Jan. 8, 1952 J. D. HAAS 2,581,761

SPRING ATTACHMENT MEANS

Filed June 23, 1949

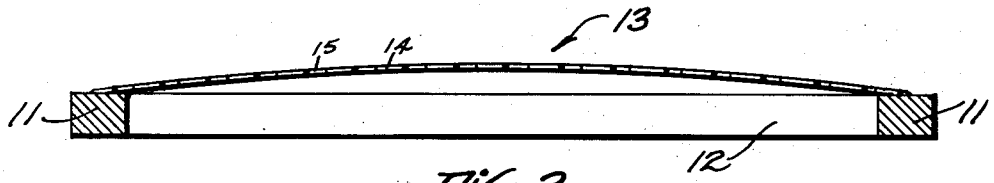


FIG. 2.

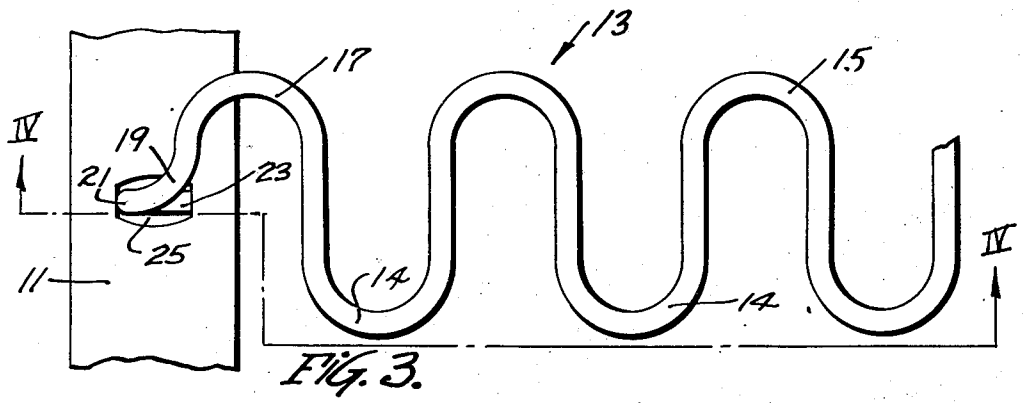
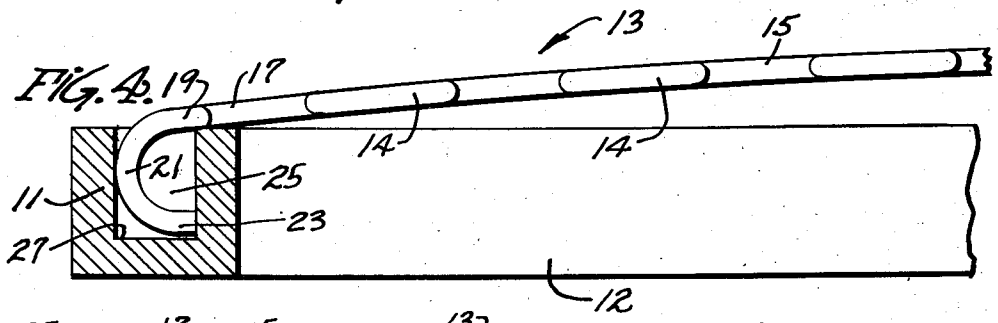


FIG. 3.



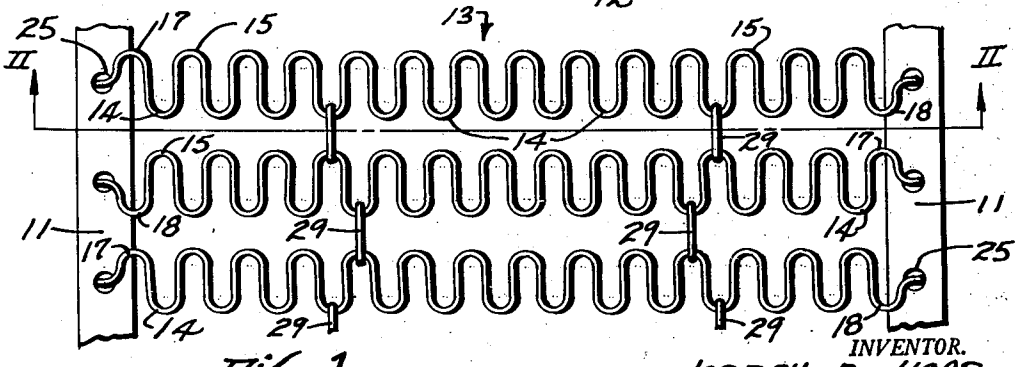


FIG. 1.

