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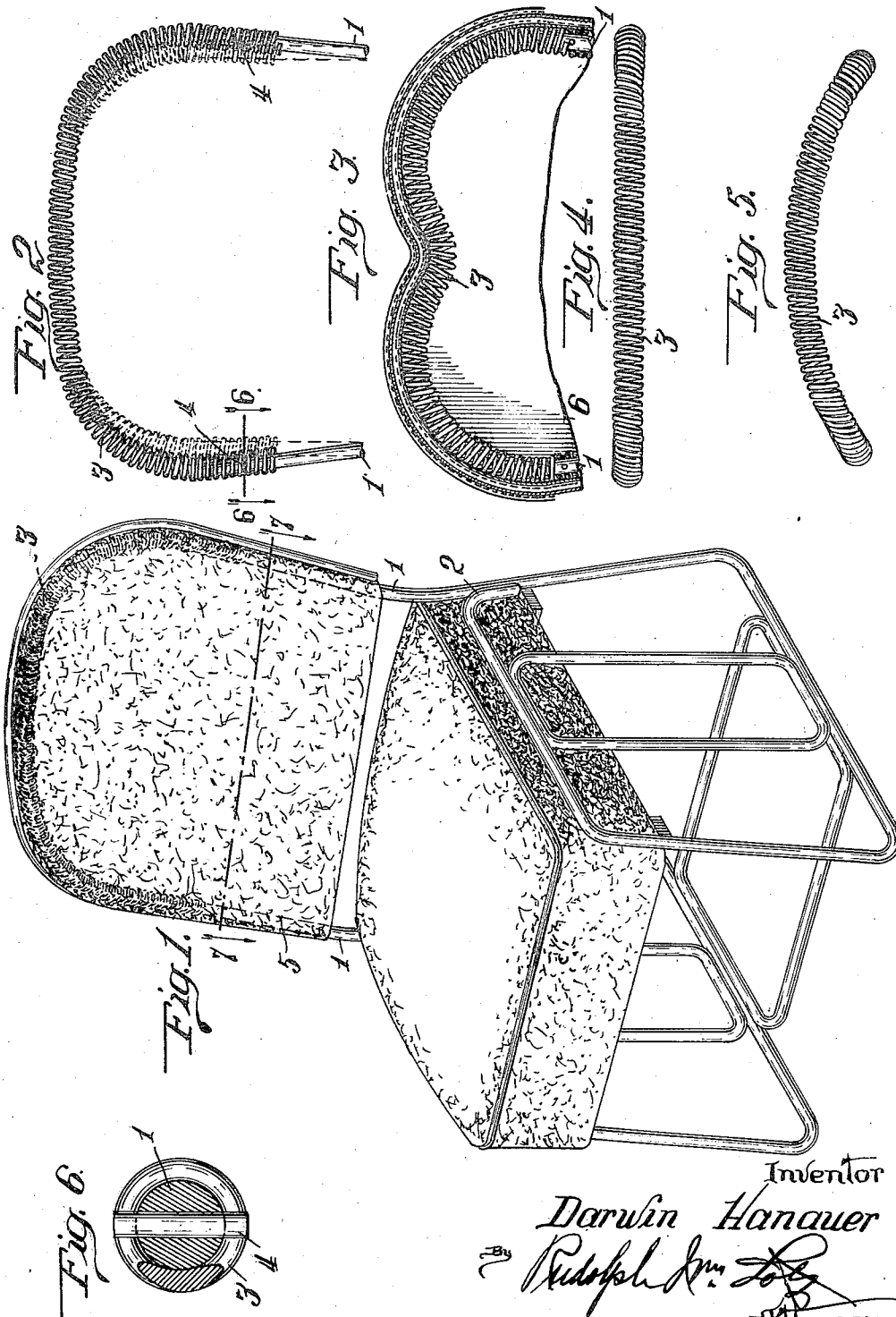
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2,020,028

