May 5, 1953 H. S. BOUTIN 2,637,371

CHAIR HAVING RESILIENT FRAME

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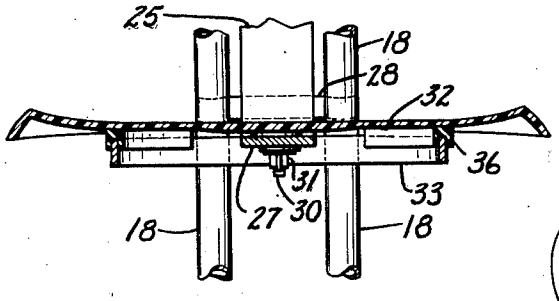


Fig. XII

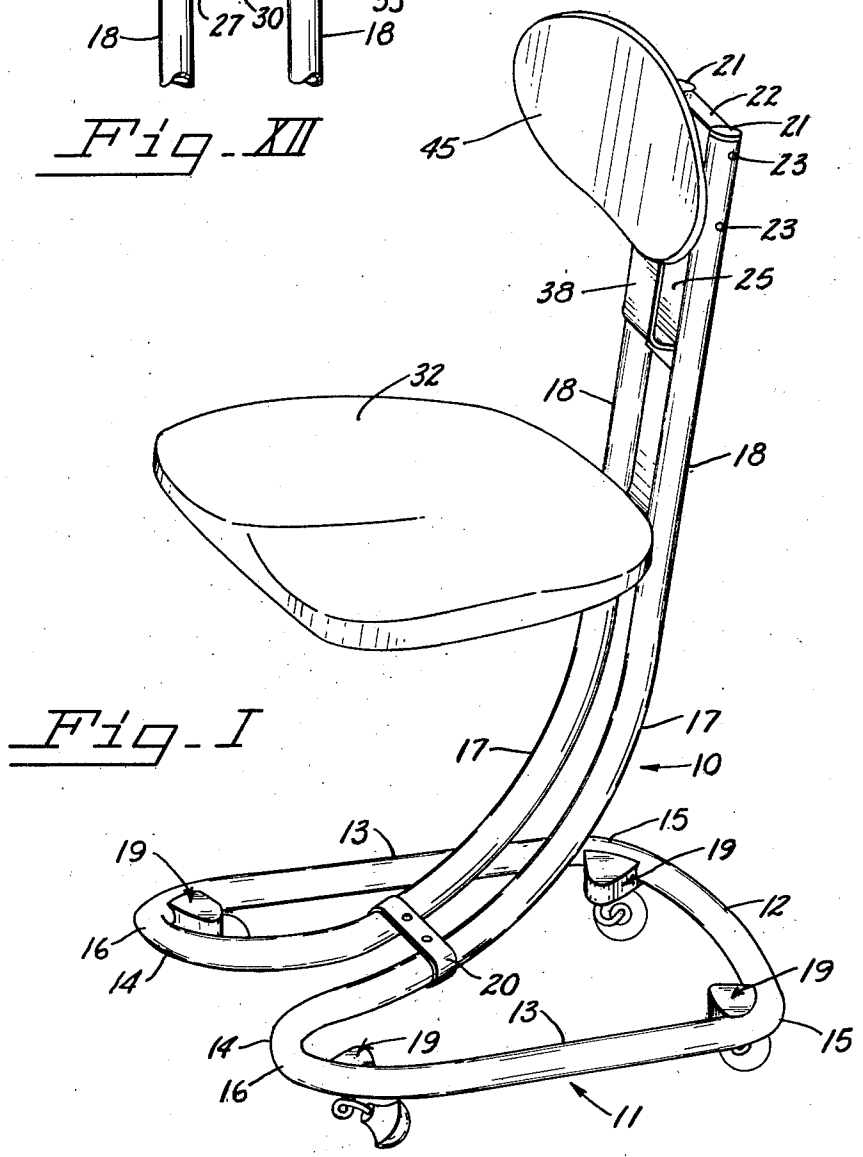


Fig. I

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May 5, 1953 H. S. BOUTIN 2,637,371

