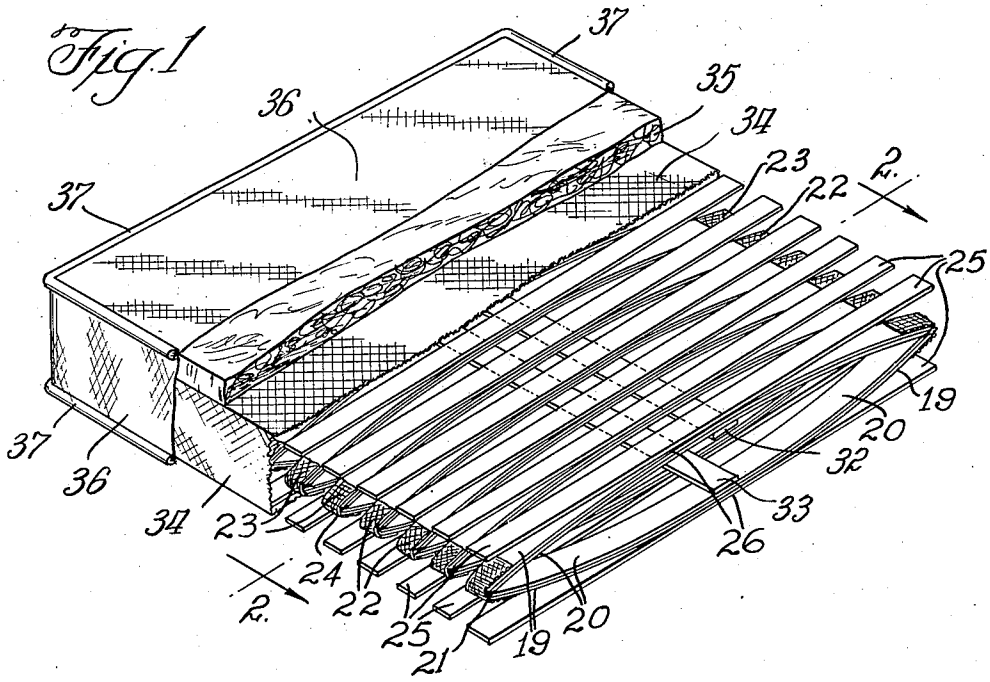
May 8, 1945. E. DEUTSCH 2,375,289

SPRING UNIT FOR USE IN FURNITURE, AUTOS, ETC

Filed Oct. 12, 1942 2 Sheets-Sheet 1

Fig. 1



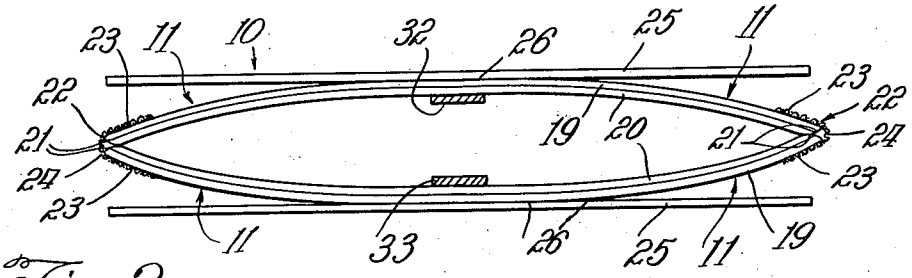


Fig. 2.

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SPRING UNIT FOR USE IN FURNITURE, AUTOS, ETC

Filed Oct. 12, 1942 2 Sheets-Sheet 2

Fig. 3.

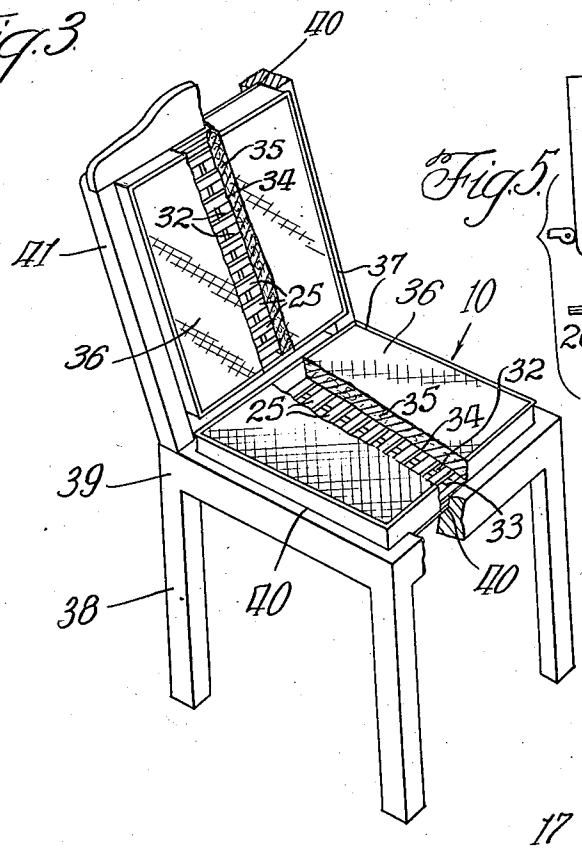


Fig. 5.

