Dec. 15, 1942. S. J. GEDRIS 2,305,074

CHAIR

Filed Nov. 30, 1940 3 Sheets-Sheet 1

Fig. 1

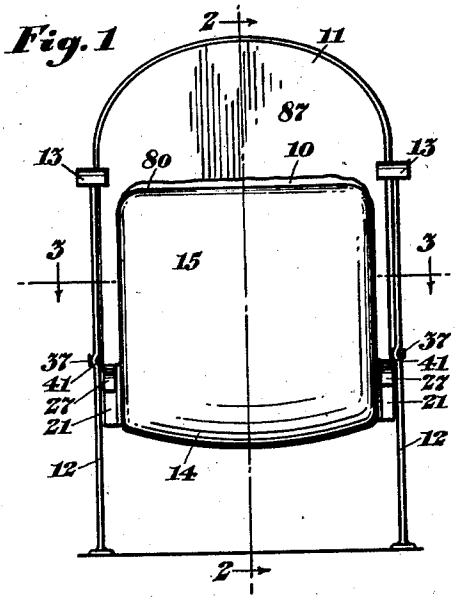


Fig. 2

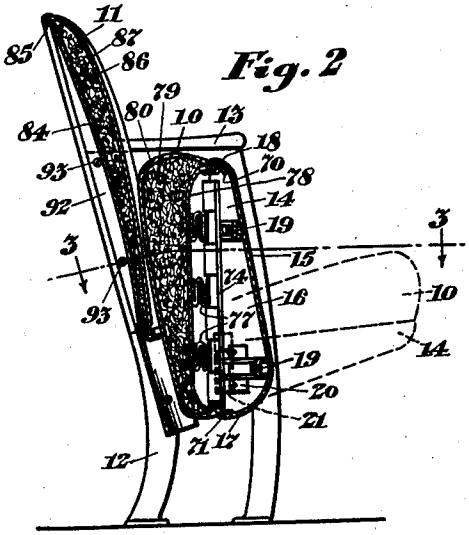


Fig. 3

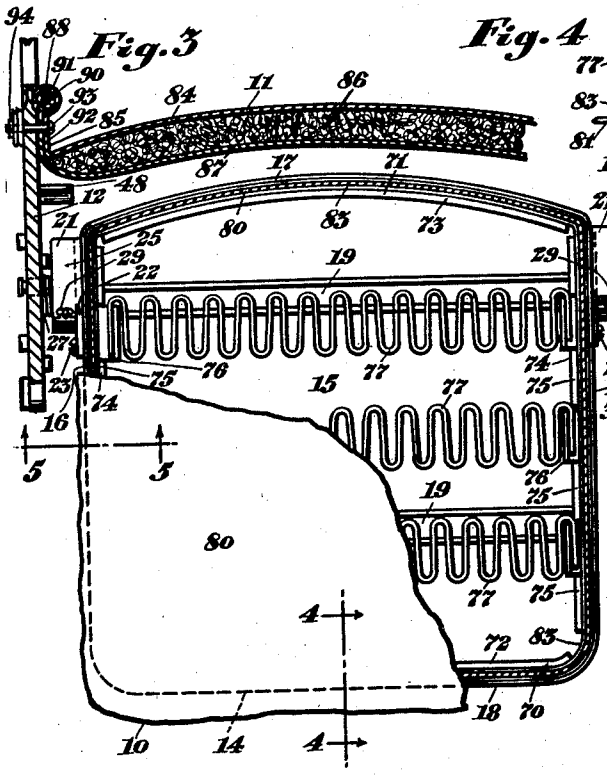


Fig. 4

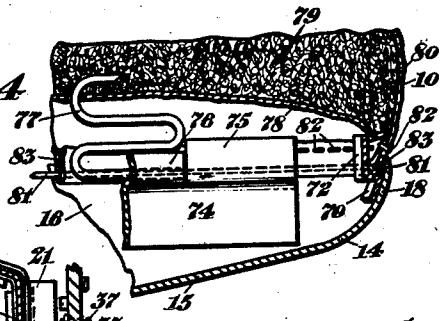
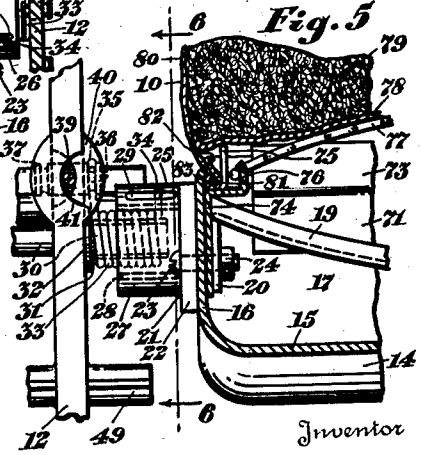


