

Feb. 22, 1938.

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2,109,282

SPRING STRUCTURE FOR FURNITURE AND THE LIKE

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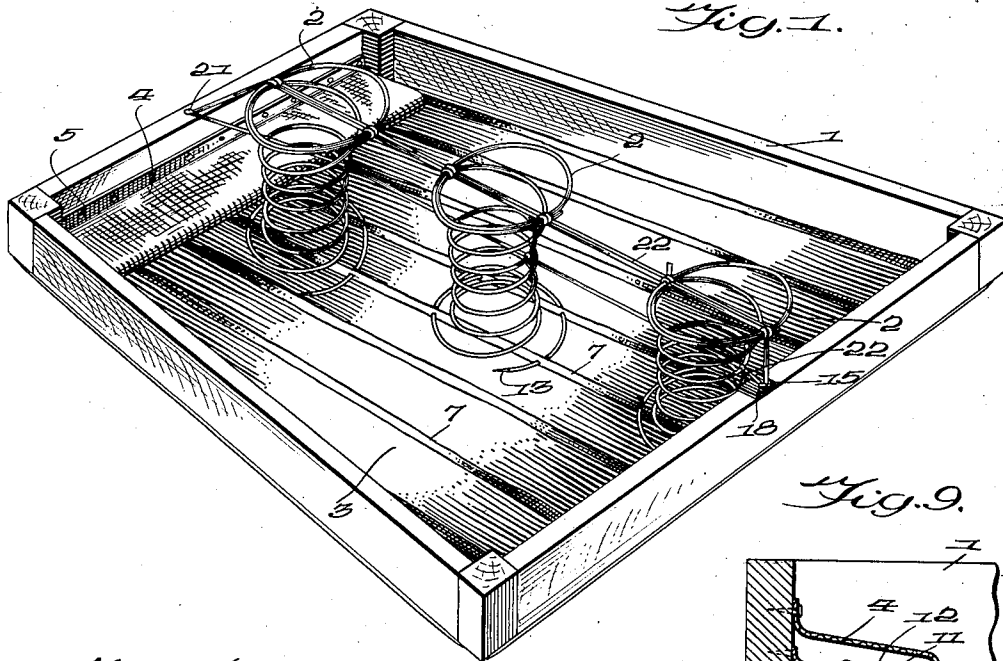


Fig. 1.

Fig. 2.

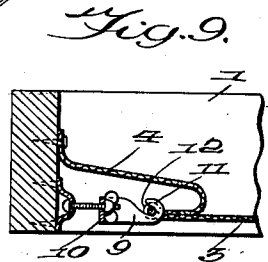
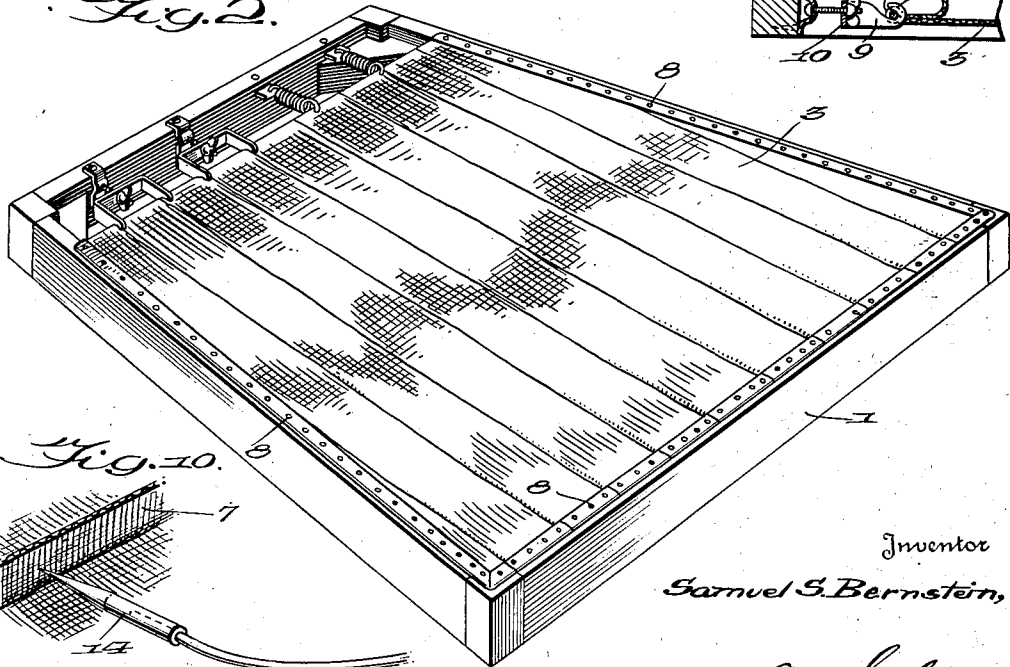


Fig. 9.