SEATING FURNITURE BACK SUPPORT

Filed June 27, 1935

2 Sheets-Sheet 1



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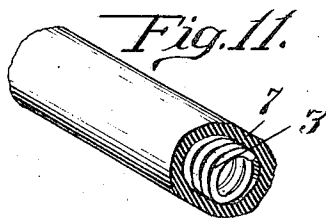
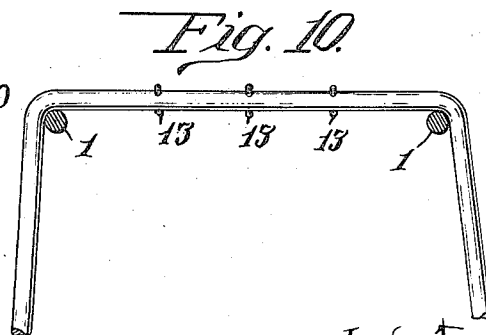
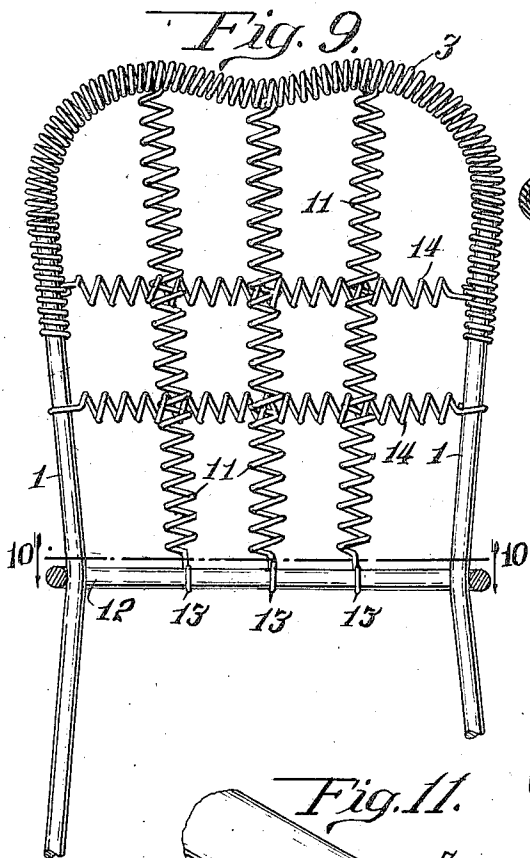
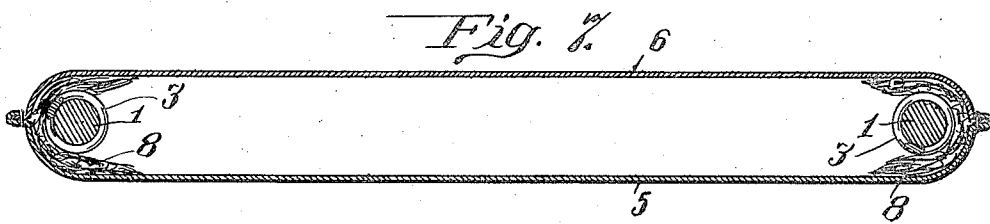
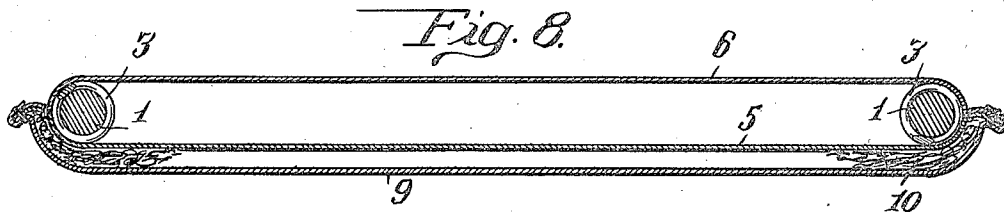
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SEATING FURNITURE BACK SUPPORT

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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SEATING FURNITURE BACK SUPPORT

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13 Claims. (Cl. 155—50)

The main object of the present invention is to provide a back support for a seating furniture unit, such as a chair or the like, which will fit itself yielding to the contour of the back of the person occupying the seat of the unit, so as to render said back extremely comfortable and afford ample, yielding support to the entire back of the occupant, thus preventing the latter from becoming tired for lack of support during a period of hours of occupancy as in playing cards or other games.