Fig. 5



Inventor

Stanley J. Gedris

Witness:-

Beatrice Bouma

By John S. Braddock

Attorney

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CHAIR

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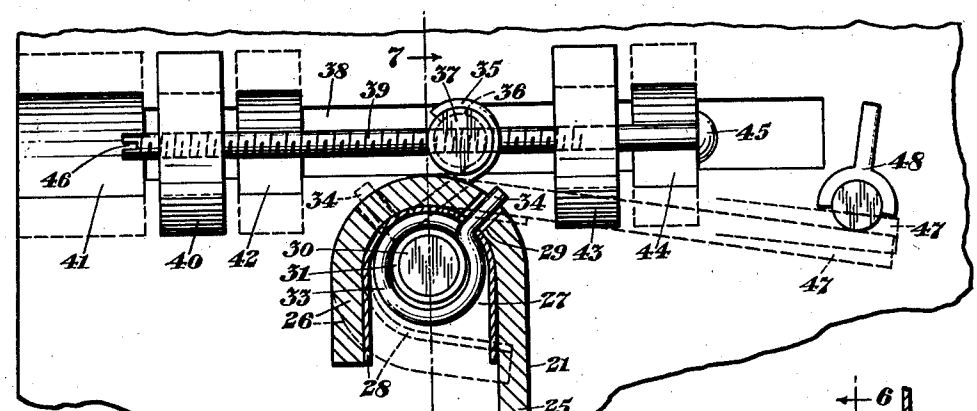