INVENTOR.
JOSEPH D. HAAS
BY
Weatherford & Weatherford
ATTYS.

Patented Jan. 8, 1952 2,581,761

UNITED STATES PATENT OFFICE

2,581,761

SPRING ATTACHMENT MEANS

Joseph D. Haas, Memphis, Tenn., assignor to U. S. Bedding Company, Memphis, Tenn., a corporation of Georgia

Application June 23, 1949, Serial No. 100,940

4 Claims. (Cl. 155—179)

1

This invention relates to certain new and useful improvements in spring and frame assemblies for use in upholstered furniture, vehicles, railroad cars and the like. For these and kindred uses, seat assemblies have heretofore employed a plurality of sinuous spring elements spanning between opposed frame members in substantially parallel relation and each lying in a curved plane with the ends of the spring elements being attached in various, and heretofore unsatisfactory, manners to the said opposed frame members.

The spring elements are conventionally formed of a plurality of lateral convolutions or loops which lie in a plane curved longitudinally of the elements. It is generally desirable to give the spring elements an initial set into a relatively tightly curled arc and to initially tension each of the elements by stretching the curled arcs to a substantially flat, slightly arched condition, in which condition the ends of the spring elements are respectively attached to the opposite frame members.

The principal object of this invention is to provide a superior and simplified means of attaching such spring elements to the associated frame members.

A further object of the invention is to provide a means of attachment of such spring elements which will be simple in manufacture and will readily lend itself to speed of assembly.

A further object of the invention is to provide attachment means for such spring elements which may be readily disengaged when the removal of the spring elements is desired.

And a further object of the invention is generally to provide such spring elements with attachment means of increased efficiency and improved design, and to otherwise simplify and improve the manufacture of spring assemblies.

The means by which the foregoing and other objects of this invention are accomplished and the manner of their accomplishment will readily be understood from the following specification upon reference to the accompanying drawings, in which:

Fig. 1 is a fragmentary plan view of a spring assembly in accordance with the present invention.

Fig. 2 is a sectional elevation view taken on the line II—II of Fig. 1.

Fig. 3 is a fragmentary plan view on an enlarged scale showing one end of a sinuous spring element and illustrating a modification in the frame members thereof; and

Fig. 4 is a fragmentary sectional view taken on the line IV—IV of Fig. 3.

Referring now to the drawings in which the various parts are indicated by numerals, there is shown a spring assembly, such as may be used in conjunction with a seat cushion, which includes a pair of parallel longitudinal frame members 11, a pair of transverse frame members 12 (of which but one is shown), and a plurality of sinuous spring elements 13 which span from side to side of the assembly and are attached in accordance with the present invention to the opposite frame members 11.

2

The spring elements 13 consist of intermediate alternate left and right hand convolutions or loops 14, 15 and end loops 17, 18. The respective loops 14 extend in one direction substantially equally laterally beyond the longitudinal mid line of the spring elements 13 and the respective loops 15 similarly extend in the opposite direction beyond the mid line of the elements 13. End loops 17 similarly extend laterally a substantially equal distance as in the direction of loops 15 beyond the said mid line, with the end loops 13 similarly extended in the opposite direction. All of the loops 14, 15, 17, 18 lie substantially parallel in a curved plane. At their terminal ends the end loops 17, 18 each include an integral curved portion 19. Depending from the curved portions 19 are substantially semi-circular hook portions 21 which are positioned in a substantially vertical plane, which plane includes the longitudinal mid line of the respective spring elements with which the opposite hook portions are associated. The hook portions 21 are open and respectively face inwardly, terminating in a free substantially straight end 23 which is directed toward the interior of the assembly, the end portions 23 lying in the plane of and substantially parallel with the longitudinal mid line of the respective spring elements with which the portions are associated.

The frame members 11 are each provided with a plurality of equally spaced, vertically disposed pockets 25 which, as illustrated in Fig. 1, may be of circular cross section, or, as illustrated in Fig. 3, may be of eliptical or oval cross section. The frame members are each provided with a number of pockets 25 equal to the number of spring elements to be included in the assembly. Each of the pockets is open topped and extends vertically downward into the frame members 11, preferably being provided with a closed bottom 27. The axis of each of the pockets 25 which lies transverse the frame members 11 is of a length to receive and closely fit the hook portions 21 of the spring elements 13, each of the pockets being preferably abutted by an end portion 23 on one side and on the opposite side by the curve of the hook 21.