A further object of the invention is to provide a back structure for a seating furniture unit which is simple, cheap and durable while presenting all of the desirable advantages aforesaid without resort to expensive upholstery.

The invention is applicable to practically all types of seating furniture units made in whole or in part of materials ordinarily employed in their manufacture, except as hereinafter specifically set forth.

In the accompanying drawings illustrating the invention, the back structure is illustrated as applied to and made a part of chairs, the frames of which are made of metal, and in said drawings,

Fig. 1 is a perspective view of a chair equipped with a back structure made in accordance with the invention.

Fig. 2 is a fragmentary view in elevation of the side and top rails of the back structure per se indicating the manner in which said elements are flexed under the influence of load or pressure.

Fig. 3 is a fragmentary, sectional view showing the upper extremities of the said rail and all of the top rail of the back structure as enclosed in a cushion web of a different shape from that shown in Fig. 1 and illustrating how the top rail will conform itself to the shape of the upper edge portion of the said web.

Fig. 4 is a top plan view of the top rail of the back structure as it is shaped normally.

Fig. 5 is a similar view showing the said top rail as flexed under the influence of pressure exerted against the same by an occupant of the chair.

Fig. 6 is a fragmentary plan section on an enlarged scale taken on the line 6—6 of Fig. 2 showing how the top rail is secured along an end portion thereof to the end portion of a side rail.

Fig. 7 is a plan section on an enlarged scale taken on the line 7—7 of Fig. 1.

Fig. 8 is a sectional view similar to Fig. 7 illustrating a modified form of construction.

Fig. 9 is a front elevation of the back frame of a chair shown in modified form of construction

thereof and showing also an upper member of the base frame of the chair in section.

Fig. 10 is a fragmentary plan section taken on the line 10—10 of Fig. 9, omitting illustration of certain of the springs shown in Fig. 9.

Fig. 11 is a perspective view illustrating a modification in construction of the arched top spring of the chair frame.

Fig. 12 is a plan section similar to Fig. 5, further illustrating the modification of construction shown in Fig. 11.

The invention consists essentially in providing a pair of flexible, but non-elastic side rails (1) at the back or rear portion of the frame of the seating unit, which extend upwardly to a desired height and which are free to flex from the point of their attachment, as at (2), with the base frame of the seating unit to their upper extremities. The length of said side rails will be dependent upon the desired height of the back structure. Said side rails (1) may be constructed of a heavy wire, tubing or other flexible metal and the same may be arranged to diverge slightly from each other toward their upper ends or may be otherwise disposed relatively to each other as may be best adapted to the design of the particular seating furniture unit to which the invention is applied.

A helical spring (3) composed of a wire of sufficiently heavy gauge and close winding to best serve the purposes for which it is intended, is engaged telescopically at its opposite end portions with the respective side rails (1) along their upper end portions so that said spring (3) will form an arch spanning the space between the side rails (1) and extending upwardly therefrom to any desired elevation.

The said end portions of said spring (3) which receive the upper end portions of the side rails (2) are secured in place by means of cross pins (4) as particularly illustrated in Fig. 6 or in any other suitable manner.

Secured along its side and upper edge portions to said side rails (1) and spring (3) is a web (5) of a suitable non-elastic material such as leather or textile fabric. Preferably said web constitutes the front wall of a flat inverted bag structure which includes a rear wall (6) coinciding in shape and size with said web (5) and which is stitched thereto along its side and top edges.