Fig. 6

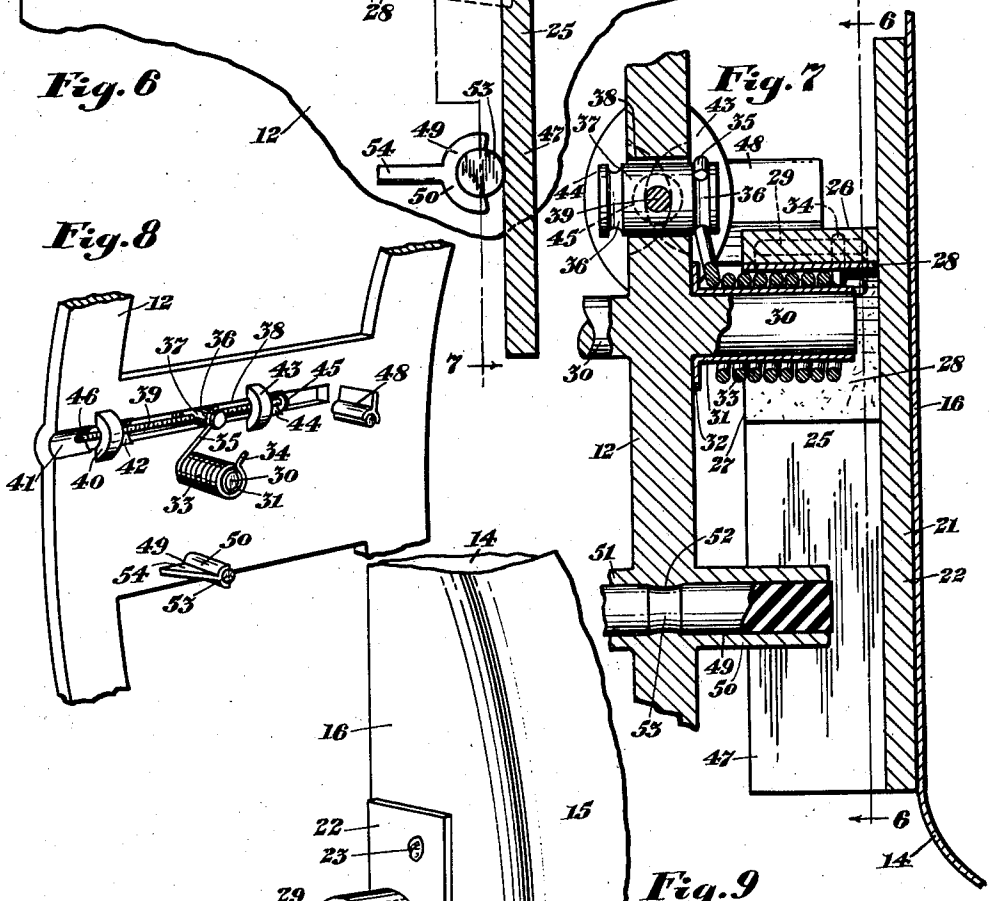

Fig. 7

Fig. 8

Fig. 9

Witness:—

Beatrice Bouma

Inventor

Stanley J. Gedris

By John S. Braddock

Attorney

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Fig.10

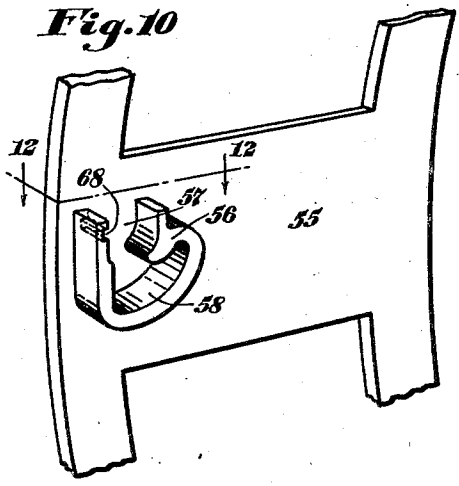
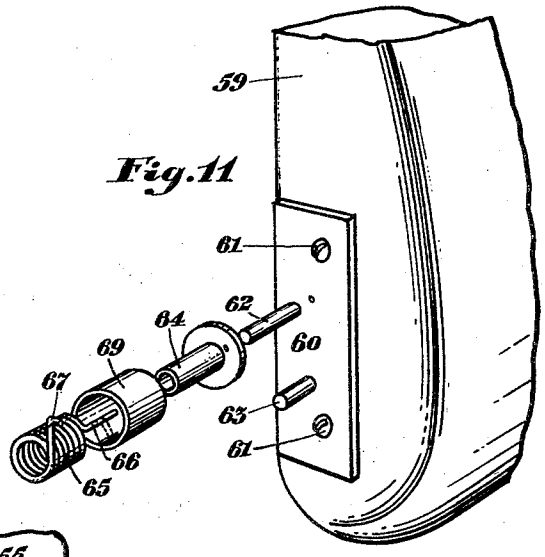