In the manufacture of the assembly the curled spring elements 13 are stretched to the slightly arched position illustrated in Figs. 2 and 4 and the vertically disposed hook portions 21 are inserted in the respective pockets 25 with the end portions 23 bearing against the inner side of the pockets 25. The initial tension of each of the spring elements is such as to constantly urge

the end portions into this engagement, and under use conditions it is found that when the elements 13 are supporting the weight of a user, the tension on the opposite ends is increased, maintaining the hook engagement. With the respective spring elements thus positioned with relation to the frame members 11, it will be seen that the end loops 17, 18, overlie the upper faces of the frame members 11 and bear against these upper faces away from the respective pockets 25. The engagement of the free ends 23 of the hooks 21 against the inward walls of the respective pockets 25 retains the spring elements 13 against vertical displacement and retains these spring elements in desired position in the assembly. The engagement of the end loops 17, 18 with the upper faces of the frame members 11 resists any undesired rotation of the spring elements about their attachments to the frame members; it being noted that the end loop 17 at one end of each spring element is a right hand loop and the other end loop 18 at the opposite end of the spring element is a left hand loop, the end loop engagements thus cooperating to resist opposite rotational movement.

It will be observed that the walls of the pockets 25 are positioned closely adjacent the sides of the hook elements 21 so as to limit any lateral movement of the hook elements within the pockets 25 and consequently to further limit any end movement of the spring elements 13 relative to the frame members 11. It is preferred that the adjacent spring elements 13 be interconnected intermediate their lengths, and for this purpose suitable means, such as tie clips 29, are provided.

It will be seen that in the event it becomes desirable to disengage a spring element 13 from frame members 11 that this disengagement may be readily accomplished by a simple removal of the hooks 21 from the pockets 25.

It will also be seen that the present arrangement provides an efficient though simple means by which sinuous spring elements or the like may be attached to frame members against undesired removal, and which provide means satisfactorily limiting undesired rotational movement of individual spring elements.

I claim:

1. In a spring assembly, a frame having a pair of spaced parallel rails, each said rail having a flat horizontal upper face provided with spaced walls forming a plurality of vertical open topped pockets, said pockets being equally spaced apart along said rails, and a plurality of sinuous spring elements spanning the distance between said rails and being attached thereto, each said spring element consisting of a plurality of intermediate loops alternately projecting oppositely from the longitudinal mid line of the element, and end loops at its opposite ends respectively projecting oppositely from said mid line, said loops being joined to form said element as a continuous member, said member being upwardly bowed, each said end loop terminating in a depending inwardly facing substantially semicircular hook portion positioned in the vertical plane which includes the longitudinal mid line of the spring element with which said hook portions are associated, said hook portions each including a straight end portion lying in said vertical plane substantially parallel to said mid line, each said spring element having its associated hook portions inserted in said pockets with said end portions abutting the inner walls of said pockets and the curves of said hooks abutting the outer wall of said pockets, and said end loops seating on said upper rail faces away from said pockets, the space between the inner and outer walls of each said pocket transverse said rail being of a length substantially equal to the outside radius of the said hook portion.

2. In a spring assembly which includes a frame having a pair of parallel horizontal rails and a plurality of normally curled pretensioned spring elements of a length to span the distance between said rails when extended from normally curled position to slightly bowed condition, means for attaching said spring elements to said rails, which include the walls of a plurality of vertical open topped pockets formed in said rails and uniformly spaced therealong, and an arcuate hook portion depending from the opposite ends of each of said spring elements housed in each of said pockets, said hook portions terminating in inwardly projecting end portions respectively engaging the inner vertical walls of said pockets, the tension in said spring elements urging said end portions into said engagement, the curves of said hook portions respectively engaging the outer vertical walls of said pockets.

3. A spring assembly, which includes a frame having a pair of parallel horizontal rails, each said rail having a plurality of vertical open topped pockets, including inner and outer walls, equally spaced apart along said rails, and a plurality of spring elements spanning the distance between said rails, each said spring element terminating at its opposite ends in depending inwardly facing hook portions positioned in the vertical plane which includes the longitudinal mid line of the spring element, said hook portions each including an end portion lying in said vertical plane, each said spring element hook portion being inserted in a said pocket with its said end portion abutting the inner wall of said pocket, and it curve abutting the outer wall of said pocket, said spring elements being thereby attached to said rails.

4. In a spring assembly, a pair of spaced parallel rails, a plurality of spring elements spanning the distance between said rails, each said element including at its opposite ends opposed curved hook portions, each terminating in a free tip, a like plurality of pockets having opposite sides formed in each said rail, each said pocket housing a said hook portion with the free tip of said housed hook abutting one side of the interior of the pocket and the curve of said hook abutting the opposite side of the interior of said pocket, said spring elements being thereby attached to said rails.

JOSEPH D. HAAS.

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