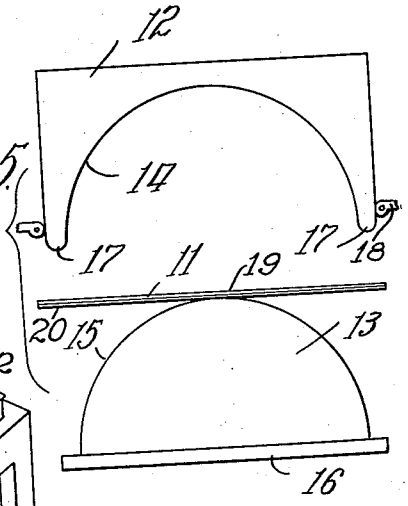
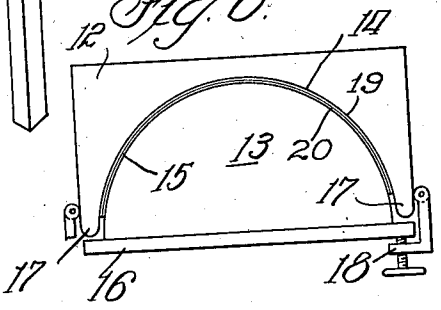


Fig. 6.



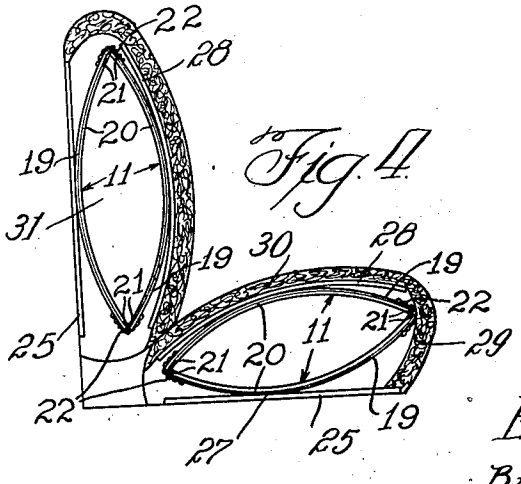


Fig. 4.

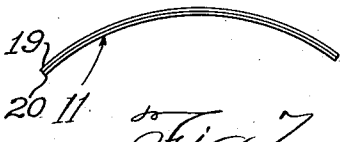


Fig. 7.

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Patented May 8, 1945 2,375,289

UNITED STATES PATENT OFFICE

2,375,289

SPRING UNIT FOR USE IN FURNITURE, AUTOS, ETC.

Eugene Deutsch, Chicago, Ill., assignor of thirty per cent to Julius Deutsch and thirty per cent to Harry Deutsch, both of Chicago, Ill.

Application October 12, 1942, Serial No. 461,732

8 Claims. (Cl. 5—239)

My invention relates to spring or cushion structures, such as seat or chair cushions, mattresses and the like, and more particularly to novel spring units or structures for use in furniture, such as chairs, overstuffed or otherwise, autos or the like, especially seats, cushions and backs thereof and while preferably of non-metal material, such as plywood may be of spring metal, such as steel or the like. Although it appears that the use of plywood or similar pliable or flexible non-metal strips for the springs will find a permanent place in the arts, even when metal is available, it finds a special advantage in use at the present time due to the demand on metals, especially spring metals, such as steel or the like, and the inability to obtain same for various uses not connected with or outside of the war effort, demand and production.

It is an object of the invention to provide a novel construction of wooden spring unit for seats, cushions or backs of chairs or seats for furniture, autos and the like, including a novel arrangement of spring strips which will replace and give better efficiency than ordinary metallic coil spring or stuffed structures and will also greatly facilitate and simplify the construction thereof as well as give better and remarkable cushioning action, strength and durability in use and withstand a great amount of weight, stresses, shocks and abuse without noticeable impairment or becoming defective, uneven, bumpy or collapsing from its normal condition permanently, at least for a somewhat indefinite period; which will give an efficient cushioning and sustaining action even when constructed of plywood, so as to be rendered completely efficient and operative indefinitely.