Fig.11



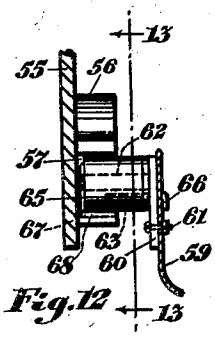


Fig.12

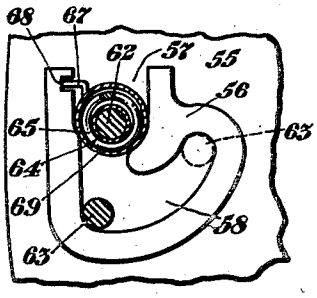


Fig.13

Fig.17

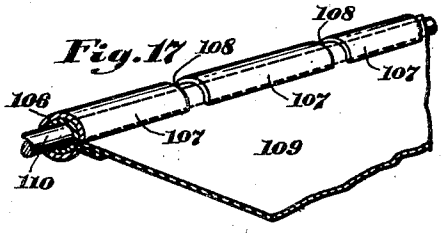


Fig.18

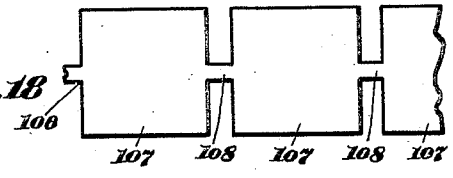


Fig.14

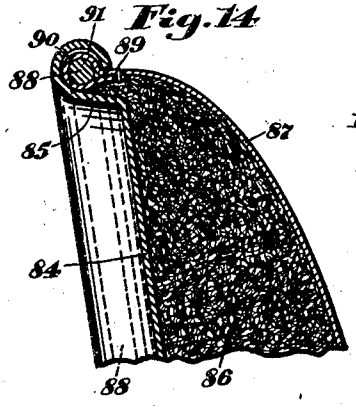


Fig.15

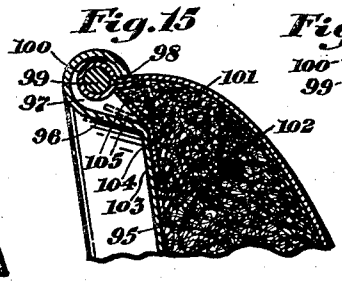
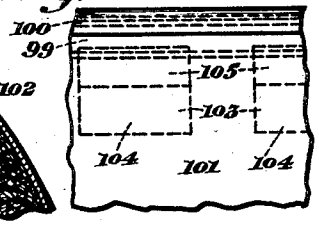


Fig.16



Inventor

Stanley J. Gedris

Witness:-

Beatrice Bouma

By John S. Braddock

Attorney

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UNITED STATES PATENT OFFICE

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CHAIR

Stanley J. Gedris, Grand Rapids, Mich.

Application November 30, 1940, Serial No. 367,903

6 Claims. (Cl. 155—85)

The present invention relates to chairs and more particularly to chairs of the theater type such as are installed in rows in motion picture houses, opera houses, auditoriums and the like.

The primary objects of the invention are to provide a theater chair having improved seat pivot connections between the chair seat and the supporting standards therefor; to provide such seat pivot connections which normally maintain the chair seat in a raised position of non-use and which are yieldable to permit easy lowering of the seat to a position for occupancy; to provide such seat pivot connections which are tensionally adjustable in order that the force with which the seat is automatically raised to its position of non-use may be varied as desired; to provide improved seat pivot connections of such construction that compensation is made for angular disposition of the supporting standards in curved rows of chairs without the necessity of modifying the seat pivot connections themselves; to provide such seat pivot connections which are quiet in operation; to provide improved stops for limiting the raising and lowering movements of the chair seat; to provide improved means for attaching upholstering material to the chair seat; to provide improved means for attaching upholstering material to the chair back and for mounting the chair back on its supporting standards; and in general to provide such an improved theater chair which is convenient in assembly, economical in manufacture, and attractive in appearance.

Illustrative embodiments of the invention are shown in the accompanying drawings wherein:

Figure 1 is a front elevational view of a theater chair, the seat thereof being shown in a raised position of non-use;

Figure 2 is a sectional view of the same taken on line 2—2 of Figure 1, the seat being here shown in its raised position of non-use in full lines and being indicated in its lowered position for occupancy in dotted lines;

Figure 3 is an enlarged fragmentary sectional view thereof taken on lines 3—3 of Figures 1 and 2, the seat being here shown in its lowered position for occupancy, and certain portions of said seat being broken away to show the interior construction thereof;

Figure 4 is an enlarged fragmentary sectional view taken on line 4—4 of Figure 3;

Figure 5 is an enlarged fragmentary sectional view taken on line 5—5 of Figure 3;

Figure 6 is a fragmentary sectional view taken on lines 6—6 of Figures 5 and 7;

Figure 7 is a fragmentary sectional view of the same taken on line 7—7 of Figure 6;

Figure 8 is a fragmentary perspective view of a chair standard and certain seat pivot connections mounted thereon;

Figure 9 is a fragmentary perspective view of a seat pan with certain seat pivot connections secured thereto;

Figure 10 is a fragmentary perspective view similar to Figure 8 but showing a chair-supporting standard provided with a modified form of seat pivot connection;

Figure 11 is a fragmentary perspective view of a seat pan similar to Figure 9 but showing modified seat pivot connections adapted for assembly with the standard shown in Figure 10;

Figure 12 is a sectional view of the modified form of standard taken on line 12—12 of Figure 10 and showing the seat and seat pivot connections of Figure 11 in assembly with the standard;

Figure 13 is an enlarged fragmentary sectional view of the same taken on line 13—13 of Figure 12;

Figure 14 is an enlarged central vertical sectional view through the top portion of the chair back;

Figure 15 is a sectional view similar to Figure 14 but showing a modified construction of the chair back;

Figure 16 is a fragmentary front elevational view of the modified form of a chair back shown in Figure 15;

Figure 17 is a fragmentary perspective view of securing means for attaching the marginal edge of upholstery material to a peripheral rod; and

Figure 18 is a fragmentary plan view of the securing means shown in Figure 17 prior to its application to the upholstery material.