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Filed July 13, 1950 4 Sheets-Sheet 2

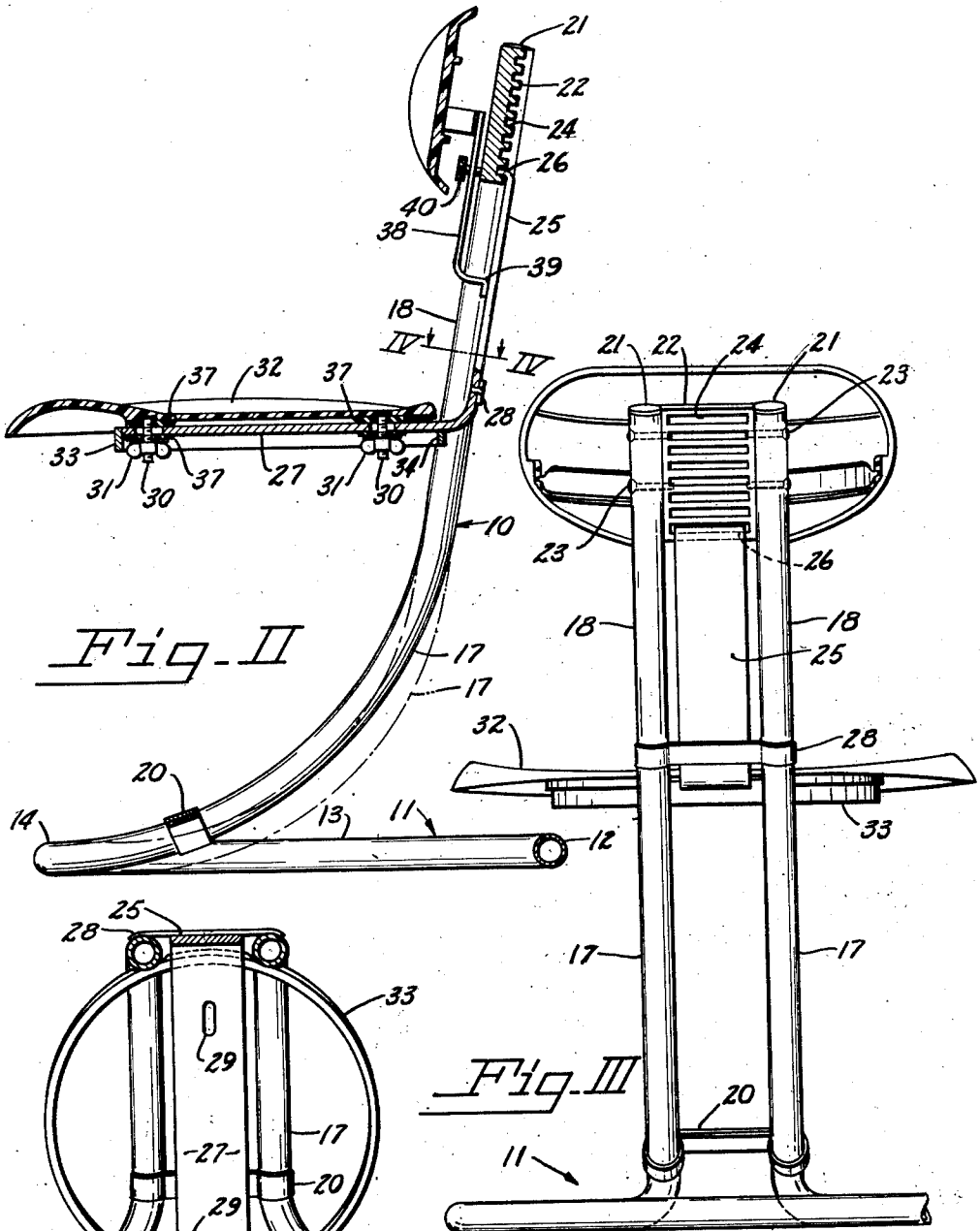


Fig. II

Fig. III

Fig. IV

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CHAIR HAVING RESILIENT FRAME