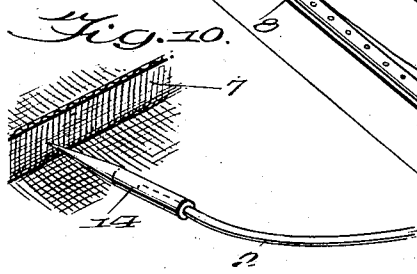


Fig. 10.

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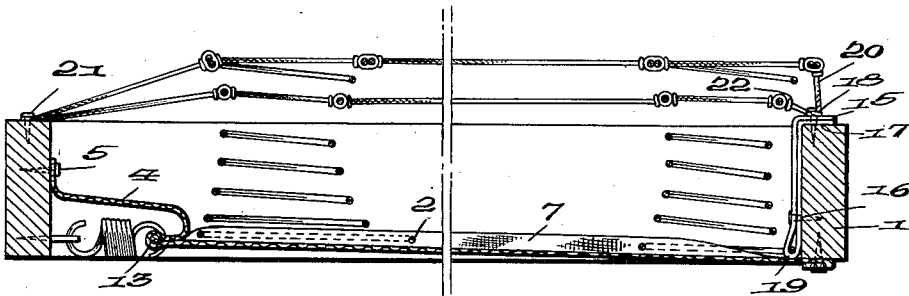
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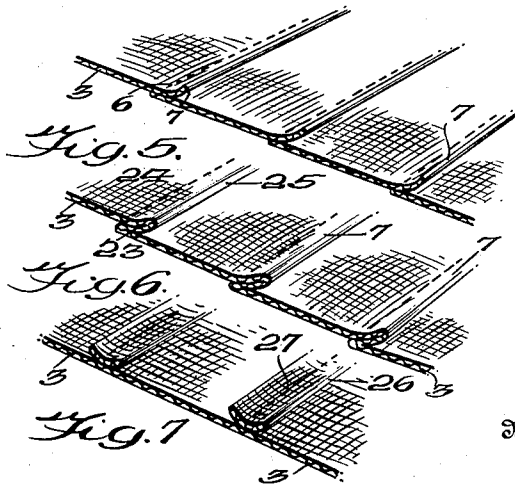
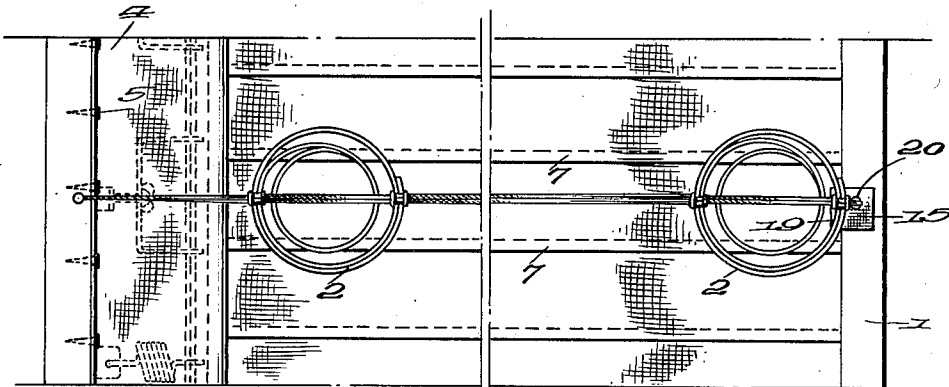
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2 Sheets-Sheet 2

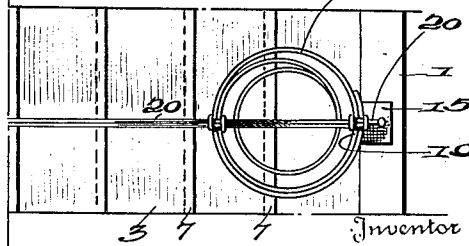
*Fig. 3.*



*Fig. 4.*



*Fig. 8.*



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# UNITED STATES PATENT OFFICE

2,109,282

## SPRING STRUCTURE FOR FURNITURE AND THE LIKE

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Application August 13, 1936, Serial No. 95,893

5 Claims. (Cl. 155-179)

This invention relates to spring structures for use in connection with various articles of furniture including seat structures, backs for davenports, arm structures, bed springs and the like, although it may, of course, be applied to other constructions, such as automobile seats and backs.