Referring now in detail to these drawings wherein like parts are designated by the same numerals in the several views, the theater type chair there shown comprises a chair seat generally designated 10 and a chair back generally designated 11 independently mounted between and supported by a pair of horizontally spaced vertically disposed chair supporting standards 12 having arm rests 13 secured thereto. Such chairs are conventionally installed in rows, each standard 12 serving as a support for the two chairs on opposite sides thereof. As disclosed in Figures 1 to 9 inclusive, the chair seat 10 comprises a seat pan 14 having a bottom 15 and upstanding side walls 16, rear wall 17 and front wall 18. Braces 19 are preferably provided within the seat

pan 14 for lending rigidity to the pan and are here shown as formed of channel irons having flat downwardly turned flanges 20 secured as by welding to the inner surfaces of the side walls 16 of the seat pan (see Fig. 5).

Seat supporting brackets generally designated 21 are mounted on the opposite sides 16 of the seat pan 14 and near the rear thereof, each of which brackets 21 comprises an integrally formed length of angle iron having one flange 22 thereof secured in forward to rearward disposition to a side wall 16 of the seat pan as by means of bolts 23 passing through apertures in the flange 22 and in the side wall 16 and provided with nuts 24 on the inner ends thereof. As shown in Figure 5, these bolts 23 may also pass through apertures in the near flange 20 of the rearward brace 19 to further strengthen the assembly. The other flange 25 of each angle iron bracket 21 has its forward end portion 26 severed from the flange 22 and rearwardly curled to form a U-shaped socket 27 extending laterally outwardly from the side wall 16 of the seat pan 14 and opening toward the rear of the seat, as best seen in Figure 9. A U-shaped fibre insulator 28 is secured as by means of glue to the inside surface of the socket 27, and a horizontally elongated slot 29, the function of which will hereinafter be described, extends through the forward upper portion of both the socket 27 and the insulator 28.

Each chair supporting standard 12 is provided with two oppositely extending and preferably integrally cast seat supporting pivot pins 30, the pivot pin on one side of each standard extending horizontally inwardly (with respect to the seat supported thereby) toward the complementary pivot pin 30 on the other standard of a chair supporting pair thereof. An annular fibre insulator 31 circumscribes each pivot pin 30 and is provided with a lateral flange 32 which is preferably secured to the adjacent face of the standard 12 as by means of glue. A cylindrically wound helical torsion spring 33 circumscribes each pivot pin 30 and its annular insulator 31, such spring being shown in its relaxed condition in the full lines of Figure 6 and in Figures 7 and 8. This spring 33 has its inner end 34 adjacent the chair seat 10 turned radially rearwardly and upwardly when in its relaxed condition.

The elongated outer end 35 of the spring 33 extends rearwardly and upwardly and is hooked within the adjacent end groove 36 of a cylindrical block 37 mounted for forward-rearward sliding movement within a slot 38 extending through the standard 12 and forwardly-rearwardly therein. The block 37 is screw-threaded on the threaded medial portion of a shaft 39 turnably journalled at its forward end in a bearing consisting of complementary bearing parts 40 and 41, 42 cast integrally with the chair standard 12, and the shaft 39 is similarly journalled at its rearward end in a bearing consisting of complementary bearing parts 43 and 44 likewise cast integrally with the chair standard 12. The rearward end of the shaft 39 is provided with a head 45 which abuts the rear bearing part 44 to prevent forward movement of the shaft 39, while the spring 33, because of the connection of this spring's outer end 35 to the block 37, restrains the shaft 39 against rearward movement.