Filed July 13, 1950 4 Sheets-Sheet 3

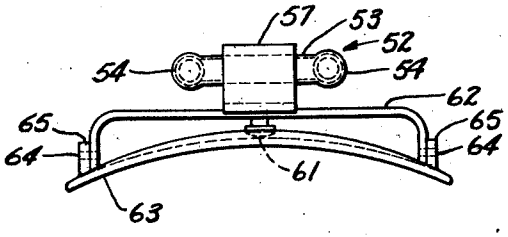
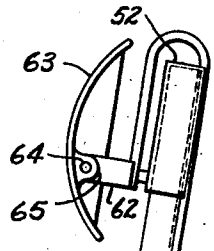
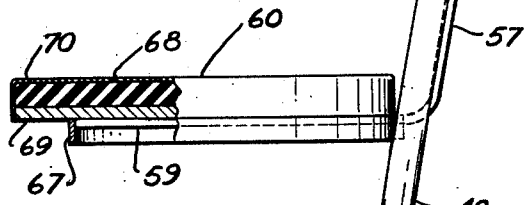


Fig. VIII





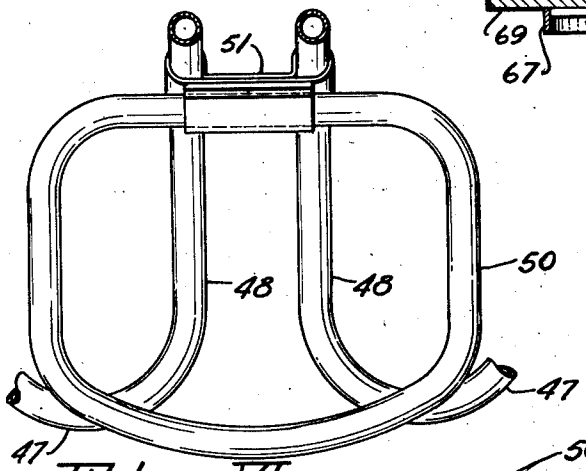


Fig. VI

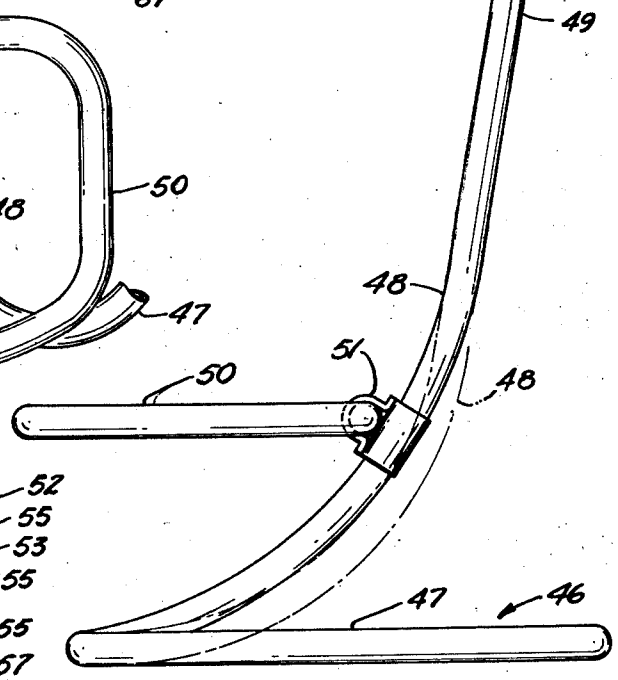


Fig. V

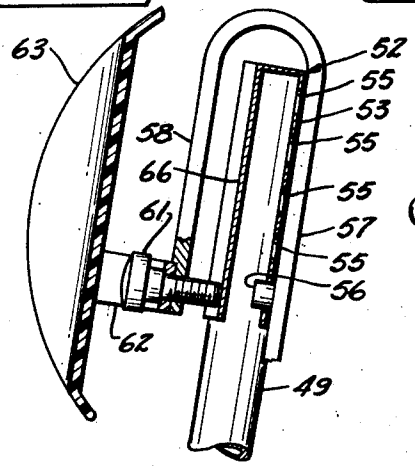


Fig. VII

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CHAIR HAVING RESILIENT FRAME