Preferably, the bag structure (5—6) will be of slightly less width than the space between the side rails (1) and will present an upper arched edge or closed end portion conforming in contour

with the arch formed by the spring (3) as illustrated in Fig. 1 but the same may be shaped variously, as, for example, is illustrated in Fig. 3, so that said bag structure will be maintained distended by said side rails (1) and spring (3) and will cause the spring (3) to conform itself to the contour of the upper or arched edge portion of said bag structure (5-6). The latter will be held in place on the side rails (1) and spring (3) by friction but may be secured in place in any suitable manner.

In order that the convolutions of the spring (3) may not be felt by the occupant of the chair, the same may be enclosed in a rubber hose (7) as shown in Figs. 11 and 12 or may be suitably wrapped to provide an equivalent of the hose (7). Or, as shown in Fig. 7, suitable fibrous padding material (8) may be disposed between the spring (3) and the opposed portions of the bag structure (5-6).

As shown in Fig. 8, the front wall of the bag structure (5-6) may constitute also the rear wall of a cushion element which includes the front wall (9) and a layer (10) of padding material disposed between the walls (5) and (9), said front wall (9) coinciding substantially in shape and size with the wall (5) and being suitably secured thereto along its peripheral edges.

Obviously, the walls (5 and 6) may constitute the wall of any desired type of upholstery unit that it may be desired to employ in connection with the structure.

In Fig. 9, there is illustrated a back-frame structure which includes the side rails (1), spring (3) and additional helical springs which include three springs (11) each secured at one end to the spring (3) at spaced apart points and which are secured at their other ends to a cross-rail (12) of the base frame of the chair at spaced apart points, the securing means being hooks (13) at the ends of said springs (11) and spot-welds securing the lower end hooks (13) to the rail (12).

The said springs (11) may be arranged to impart to the arch of the spring (3) any desired contour and, to this end, the number and relative spacing apart and arrangement of the springs (11) may be changed and varied.

Cross-springs (14), preferably interlaced with the springs (11) and suitably secured at their ends to the side rails (1) may be included in the back structure, all of said springs (3), (11) and (14) constituting elastic frame members which are both flexible and elongatable but whose flexion, elongation, and contraction are limited by the web (5) or bag structure (5-6).

The preferred construction is illustrated in Fig. 1 to 8 inclusive which has been found to be extremely efficient and presents the advantages of being simplest, lightest and cheapest.

Obviously, if the spring (3) is enclosed in a rubber hose or is otherwise reinforced, its flexibility will be decreased appreciably and this may be desirable in instances wherein the back is of a height sufficient to include a head-rest and, more particularly, if the back of head-rest height is tiltable to afford a reclining member.

While the back support is illustrated herein as applied to a metal frame chair, it will be apparent to those skilled in the art that the same may be applied to chairs of all types and to other seating furniture units without departing from the invention.

Obviously, the spring (3) lends itself readily to flexion to conform itself to the particular contour of the upper edge portion of the bag struc-

ture (5-6) and is exemplified in Fig. 3 and, in the event that any other type of web structure is employed, the same may be shaped as desired and so engaged with the spring (3) as to distort or shape the same to the contour desired.

From the foregoing description it will be apparent that the structure of this invention consists essentially of a pair of spaced apart flexible but non-elastic bars, a non-elastic but flexible web structure engaged with and maintained taut by said bars, and one or more flexible and elastic members cooperating with said bars and said web structure to provide a well-shaped and yielding back which conforms itself easily to the back of the occupant of the seating unit over the entire area of contact between the web structure and the said occupant.

Responsively to pressure exerted against the web structure, the side rails (1) will be caused to move toward each other along their upper end portions and also to flex rearwardly.