The seat 10 is assembled on a pair of chair supporting standards 12 by holding the seat in its raised position of non-use between the standards, the seat pan 14 being in its position indicated in Figure 9, and then lowering the seat until the sockets 27 on opposite sides of the seat pan embrace the helical springs 33 on the standards. The inner radially turned end 34 of each spring 33 engages in the slot 29 through the socket 27 and the U-shaped fibre insulator 28. The seat is thus mounted in its normally raised position, and it will be seen that when the seat is manually lowered for occupancy, the torsion springs 33 are tensioned for automatic raising of the seat when the occupant vacates the chair. The lowered positions of the sockets 27, the U-shaped insulators 28, and the helical springs 33 are best indicated in Figure 6. It will further be seen that the amount of tension to be placed on each helical spring 33 when the chair seat is lowered may be pre-adjusted as desired by inserting a screwdriver in the kerf 46 in the forward end of the shaft 39 and turning the shaft until the block 37 threaded thereon has moved far enough forwardly or rearwardly to effect the desired tension on the spring 33.

As best seen in Figures 6 and 7, the upper or rearward arm of each U-shaped socket 27 is elongated to form a striker 47 adapted to contact a stop 48 for limiting the lowering movement of the seat 10, or to contact a stop 49 for limiting the raising movement of the seat 10, these stops 48 and 49 being arcuately spaced with relation to the pivot pin 10. The stops 48 and 49 being identical in construction, only one—the stop 49—need be described. This stop 49 comprises a substantially semi-annular positive stop 50 projecting laterally into the path of the striker 47, and is integrally cast with the standard 12. On the opposite side of the standard is a similar positive stop 51 for the seat of the adjacent chair, and these positive stops 50 and 51 form a pair concentric with an aperture 52 through the chair standard 12. A single cylindrical rubber cushioning element 53 extends through the aperture 52 in the standard and into the hollow center of both positive stops 50 and 51 for cushioning the stopping of the adjacent chair seats. Preferably the aperture 52 is restricted as shown in Figure 7 to thus grip the rubber element 53 in position, and the positive stops 50 and 51 may have strengthening ribs 54 cast therewith as shown.

The annular fibre insulator 31 on the pivot pin 30, as shown in Figures 6 and 7, has an outside diameter somewhat smaller than the inside diameter of the helical torsion spring 33, and the U-shaped fibre insulator 28 in the socket 27 has an inside diameter somewhat larger than the outside diameter of the helical spring 33. This loose fit between the pin and socket connections permits a limited angular adjustment in vertical planes respectively of the chair standards relative to the seat supported therebetween, and thus the chairs may be installed in curved rows having horizontally angularly positioned standards without the necessity of modifying the seat pivot connections in any way.

Manifestly, substantially equivalent means for compensating for the curvature in a row of theater chairs would be loosely fitted pin and socket connections between the chair seat and its supporting standards in which connections the pins would be on the opposite sides of the seat and the sockets on the standards. Such a modified structure is shown in Figures 10 to 13 inclusive. The standard 55 there shown is provided with a laterally inwardly extending boss 56 forming an upper socket 57 and an arcuate lower groove 58. The seat pan 59 has a supporting bracket 60 secured to each of its opposite sides as by means

of bolts 61, said brackets each being provided with a laterally outwardly extending pivot pin 62 and a laterally outwardly extending stop 63. Interposed between the pivot pin 62 on the seat pan 59 and socket 57 on the standard 55 are, in the order named, an annular fibre insulator 64, a cylindrically wound helical torsion spring 65 having an inner end 66 secured to the seat pan 55 and an outer end 67 anchored in a groove 68 in the boss 56 at the time the chair is assembled, and a cylindrical fibre insulator 69. It will be readily seen that the looseness of fit between the annular insulator 64 and the helical spring 65, and between the cylindrical insulator 69 and the helical spring 65, permits limited angular adjustment in a vertical plane of the chair standard 55 relative to the chair seat. The stop 63 on the supporting bracket 60 travels in the arcuate groove 58 of the standard 55 and limits the raising and lowering movements of the seat when coming into contact with the ends of the groove.

In the seat pivot connections shown in Figures 1, 2, 3 and 5 to 9 inclusive, and also in the modified connections shown in Figures 10 to 13 inclusive, the presence of the fibre insulators effectively eliminates any noise which might otherwise occur during raising and lowering movements of the chair seat.