In the art as heretofore known, it has been customary to support the springs of a seat or similar construction in a frame by means of strips of interlaced webbing, which are tacked to the frame in a tensioned condition. However, after considerable periods of use, it has been found that these webs have stretched, due to the fact that the webs are not tensioned transversely, and the weight imposed thereon causes the same to constrict transversely and thereby elongates the strip so that the springs sag. Another difficulty with this type of construction is that in applying the webs to the frame the operator will not tension each web the same and accordingly the springs have a tendency to tilt and sag.

In another type of construction, a single sheet of material has been employed which is tensioned both laterally and longitudinally and secured to the frame in such condition. The springs of this construction are then sewed at desirable intervals to the fabric with the result that the unsightly stitching appears on the bottom face of the fabric, making the structure unsightly to such extent that it has been thought desirable heretofore to cover this stitching with a fabric covering.

By the present invention, the difficulties and objections, heretofore encountered, are eliminated and a structure is produced which prevents sagging, and at the same time, presents a pleasing and attractive appearance when viewing the structure from the bottom.

It is the primary object of the present invention, therefore, to provide a structure having the above advantages which may be easily and quickly produced with material saving in time and expense, but which will nevertheless produce a durable and rugged construction.

The objects will more fully appear as this description proceeds, reference being had to the accompanying drawings forming a part hereof, and in which

Figure 1 represents a perspective view of the device;

Figure 2 represents a perspective view of my invention when inverted;

Figure 3 is a broken sectional view taken through the longitudinal center of Fig. 1;

Figure 4 is a broken fragmentary plan view;

Figure 5 is a fragmentary view of the composite fabric forming the spring support;

Figures 6 and 7 are modified forms of the fabric which may be employed;

Figure 8 is a fragmentary plan view of a modified form of construction;

Figure 9 is a fragmentary sectional view of one form of tensioning device; and

Figure 10 is a fragmentary view of an optional form of spring threading device.

The invention has been illustrated as relating to a supporting structure for the springs of a seat, in which 1 designates a frame of conventional form. Within the frame a plurality of rows of springs 2 are supported by means of a supporting fabric 3 secured to the lower face of the frame 1 and having attached thereto a gusset strip 4, which is secured to the frame 1 by suitable securing means such as the tacks or nails 5. The purpose of this gusset strip will be hereinafter more fully described.

While I have illustrated only a single row of springs it is to be understood that as many rows as desired may be used, the present illustration being merely for purposes of clarity.

The supporting fabric 3, which supports one end of the springs, is made up, in the preferred form, of a plurality of strips having their marginal edges overlapping, as shown in Figure 5, and being stitched together as at 6, so that the fabric presents a continuous sheet extending completely across the frame and closing one side thereof, and may also extend completely across the frame from front to rear so that the ingress of insects and vermin is prevented.

By constructing the fabric as shown in Fig. 5, it will be seen that the overlapped margin 7 is free and may readily be turned to vertical position. Furthermore, by this construction, a plurality of free edges or flaps are provided, which extend longitudinally of the seat at regularly spaced intervals.

By employing a supporting fabric of this construction it will be apparent that it may be stretched both longitudinally and laterally so as to furnish rigid support for the springs so that in this respect the fabric possesses definite advantages over the use of inter-laced webs which have no lateral tension.

The fabric support is secured to the frame 1 by means of nails or tacks 8 on three sides as illustrated in Fig. 2, although of course it may be secured in like manner on all four sides. It is, of course, stretched laterally before it is secured

and the longitudinal tension may be produced either by stretching the fabric by hand and then tacking the same to the frame, or it may be produced by means of the tensioning devices illustrated in Fig. 2.

In this figure, the tensioning devices at the right hand side of the rear of the seat are of the type shown and described in my Patent No. 2,042,763 of June 2, 1936, whereas the tensioning devices shown at the left hand side at the rear of the seat are of substantially the same construction as shown in my Patent No. 2,028,493 of Jan. 21, 1936, except that the arms 9 which are connected to the spring bow 10 are provided with hooks 11 passing through the supporting fabric 3 and engaging a rod 12 mounted in a pocket 13 which extends transversely across the fabric throughout its entire width.

It will be apparent, therefore, that the fabric 3 may be tensioned longitudinally by means of resilient tensioning devices alone, or by adjustable, resilient tensioning devices.