Filed July 13, 1950 4 Sheets-Sheet 4

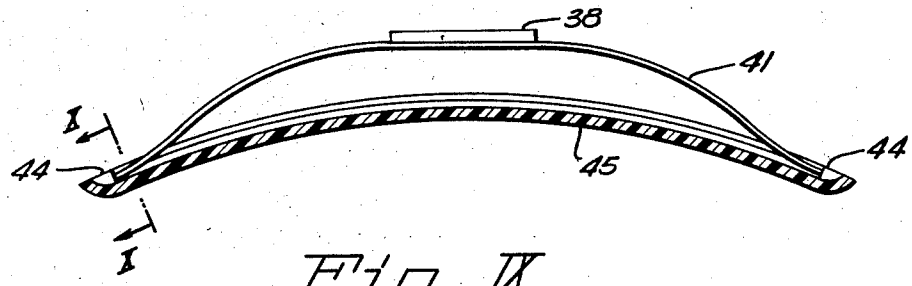


Fig. IX

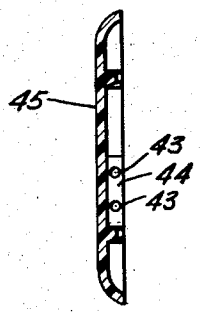


Fig. X

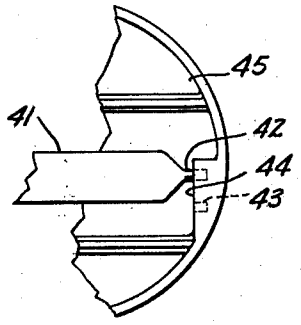


Fig. XI

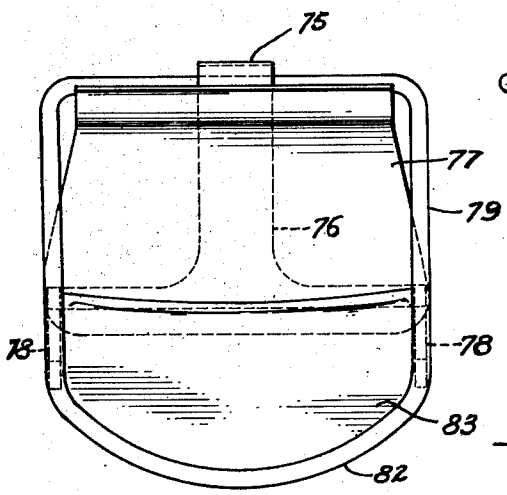


Fig. XIV

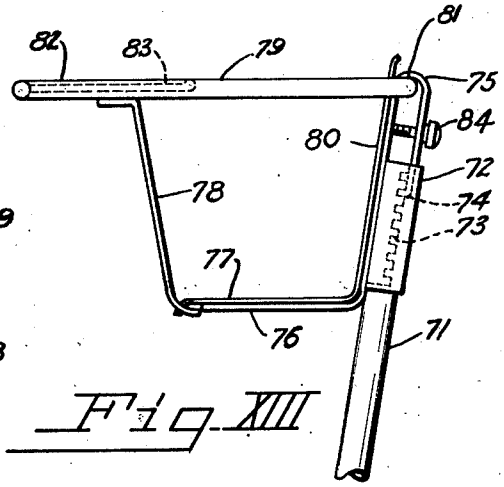


Fig. XIII

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UNITED STATES PATENT OFFICE

2,637,371

CHAIR HAVING RESILIENT FRAME

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Application July 13, 1950, Serial No. 173,568

4 Claims. (Cl. 155—50)

1

This invention relates to improvements in chairs and more particularly to an improvement in a chair frame structure embodying a new concept of structure for providing cantilever support for the seat of the chair and a new means for providing resiliency in the chair frame.

