. A spring assembly as defined in claim 5 in which each said tension spring is pivotally connected to each said joint.

7. A spring assembly as defined in claim 5 in which each end of each said tension spring is directly connected to a bow member adjacent one said joint.

8. A collapsible edge stiffener component for a coil spring assembly having a pair of frame members resiliently maintained in spaced parallel relation by a plurality of coil springs interposed therebetween, each component comprising a pair of toggle arms pivotally joined together, each arm comprising a flat wire member bent at an obtuse angle at a point spaced from said joint to provide an end portion remote from said joint adapted to be secured to a marginal portion of said frame member by a helical connector, the flat faces of said end portion being disposed at right angles to the plane in which said arms move about said joint, said end portion being offset from the remaining portion of said arm to provide an abutment, and means for securing a tension spring to said component adjacent said joint.

9. A collapsible edge stiffener component as defined in claim 8 in which said tension spring securing means

comprises a separate arm pivotally connected to both said toggle arms at said joint.

10. A collapsible edge stiffener component for a coil spring assembly comprising a pair of flat resilient metal strips each having a free end and a joint end, each of said strips being formed to have a straight portion adjacent said free end which forms an obtuse angle with a second straight portion adjacent said joint end, means for securing said joint ends together in a pivotal connection, the flat face of said strip adjacent said free end being at right angles to the plane in which said strips are adapted to pivot and means for attaching a tension spring to said component adjacent said joint.

11. The collapsible edge stiffener component as defined in claim 10 wherein said tension spring attaching means includes a link pivotally connected to both of said strips at said joint.

12. A spring assembly comprising in combination a pair of frame members resiliently mounted in spaced parallel relationship by a plurality of coil springs interposed therebetween and a plurality of collapsible edge stiffeners, each edge stiffener comprising a pair of oppositely disposed components, each said component comprising a pair of flat metal strips, each strip having a first

straight portion formed at an obtuse angle to a second straight portion, means to secure the ends of said strips adjacent said first portions together in a pivotal joint, means to secure said second portions of each component to opposing marginal portions of said frame members, said second portions of said oppositely disposed components being arranged in superimposed relationship such that the second portions of one of said components overlap the corresponding second portions of the other component, and a tension spring removably connected between the pivotal joints of each pair of components adapted to urge said frame members, apart, said edge stiffeners being readily collapsible on removal of said springs.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 2,932,832 April 19, 1960

David I. Levine

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 6, list of References Cited, under UNITED STATES PATENTS, between lines 19 and 20, insert the following:

807,314 Pepple--------Dec. 12, 1905

Signed and sealed this 20th day of September 1960.

(SEAL)
Attest:

KARL H. AXLINE
Attesting Officer

ROBERT C. WATSON
Commissioner of Patents