When the fabric 3 is secured to the frame in this tensioned condition and it is desired to secure the springs thereto, the free marginal edges 7 of the strips are turned to vertical position and the lower coils of the springs are threaded through the same. In order to facilitate the threading or looping of the coil through these upstanding ribs, or flaps, the end of the coil may be pointed as shown at 13 or a pointed sleeve 14 as shown in Fig. 10 may be slipped over the end of the coil to permit easy penetration through the rib.

In most structures the lower coils of the springs 2 are considerably wider than the width of the individual strips employed to make up the composite fabric and accordingly when the lower coil is threaded through the inwardly projecting ribs 7, it will be seen that they pass through at least two of them as clearly shown in Fig. 1. Therefore, the coil spring is secured to the base fabric 3 at four distinct points, although it is to be understood that it can be secured to adjacent ribs at two or three points, depending upon the security desired.

By mounting the springs on the fabric 3 in this manner, it is obvious that all stitching to effect the attachment is eliminated, so that when viewing the seat from the bottom a pleasing and attractive appearance is presented and can be enhanced by employing variously designed webs.

In addition to the foregoing advantage, it will be seen from Fig. 3 that the lower coil passes through the upstanding rib 7 above the main body of the base fabric so that before the springs can wear through the fabric, it is necessary that they first wear through the ribs 7 before they will contact with the fabric forming the bottom of the structure.

This is in contrast with previous constructions employing a single sheet of fabric to which the springs are secured by stitching. In this construction constant use causes the springs to cut through the stitching rapidly, with the result that the lower ends of the springs are free to move with reference to the supporting fabric.

It will be apparent that when the springs 2 are secured to the supporting fabric 3 at two or three points as heretofore described, the free edge or flap 7 that is not penetrated by the lower coil will nevertheless lie beneath the coil and support the same so that it is necessary for the coil to wear through this overlapped edge before the bottom fabric can be injured.

In spring structures of this type, it is customary to tie the springs down and secure to the top of the springs the support for cushions and the like. By this means, therefore, the springs 2 are prevented from turning and consequently cannot become disconnected from the ribs or flaps 7.

In that form of my invention in which tensioning devices are employed, it will be apparent that the supporting fabric 3 terminates short of the rear frame member which would leave an opening for insects and the like. Therefore, this opening is closed by the gusset strip 4 as clearly indicated in Fig. 3 and while I have shown the tensioning devices as being applied at the rear of the frame, it is to be understood that my invention contemplates their use and the use of the gusset strip, at any desired point.

The coil springs constituting the front row are placed as near to the front frame member as possible so that the upper end of the spring will overlie the front frame member and in order to secure these springs in this position, I may employ an additional attaching means consisting of a piece of looped fabric 15 which is secured to the front frame member at 16 and extends over the top edge of the frame as at 17 where it is secured by means of nails or tacks 18.

This attaching member lies directly beneath the upper coils of the front springs so that when the springs contract in use they will contact with the fabric rather than the frame, thereby silencing noise that would otherwise occur.

At the bottom of the front frame the fabric is looped as at 19 to receive the lower coil of the spring 2. Consequently, these springs may be attached to the rib members 7 at only two points and the front of the spring supported by the loop 19. By this construction, the springs at the front of the seat are positively held from shifting rearwardly.

While in some cases it is found desirable to pass the lower coil of the spring through the loop 19, this is not essential in all cases, and when the loop is not employed the spring is threaded through the ribs 7 at a point as closely adjacent to the front frame member as possible. It is likewise possible to thread the coil through one of the ribs 7 adjacent the front frame member, then through the loop 19 and subsequently through the next adjacent rib member 7, so that in this construction the spring will be held at its front edge both by the ribs 7 and the loop 19.

In addition to the function of maintaining the front spring in position and in silencing any noise accruing from contracting of the springs, the loop fabric 15 serves the additional function of preventing to a large degree the wearing out of the cords or ropes that are employed to tie down the rows of springs.

By reference to Fig. 3, it will be seen that these ropes 20 are secured to the frame by means of the tacks 18 and then around the uppermost coil of the several springs of the row, after which they are secured to the rear frame member by suitable tacks 21.

The intermediate coils of the springs are likewise tied by an extension of the rope such as indicated at 22 and in the absence of the fabric strip 15 it is apparent that contracting of the spring under weight will cause the cord or rope 22 to engage the inner upper edge of the front frame member 1, with the result that the cord is quickly cut, thereby releasing the intermediate portion of the spring. The fabric 15, however, eliminates this difficulty.

In one form of my invention the upstanding ribs are illustrated as extending from front to rear of the seat construction, but an equally efficient structure can be produced by providing a composite supporting fabric in which the upstanding ribs extend from side to side of the frame as disclosed in Fig. 8, it being understood that the ribs may extend in any desired direction so long as they afford means for receiving and supporting the lower coils of the spring.