Chairs embodying the invention are particularly adaptable for use as stenographers' or clerks' posture chairs, as factory chairs, as stools, for example in kitchens or in bars, or at lunch counters, as dinette chairs or as restaurant chairs. Modifications of the invention can be embodied in chairs designed for all of these purposes as well as for other uses and purposes where simplicity and inexpensive construction are desired, modern appearance is an attribute and comfort during long periods of sitting an object.

The construction of chairs embodying the invention can best be understood by reference to the drawings, in which:

Figure I is a view in perspective of a stenographer's posture chair embodying the invention.

Figure II is a vertical, sectional view taken substantially on a median plane of a chair similar to the chair shown in Figure I but without casters.

Figure III is a rear elevation, with parts being broken away, of the chair shown in Figure II.

Figure IV is a fragmentary horizontal view showing details of the seat support with the frame shown in section at the position indicated by the line IV—IV of Figure II.

Figure V is a view in side elevation of another embodiment of the invention as designed for use as a factory chair, or a high level chair such as used by telephone switchboard operators, in kitchens, or adjacent counters or bars.

Figure VI is a fragmentary enlarged view partly in section showing a foot rest support which may be employed on the chair shown in Figure V.

Figure VII is an enlarged, detailed view of the back rest supporting means used on the chair illustrated in Figure V.

Figure VIII is a plan view of the back rest supporting means illustrated in Figure VII.

Figure IX is an enlarged, detailed view of a back rest as employed on the chairs illustrated in Figures I through IV.

Figure X is an enlarged, detailed, sectional view taken on the line X—X of Figure IX.

Figure XI is a fragmentary, detailed, enlarged view of the back rest supporting means shown in Figure IX.

Figure XII is a fragmentary, sectional view transversely across the seat of the chair illustrated in Figures I through IV.

2

Figure XIII is a fragmentary view illustrating another modification of the chair as designed for use by a small child.

Figure XIV is a plan view of the portion of the chair shown in Figure XIII.

A chair embodying the invention and designed for use as a stenographer's posture chair is illustrated in Figure I. The same embodiment of the invention, but slightly modified for use as a stationary chair, for example, in restaurants, dinettes, porches, as a lawn chair and for other uses, is illustrated in Figures II and III. The details of construction of the chair shown in Figures I, II and III are identical, the only difference being the presence of casters in the embodiment illustrated in Figure I.

A chair embodying the invention has a main frame 10 comprising a base section 11 which consists in a rear portion 12 and side portions 13 having inwardly turned front ends 14. The main frame preferably is constructed from tubing, for example, stainless steel tubing or aluminum tubing with the aluminum having a considerable portion of alloy metal to give it resiliency. Other metals and other materials may also be employed, it being necessary only that the structure have resiliency for comfort support for a person seated on the chair as will later be explained.

The rear portion 12 of the frame extends generally crosswise of the chair and may be shaped in a curve of large radius. At what would be the rear corners of a conventional chair, a sharper curve, as at 15, blends into the side portions 13 of the base section 11 and the two side portions 13 extend forwardly in laterally spaced relationship. The precise curvatures of the rear portion 12, the corners 15 and the side portions 13 are not critical and they may be one continuous curve or they may be a series of blending curves as is illustrated in Figure I.