Another object of the invention is to provide a novel spring unit or structure and seat or back cushion produced therefrom in which a cushioning action is produced evenly throughout the area thereof, comprising elliptical springs preferably of wood, with straight top and bottom pieces parallel to each other, to give additional strength to the springs and to keep the seat and cushion covering including the margins thereof, flat and even, so that permanent collapsing or partial distortion and flattening out of the spring structure or cushion will not take place at said margins or edges to leave the cushions uneven or lower at the margins as in ordinary structures heretofore produced, and which at the same time will be economical to manufacture.

Another object of the invention is to provide an improved spring unit or structure and a cushion made up of a plurality of such units, so that the spring units will maintain their shape without breaking under various conditions of use and which will withstand considerable abuse.

Another object of the invention is to simplify the spring structure of cushions as compared with coil spring structures and to obviate the necessity of employing tapes or cords, such as between ordinary metallic coil springs or permitting the bending or canting of the individual springs and piercing or breaking of the springs through the padding and covering as in coil spring structures and to greatly simplify and render more economical the padding and covering of such structures as compared with prior structures, especially those using coiled springs.

Further objects and advantages will appear and be brought out more fully in the following specification, reference being had to the accompanying drawings, in which:

Fig. 1 is a perspective view partly in elevation and partly in section of a cushion or seat structure having a spring structure made up of units in accordance with the invention.

Fig. 2 is an enlarged sectional view taken in the plane of the line 2—2 of Fig. 1 and showing the compression or compensating action of the springs in use.

Fig. 3 is a perspective view partly broken away and in section of a chair having seat and back cushions produced in accordance with the invention.

Fig. 4 is a sectional view showing the invention applied to a typical automobile seat or the like.

Fig. 5 is an exploded view showing a mold for producing the curved or arcuate parts or strips of the spring structure, especially of elliptical, oval or lenticular shape and where constructed of plywood or plastic.

Fig. 6 is a view of the mold with the parts clamped together at the completion of the bending or forming action, and

Fig. 7 is an edge elevation of one of the curved or arcuate members, preferably of two ply or composite structure forming part of a spring unit after the same has been removed from the mold shown in Fig. 6.

Referring more particularly to the drawings, the spring unit or structure is designated at 10 and while shown elliptical, oval or lenticular shape, may be of any other suitable semi or double convex contour. Also, while it is prefer-