Means for upholstering the chair seat are shown in Figures 2–5 inclusive. A bracket 70 is secured as by welding to the inner surface of the front wall 18 of the seat pan 14, and a similar bracket 71 is secured to the inner surface of the rear wall 17 of the seat pan. Each of these brackets 70, 71 has an upper flanged portion 72, 73 respectively which flanged portions extend inwardly and then upwardly. Side wall brackets 74 are secured as by welding to the inner surfaces of the side walls 16 of the seat pan and are provided with alternating inwardly upwardly flanged portions 75 and hook portions 76. A plurality of upwardly bowed undulate seat supporting springs 77, here shown as three in number, extend from side to side of the seat pan 14 and have their end portions attached to the hook portions 76 of the side wall brackets 74. An insulation sheet 78 of burlap or the like is stretched over the springs 77, and a layer of padding 79 of cushioning material such as cotton, hair or sponge rubber is placed over the insulation sheet 78. An upholstery sheet 80 of suitable material such as fabric or leather covers the padding 79 and is secured to the seat pan 14 by means of an elongated semi-rigid member such as the rod or wire 81 secured by stitching 82 within the peripheral hem 83 of the upholstery sheet 80, the rod or wire 81 and the peripheral hem 83 of the upholstery sheet 80 being clamped between the inwardly curled upper portions of the walls 16, 17, 16, 18 of the seat pan 14 and the upper flanged portions 75, 73, 75, 72 respectively of the brackets 74, 71, 74, 70.

The chair back as shown in Figures 2, 3, and 14 comprises a horizontally rearwardly bowed and vertically forwardly bowed metal back plate 84 having a continuous rearwardly extending flange 85 at the top and sides thereof. Padding 86 of cushioning material such as cotton, hair or sponge rubber is disposed over the front surface of the back plate 84 and an upholstery sheet 87 of suitable material such as fabric or leather covers the padding 86. An elongated semi-rigid member such as the rod or wire 88 is secured as by stitching 89 within the continuous hem 90 at the top and side margins of the upholstery sheet 87, and the continuous rearwardly extending flange 85 on the back plate 84 is curled outwardly, forwardly and then inwardly to form a pocket 91 embracing and firmly retaining therein the rod 88 and the hem 90 at the top and side margins of the upholstery sheet 87 (see Fig. 14).

The relatively wide side portions 92 of the rearwardly extending flange 85 on the back plate 84 are secured to the supporting standards 12 as by means of bolts 93 extending through the side portions 92 of flanges 85 on adjacent chair back plates 84 and through the supporting standard 12 therebetween and provided with nuts 94. The chair back 11 as thus constructed possesses sufficient flexibility to adapt itself to the angularly positioned standards in a curved row of chairs.

Figures 15 and 16 illustrate a modification of the means for securing the upholstery sheet to the back plate. In these views, the back plate 95 is provided at the top and sides thereof with a continuous rearwardly extending flange 96 which is curled outwardly, forwardly and then inwardly prior to assembly of the chair back to form a pocket 97 having a forward opening 98 of sufficient width to permit insertion therein of a rod 99 and the hem 100 of an upholstery sheet 101 covering the padding 102. In this instance, a plurality of spaced clips 103 are provided, each having a portion 104 secured to the back plate 95 and a springable portion 105 extending into the pocket 97. These springable portions 105 of the clips 103 normally press forwardly and upwardly toward the inwardly curled portion of the flange 96. It will be seen that the springable portions 105 of the clips 103 will yield to the position indicated in dotted lines in Figure 15 when the rod 99 and hem 100 of the upholstery sheet 101 are inserted into the pocket 97, but after such insertion, these springable portions 105 of clips 103 spring forwardly and upwardly to securely retain the rod 99 and the hem 100 of the upholstery sheet 101 within the pocket 97.

Figures 17 and 18 disclose modified means for securing flexible sheets like the upholstery sheets of the chair seat and chair back previously described, to the rods within the marginal edges of such sheets to eliminate stitching of the sheets. A thin sheet metal strip 106 is formed with wide portions 107 and narrow connecting portions 108 as shown in Figure 18. The marginal edge of the flexible upholstery sheet 109 is folded over the rod 110, and the wide portions 107 of the metal strip 106 are then independently curled around both the flexible sheet and the rod thus gripping the flexible sheet between the metal strip 106 and the rod 110.