I claim as my invention:

1. A seating furniture unit such as a chair, comprising a base frame, a seat surface thereon, and a back supporting structure comprising a pair of substantially upright flexible side rails rigidly secured at their lower ends to the base frame at the rear of the latter in spaced relation to each other and projecting above the seat surface thereof, a flexible substantially inelastic web secured along its side edges to the said side rails from the upper extremities to the lower end portions of the latter and normally presenting a substantially taut surface to the back of an occupant of the chair, said side rails being increasingly yielding from their lower to their upper ends, and a cross member of greater flexibility than said side rails secured at its ends to the upper ends of the latter and engaged with the upper edge of said web and permitting substantially unresisted flexing of said side rails while yieldingly resisting flexing of the upper edge portion of the said web.

2. A seating furniture unit such as a chair, comprising a base frame, a seat surface thereon, and a back supporting structure comprising a pair of substantially upright flexible inelastic side rails rigidly secured at their lower ends to the base frame at the rear of the latter at approximately the respective rear corners of and projecting above the seat surface of said base frame, a flexible substantially inelastic web secured along its side edges to the said side rails from the upper extremities to the lower end portions of the latter and normally presenting a substantially taut surface to the back of an occupant of the chair, said side rails being increasingly yielding from their lower to their upper ends, and a cross member of greater flexibility than said side rails secured at its ends to the upper ends of the latter and projecting between its ends above the level of the upper ends of said side rails, said member being engaged with the upper edge of said web to support the same and permitting substantially unresisted flexing of said side rails while yieldingly resisting flexing of the upper edge portion of the said web.

3. A chair comprising a base frame, a seat surface supported thereby, a pair of flexible substantially upright members secured to said base frame at the rear thereof in spaced relation to each other and below the level of said seat surface, said members being divergent from each other toward their upper ends above the level of said seat surface, and a flexible, substantially

inelastic web of less width than said side rails encompassing the latter along their side edges and maintained laterally distended thereby while maintaining said members flexed toward each other and divergent toward their upper ends, said web including a portion overlying the upper extremities of said members and cooperating with the normally divergent relation of the latter to maintain said web in position on said member.

4. A chair back structure including a pair of flexible side rails rigidly associated at their lower ends with the rear end portion of the chair frame and maintained spaced apart by the latter, a self-restoring cross rail member of greater flexibility than said side rails secured at its ends to the upper end portions of the latter and bridging the same, and a flexible web secured to the side rails along its side edges and to said cross-rail member along its top edge, said web being maintained normally distended by said side rails and having its upper edge portion supported against sagging by said member.

5. A chair-back structure including a pair of flexible side rails rigidly associated at their lower ends with the rear end portion of the chair frame and maintained spaced apart by the latter, a self-restoring cross-rail member of greater flexibility than said side rails secured at its ends to the upper end portions of the latter and bridging the same, and a flexible web secured to the side rails along its side edges and to said cross-rail member along its top edge, said web being maintained normally distended by said side rails, said cross-rail member presenting substantially arcuate end portions and conforming itself yieldingly to the contour of the upper edge of said web and providing a yielding distending and supporting means for all of the portion of said web disposed above the level of the upper extremities of said side rails in all relative positions of the latter resulting from pressures exerted on said web.

6. A seating furniture unit such as a chair, comprising a base frame, a seat surface thereon, and a back supporting structure comprising a pair of substantially upright flexible side rails rigidly secured at their lower ends to the base frame rearwardly of the seat surface of the latter and in spaced relation to each other, said rails projecting above the said seat surface, a flexible substantially inelastic web secured along its side edges to the said side rails from the upper extremities to the lower end portions of the latter and maintained taut laterally thereby, said side rails being increasingly yielding from their lower to their upper ends, and an elastic flexible cross member of greater flexibility than said side rails secured at its ends to the upper ends of the latter and engaged with the upper edge of said web and permitting substantially unresisted flexing of said side rails while yieldingly resisting flexing of the upper edge portion of the said web, said cross member conforming itself to the contour of the upper edge of said web and supporting the same.