ably of non-metal, such as plywood with the grain running lengthwise, it may be of spring metal, such as steel. This spring unit is made up of arcuate strips 11, such as narrow strips of plywood which has been kiln dried or other suitable resilient, but preferably tough, bendable, yieldable or pliable material, which of course may be other than wood or metal, such as a suitable plastic. These strips, especially when made of plywood are of suitable thickness, width and length according to the size of the seat, cushion or back and preferably elongated, thin narrow strips. These strips are placed between two sections 12 and 13 of a mold or forming means, the section or part 12 having a concaved recess 14, which receives the convex mating member 15 of corresponding curvature which may be of any degree desired either concentric or eccentric. The portion 15 is mounted upon a base 16 and the strip 11 is placed in position over the portion 13 or against the section 12 at the ends 17 and then the two sections are forced together by a suitable clamping means 18 operated by screws or otherwise to bend the strips 11 in conformity with the curvature of the parts 12 and 13, such as indicated at 14 and 15, whereby from the position shown in Fig. 5, the strips are bent into the proper shape as shown in Fig. 6. These strips may be cut from a sheet of plywood and then preformed or bent as described so as to remain permanently in arcuate or bowed form when released from the mold or shaping means, as shown in Fig. 7, the curvature being somewhat less than when in the mold. Or, the sheets may be so bent and the strips or spring units cut therefrom, though the former is preferable. It should be noted that when the mold sections are together, the ends 17 are engaging the projecting ledge of the base 16 so as to limit the movement, but it is to be understood that while the present mold structure is preferably used, any other suitable mold or bending means may be employed to permanently shape the strips into arcuate form before use or assembly in a spring unit or cushion structure. The strips 11 are shown made up of two plies 19 and 20, which may be independently bent and then connected or cemented together facewise or simultaneously bent after being coated with glue, cement or other adhesive at their coacting faces, so as to adhere to one another and become permanently connected when shaped as shown in Figs. 5, 6 and 7 of the drawings when the glue or adhesive becomes set or hardened. It should also be noted that since the inner strip or ply of the unit is on a smaller curvature or shorter arc than the outer ply or strip, the strips will slide relative to one another so that the inner ply or strip may be made shorter or its ends may and will project beyond the ends of the outer ply or strip. These ends are preferably rounded in convex formation or tapered with a slight curvature on their inner sides as indicated at 21 so that when two opposed members are placed together in oppositely outwardly bowed relation, said ends are spaced in divergent relation and a structure of elliptical, oval or lenticular form is produced. In order to prevent injury or breaking of the strips or plies by permanently connecting the opposed ends together rigidly, they preferably fulcrum on or bear against one another at or adjacent said convexly rounded or tapered ends as clearly shown in Fig. 2 of the drawings so as to ride or slide on one another when the spring is partially collapsed or expanded. To facilitate this, the ends are preferably pivotally connected in a somewhat loose manner instead of at a fixed axis, and for this purpose a heavy flexible strip 22 is used at the ends. These strips 22 may be of canvas, duck or other suitable heavy tape of short lengths glued or otherwise anchored as at 23 to the outer faces of the adjacent end portions of the strips 11 by cementing, gluing, or otherwise fastening the same thereto, thus causing the intermediate loose portions 24, which bridge the opposed ends, edges or apices thereof to draw and hold the strips together and remain taut as well as to hold the curved or convex bearing surfaces 21 against each other, but permit the necessary pivotal and sliding action one on the other while holding the parts assembled. Of course the strips 11 may be of single, double or other ply construction depending upon the material of the strips and the thickness thereof or weight to be sustained, but in practice the two plies have been found highly efficient, especially where the strips are made from plywood. In actual practice a spring structure of plywood made in accordance with the invention has withstood the weight of four persons thereon, even while jumping up and down. With the arcuate strips joined to fulcrum and flex in the manner described, rectilinear strips 25, as illustrated in Figs. 1, 2 and 4, or curved strips 28, as illustrated in Fig. 4, are glued or otherwise connected at their intermediate portions as at 26 to the intermediate portions of the strips 11 at the top and bottom. In Figs. 1 and 2 these strips 25 are shown straight and the ends thereof are free to extend over the end portions of the strips 11 where they are bent toward each other and connected as described so as to lie in spaced relation thereto, and divergent therefrom at the top and bottom but parallel to each other. Of course, these strips 25 may be closer toward each other at one end than at the other if the cushion or seat is so constructed or as shown in Fig. 4, the bottom strip may be mounted off center as at 27 and the upper strip 28 may be somewhat curved to conform to the curvature of the seat 29, such as used in an automobile, in which instance the ends are also curved but spaced from the ends of the elliptical structure and suitable padding or filling 30 may be disposed between the springs and the covering of the seat. The same structure is employed in the back 31 which is thereby cushioned, but the arrangement of the back strip 25 is straight and the front strip 28 is curved, but both are centralized on the elliptical spring unit or structure with the same result.

In Fig. 1 of the drawings an assembly in a seat or cushion is illustrated in which a plurality of the spring units are arranged parallel to each other and may be slightly spaced apart, preferably substantially the width of the strips or spring units or otherwise. These units are placed in upright positions and connected by upper and lower transverse intermediate strips 32 and 33, which are fastened as by gluing to hold them assembled in this relation. All of the spring units may be covered with a sheet of textile material 34, such as burlap, canvas or the like and then a padding or filling layer 35 arranged on the top and enclosed in a suitable cloth or leather upholstering material or covering 36 which may be provided with beaded edges, as shown at 37.

In Fig. 3 of the drawings, the invention is shown applied to a chair 38, which although illustrated as a straight chair, may be a reclining or overstuffed chair, settee or the like. The seat frame 39 of the chair 38 has a recess or

seat 40 for taking a cushion such as shown in Fig. 1, and the back 41 may be similarly formed to take a similar cushion. In this view, the back cushion is shown in section and broken away to more clearly illustrate the same in connection with its interior structure. Of course, the invention can be applied to sofas, mattresses or other similar cushion structures or articles.