In the form of invention disclosed in Fig. 8, the importance of the looped piece of fabric 15 will be more readily apparent because in this form it may happen that the composite fabric available is not provided with a rib 7 closely adjacent the front frame 1. In such case, the lower coil of the spring, if threaded through the upstanding rib 7, would be without support immediately adjacent said frame member. By using the looped fabric 15, however, it is apparent that whether or not a rib is present adjacent the frame, the front edge of the lower coil may be securely held in position by passing it through the loop 19. In this way it is possible to utilize pieces of fabric that would otherwise be wasted.

Referring now to Figs. 6 and 7, I have illustrated additional forms of supporting fabric that may be used in the same manner as that disclosed in Fig. 5.

The form shown in Fig. 6 is a single sheet provided with tucks 23 which are formed by gathering the fabric and stitching along the line 24 so as to provide free edges or flaps 25 through which the coil of the spring may be threaded as in the previous form of invention.

In Fig. 7 a single sheet of fabric is likewise employed, but in this case independent strips 26 are sewed to the inner face of the fabric 3 as at 27 so that in this case either edge of the strips 26 may be turned so as to receive the coil of the spring which is threaded therethrough.

The fundamental thought underlying my invention is the fact that I am enabled to attach the coil springs to the supporting fabric without the aid of any extraneous means such as stitching, staples or the like, and I intend to include herein all devices in which a rib or ridge is formed on the supporting fabric and is utilized for purposes of support and securing of the springs by threading or looping therethrough. The rib, or ridge, may be formed on the supporting fabric either by the fastening of strips thereto similar to those shown in Fig. 7, or it may be formed integral with and as a part of the fabric itself, as in Fig. 6, or in any other suitable manner.

Therefore, it is possible, although not as desirable, to use inter-laced webs of the conventional type wherein the webs cross each other. In such case, at the point of intersection, the strips of webbing may be stitched together in such manner as to provide a free marginal edge which may be turned inwardly so that the coil of the spring may be passed therethrough. It is obvious that such construction falls within the purview of this invention.

In describing Figs. 5 to 7, I have referred to the fact that stitching is employed, but it is obvious that any form of fastening may be employed

so long as the free edge is provided, and in the form shown in Figs. 5 and 7, the marginal edges that are to receive the coil are preferably provided with a selvage edge so as to eliminate danger of the coil tearing through, due to continual contraction and expansion of the coil spring.

From the foregoing, it will be seen that a simple, efficient and durable structure is obtained and that the coiled springs may be placed at will throughout the length and breadth of the seat frame. Furthermore, sagging is to a large degree eliminated due to the fact that the fabric may be tensioned in two directions, with the additional advantage that the necessity for concealing unsightly stitching on the bottom of the fabric is eliminated.

Due to the double thickness of fabric caused by formation of the ribs it is evident that when these ribs are tensioned or tautly stretched that they act as a reinforcement and render the fabric less susceptible to sagging. It has been found that the rib portion when tensioned is considerably stronger in resisting sag than that portion of the fabric lying between the ribs.

It is to be understood that while I have herein described and illustrated the preferred forms of my invention, I do not intend to limit myself to the precise construction described, but include within its scope whatever changes fairly come within the scope of the appended claims.

I claim:

1. In a device of the character described, a frame, a coil spring supporting fabric secured to said frame, said fabric being provided with ribs, a coil spring on said supporting fabric, a coil of said spring passing through the material of one or more of said ribs to secure the same to the fabric.

2. In a device of the character described, a frame, a coil spring supporting fabric secured to said frame, said fabric being provided with spaced inwardly projecting flaps, a coil spring on said fabric, a coil of said spring passing through one or more of said flaps to secure the same to the fabric.

3. In a device of the character described, a frame, a coil spring supporting fabric secured to said frame, said fabric having strips secured thereto provided with free edges, a coil spring on said fabric, the lower coil of said spring passing through one or more of said edges.

4. In a device of the character described, a frame, a spring supporting fabric secured to said frame, said fabric comprising a plurality of strips secured to each other in overlapping relation and providing a plurality of free edges on the upper side of said fabric, and coil springs on said supporting fabric, said springs each having a coil passing through one or more of said free edges.

5. In a device of the character described, a frame, a spring supporting fabric secured to said frame, said fabric being provided with a plurality of tucks thereby providing flaps on the upper side of said fabric, and coil springs on said fabric, said coil springs each having a coil passing through one or more of said flaps.

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