7. A seating furniture unit such as a chair, comprising a base frame, a seat surface thereon, a pair of substantially upright flexible rails rigidly secured at their lower ends to the base frame at the rear of the latter in spaced relation to each other and projecting above the seat surface thereof, said side rails being increasingly yielding from their lower to their upper ends, and an elastic arched cross member of greater flexibility than said side rails secured at its ends to the upper ends of the latter and projecting between its

ends above the level of the upper extremities of said side rails, and permitting flexing of said side rails in all directions, and means engaged with said side rails and said member and occupying free space bordered by said rails and said member for cooperation therewith to provide a yielding back support for an occupant of said seat surface.

8. A seating furniture frame including a pair of flexible spaced apart and substantially upright members rigidly secured at their lower ends to the base frame at the rear of the latter and projecting above the seat portion of the same, and a helical spring having its end portions telescopically engaged with and secured to the upper end portions of said uprights and presenting an arch-formation projecting above and spanning the space between said members.

9. A seating furniture frame equipped at the rear thereof with a pair of spaced apart uprights rigidly secured thereto at their lower ends and projecting above the seat portion of the same, and a plurality of helical springs secured at their ends to and spanning the space between said uprights, one of said springs being telescopically engaged at its ends with the upper end portion of said uprights and presenting an arch-formation above the latter.

10. A seating furniture frame equipped at the rear thereof with a pair of spaced apart flexible uprights rigidly secured thereto at their lower ends and projecting above the seat portion of the same, and a plurality of helical springs secured at their ends to and spanning the space between said uprights, one of said springs being telescopically engaged at its ends with the upper end portions of said uprights and presenting an arch-formation above the latter, one of the first named springs being engaged at its ends with the portion of the last-named spring which is telescopically engaged with the said uprights, and at least one helical spring engaged at one end with the said arched helical spring between the ends of the latter and engaged at its other end with the said seat frame.

11. A seating furniture unit such as a chair, comprising a base frame, a seat surface thereon, and a back supporting structure comprising a pair of substantially upright flexible side rails rigidly secured at their lower ends to the base frame at the rear of the latter in spaced relation to each other and projecting above the seat surface thereof, a flexible substantially inelastic web secured along its side edges to the said side rails from the upper extremities to the lower end portions of the latter and including a portion disposed above the level of the upper extremities of the side rails, and mainly normally presenting a substantially taut surface to the back of an occupant of the chair, said side rails being increasingly yielding from their lower to their upper ends, and an arched helical spring secured at its opposite end portions to the upper end portions of the said side rails and having its middle portion disposed above the level of the upper extremities of the side rails and engaged with the upper edge portion of said web for support thereof, said spring being adapted to conform itself to the contour of the upper edge of said web.

12. A seating furniture unit comprising a base frame equipped with a seat surface, a pair of substantially upright flexible members rigidly secured at their lower ends to the rear end of the base frame and projecting above the level of the said seat surface in spaced relation to each other,

flexible elastic means secured to said members and bridging the space between the same, and a flexible substantially inelastic web of less width than the space between said members secured
5 along its side edges to the latter and maintaining them normally flexed toward each other, whereby said web is maintained normally distended, said web being disposed over the said elastic means on the side thereof opposed to said seat
10 surface and being supported in part by the latter when flexed by pressure of the back of an occupant of said seat surface exerted against said web.

13. A chair comprising a base-frame, a seat
15 surface supported thereby, a pair of substantially upright independently flexible members having free upper ends capable of flexing in all directions and rigidly secured at their lower ends to the rear end portion of the base frame in spaced re-

lation to each other and projecting above the seat surface, the points of junction of said members with said base frame being appreciably below the level of said seat surface, and a flexible substantially inelastic web secured along its side edges to said members and maintained taut thereby, said web presenting a lower edge portion disposed proximately to the level of said seat surface and sufficiently above and spaced from said points of junction of said members with said base frame to be disposed at an appreciably yielding portion of said members and in position to bear against the small of the back of an occupant of the seat surface, the remainder of said web being disposed to yieldably support higher portions of the back
15 of the said occupant, said members being adapted to flex throughout their lengths responsively to pressures exerted against the said web.

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