While but several specific embodiments of the invention have been herein shown and described, it will be understood that certain details thereof may be altered or omitted without departing from the spirit of the invention as the same is defined by the following claims.

I claim:

1. In a chair structure of the class described, a pair of horizontally spaced vertically disposed chair supporting standards each provided with a horizontally inwardly extending pivot pin, a chair seat provided at each side thereof with a laterally outwardly extending U-shaped socket opening toward the rear of the seat and pivotally supported by the pivot pin of the chair standard adjacent thereto, and a cylindrically wound helical torsion spring interposed between one of said pivot pins and its adjacent U-shaped socket and circumscribing the pivot pin, said spring having

one end thereof connected to the chair standard and the other end thereof connected to the chair seat for normally urging the chair seat to a raised position of non-use.

2. In a chair structure of the class described, a pair of horizontally spaced vertically disposed chair supporting standards each provided with a horizontally inwardly extending pivot pin, a chair seat provided at each side thereof with a laterally outwardly extending U-shaped socket opening toward the rear of the seat and pivotally supported by the pivot pin of the chair standard adjacent thereto, a cylindrically wound helical torsion spring interposed between one of said pivot pins and its adjacent U-shaped socket and circumscribing the pivot pin, said spring having one end thereof connected to the chair standard and the other end thereof connected to the chair seat for normally urging the chair seat to a raised position of non-use, an annular insulator interposed between said pivot pin and its surrounding helical spring, and a U-shaped insulator interposed between the helical spring and its adjacent U-shaped socket.

3. In a chair structure of the class described, a chair supporting standard for supporting the backs and seats of adjacent chairs in a row thereof, said seats having their sides adjacent the standard pivotally mounted thereon and provided with strikers, pairs of stops on the standard for limiting the raising and lowering movements respectively of the adjacent chair seats upon contact therewith of the strikers, each pair of stops comprising substantially semi-annular positive stops extending oppositely from the standard and concentric with an aperture therethrough, and a resilient element extending through the aperture in the standard and into the hollow center of both semi-annular positive stops in the pair for first contacting the strikers and cushioning the stopping of the chair seats.

4. In a chair structure of the class described, a pair of horizontally spaced vertically disposed chair supporting standards each provided with a horizontally inwardly extending pivot pin, a chair seat provided at each side thereof with a socket pivotally supported by the pivot pin of the chair standard adjacent thereto, a shaft having its opposite ends journalled in spaced bearings on one of said chair standards and having its intermediate portion screw-threaded, a block screw-threaded on the intermediate portion of the shaft for longitudinal movement thereon during turning movement of the shaft, and a helical torsion spring interposed between the pivot pin of said chair standard and the chair seat's socket adjacent thereto for normally urging the seat to its raised position of non-use, said spring having one end thereof connected to the chair seat and the other end thereof connected to said block whereby turning movement of the shaft effects adjustment of the tension on said spring.

5. In a chair structure of the class described, a chair supporting standard for supporting the backs and seats of adjacent chairs in a row thereof, oppositely horizontally extending pivot pins on said standard, adjacent chair seats on opposite sides of the chair standard and each provided with a socket pivotally supported by the adjacent pivot pin of said standard, said standard having a forwardly rearwardly extending slot therethrough, forwardly-rearwardly aligned bearings on said standard at opposite ends of the slot, a shaft having its opposite ends journalled in said bearings and having its intermediate portion screw-threaded, a block extending through said slot and screw-threaded on the intermediate portion of the shaft for longitudinal movement thereon during turning movement of the shaft, and a helical torsion spring interposed between each of said pivot pins and the socket of the chair seat adjacent thereto for normally urging said chair seats to their raised positions of non-use, said helical springs each having one end thereof connected to its adjacent chair seat and the other end thereof connected to said block whereby turning movement of the shaft effects adjustment of the tension on both of said springs.

6. In a chair structure of the class described, a chair seat supporting bracket for horizontally pivotally mounting a side of the chair seat on a horizontally inwardly extending pivot pin of the adjacent chair standard, said bracket comprising an integrally formed length of angle iron having one flange thereof adapted for forward-rearward attachment to a side of the chair seat, and the other flange thereof having its forward end portion partially severed from the first mentioned flange and rearwardly curled to form a U-shaped socket adapted to embrace said pivot pin.

STANLEY J. GEDRIS.