In the structure, such as described, it will be seen that the free ends of the strips 25 give support at the edges, opposite sides or ends of the cushion, seat or the like and support the margins thereof. Ordinarily the flexing of the strips 11 is depended upon to give the necessary softness or cushion and to rebound to normal expanded position after being partially collapsed when relieved of the weight thereon. During this action, the ends 21 form bearing surfaces to fulcrum or ride on each other and compensate for the distribution of the weight and to keep the pivots or fulcrums from binding and interfering with the adjustment or pivotal action of the spring strips 11 relative to each other, while the tapes 22 retain the connections and insure proper fulcrums at such points. Should the projected ends of the strips 25 be flexed, pressure will be exerted against the intermediate arcuate portions of the spring units and said ends may be brought together, in which event they will not only compress the intermediate portions of the elliptical springs, but will be moved toward each other but at all times sustain the top and bottom walls of the covering or cushion enclosing them, so that the edges will not stay collapsed and become permanently somewhat thinner than the intermediate portion or area of the seat or cushion at least for a somewhat indefinite period. In this way, the seat or cushion will not only be sustained throughout its area but will be prevented from becoming permanently thinner or permanently flattening or collapsing at the edges and corners until fatigued. Downward movement at one edge on the free ends of the strips 25 would first compress the elliptical structure and acting as a leverage will tilt downwardly at said edge or margin while the opposite edge or margin supported by the other ends of the spring units will be sustained in an open or extended position, thus giving good support all around by reason of the fact that said ends would tend to move apart while the other ends are being partly collapsed. Of course, while the plywood construction is preferred and is also light and cheap, as well as convenient and easy to manufacture and replaces metal which is not readily available, it will efficiently serve its purpose. Of course the spring units may be made of a plastic shaped in any suitable manner, such as described. If the springs are of spring steel or other metal they will be shaped in any suitable way by rolling or may be formed into shape by bending or otherwise. By the construction described, not only will the springs of the unit, such as used in a seat or cushion operate together but they will return to a flat condition when relieved of a load and remain flat and even, instead of becoming distorted and uneven as in connection with coiled springs and in addition the device will withstand considerable rough usage and abuse for a long time without being impaired.

While I have illustrated and described the preferred form of composition for carrying my invention into effect, this is capable of variation and modification without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A spring unit of the class described including oppositely outwardly bowed members having straight transverse ends rounded longitudinally on the inside to bear and rock on one another upon compression and expansion of said bowed members, and flexible strips joining the end portions of the members and holding the ends together.

2. A spring unit for cushions, including a plurality of upright elliptical spring members having upper and lower resilient members outwardly convex and curved toward each other with rounded ends bearing on each other and flexible web connections between said ends.

3. A spring unit for cushions, including a plurality of upright elliptical spring members having upper and lower flexible members initially formed in oppositely outwardly bowed form and curved toward each other with tapered ends with convex portions on their inner sides slidably bearing on each other, and means loosely connecting said ends comprising flexible connections between said ends on the outer faces thereof with intermediate loose portions bridging the spaces between the opposed ends.

4. A spring unit of the class described including oppositely outwardly bowed members having straight transverse ends rounded longitudinally on the inside to slide and rock on one another upon compression and expansion of said bowed members, and means for maintaining said rounded ends in sliding and rocking engagement.

5. A spring device of the class described consisting of a plurality of parallel units in slightly spaced arrangement, each of said units comprising oppositely outwardly bowed members having straight transverse ends rounded longitudinally to slide and rock on one another upon compression and expansion of said bowed members, means for maintaining said rounded ends in sliding and rocking engagement, and a pair of transverse flexible strips secured to the inner faces of the upper and lower bowed members respectively and connecting the same in said slightly spaced relation.

6. A spring device of the class described consisting of a plurality of parallel units in slightly spaced arrangement, each of said units comprising oppositely outwardly bowed members having straight transverse ends rounded longitudinally to slide and rock on one another upon compression and expansion of said bowed members, means for maintaining said rounded ends in sliding and rocking engagement, a resilient strip substantially coextensive in length with said bowed members attached at a point intermediate the ends to the upper of said bowed members and diverging therefrom with said ends free, and transverse flexible strips secured to the inner faces of the upper bowed members.

7. A spring device of the class described consisting of a plurality of parallel units, each of said units comprising a pair of outwardly and oppositely bowed members having straight transverse ends rounded longitudinally on the inside to rock and slide on one another upon compression and expansion of the bowed members, means for maintaining said rounded ends in slid-

ing and rocking engagement, a pair of resilient strips secured intermediate their ends to the upper and lower bowed members respectively, and a pair of transverse flexible strips secured to the inner faces of the upper and lower bowed members respectively, connecting the same in closely spaced relation.

8. A spring unit for cushions, including a plurality of upright elliptical spring members having upper and lower preformed arcuate resilient members bowed outwardly in opposite directions and curved toward each other with rounded ends movably bearing and adapted to rock on each other during collapsing and expansion of the unit, and flexible strips connecting said upper and lower flexible members over said ends on the outside with intermediate loose portions bridging the opposed ends and holding the latter together.

EUGENE DEUTSCH.