The front ends 14 of the side portions 13 are turned inwardly toward each other in a sharper curve as at 16 and then are turned rearwardly again substantially parallel and in spaced relationship. The turned in portions of the base section blend into upwardly sweeping parallel elements 17 of the main support section of the frame 10. The elements 17 consist in upwardly sweeping curved portions which blend into rearwardly inclined, parallel, spaced, straight portions 18. Again, the precise curvature of the curved portions of the elements 17 is not at all critical nor are the radii of the curved sections blending between their lower forward ends and the inwardly turned front ends 14 of the side portions 13.

While the precise curvatures of all of these elements and portions of the chair are matters of choice, one factor must be taken into consideration in their curvature and design. The rear portion **12**, side portions **13** and the front ends **14** thereof, all lie substantially flat on the floor in a chair embodying the invention which is not equipped with casters (for example, the chair shown in Figures II and III). It is necessary, therefore, that these portions of the base section **1** all lie substantially in the same horizontal plane. Similarly for simplification of structure, in a chair designed to be moved (for example, the stenographer's posture chair illustrated in Figure I) the portions of the base section should be flat so as to permit the attachment thereto of four or more substantially identical caster elements **19**. The caster elements generally indicated at **19** may be welded or otherwise secured to the base section **11** as shown in Figure I, these elements **19** preferably are offset caster elements having twisted shafts rotatable at one end on their axes in mounting blocks and at their other ends rotatably carrying bell shaped wheels, which facilitate the moving of the chair. Conventional vertical axis casters may also be employed if desired.

A lock or spacer **20** preferably is secured between the elements **17** of the support section of the chair in order to insure their flexure simultaneously and to the same degree during the action resulting when a person sits on the chair as will later be explained. The uppermost ends of the tubes forming the straight portions **18** of the support section of the chair may be closed by metal caps **21**.

In the modifications of the invention illustrated in Figures I, II and III the upper ends of the portions **18** of the support section are secured to each other by a seat support member **22** (see Figures II and III). The member **22**, shown as a casting in the drawings, is designed to fit between the parallel straight portions **18** of the support section and is secured to the upper ends of the portions **18** by four machine screws **23**, which pass through the portions **18** and are screwed into the member **22**. The member **22** is provided with a series of horizontally extending notches **24** which are spaced vertically from each other by fixed distances. A seat support strap **25** has a turned over lip **26** (Figure II) which is engageable in the notches **24** in the member **22**. The strap **25** extends downwardly and then forwardly between the spaced straight portions **18** of the support section of the chair being turned horizontally to form a seat support **27** cantilevered out above the upwardly sweeping portions **17** of the support section of the chair. A rider **28** is secured to the support strap **25** near the point where the latter extends forwardly and slides along the rear surface of the straight portions **18** of the support section.

The seat support **27**, which may actually be an extension of the seat support strap **25**, is provided with a pair of elongated slots **29** through which extend two screws **30** provided with wing nuts **31**. The screws **30** are embedded in a formed molded seat **32** in the modification of the invention shown in Figures I, II and III and serve to secure the seat **32** to the chair support **27** and on the chair The chair support **27** may also be provided with a ring **33** which may be weldel to the chair support as at **34** (Figure II) and **35** (Figure IV).

In the embodiment of the invention illustrated in Figures I, II and III the seat **32** is molded from, for example, resin impregnated laminated fabric. The ring **33** may or may not be provided with an annular rubber cushion **36** (see Figure XII) or it may be desirable in other cases to surround the bolts **30** (Figure II) with resilient washers **37** above and below the seat support **27** to eliminate possibilities of rattling or working loose and to make a flexible joint between the seat **32** itself and the seat frame, consisting in either the seat support **27** or the ring **33**. These details can be modified as desired to accomplish facility in construction, particularly of the molded resin impregnated seat **32**, the selection of particular cushioning means between the seat and seat support frame being a mere matter of choice.

A back rest support **38** may be welded to the seat support strap **25** as at **39**, and extends upwardly parallel to the seat support strap **25** a distance sufficient to lie in front of the support member **22**. A knurled thumb screw **40** is threaded through the back rest support **38**, bearing against the forward surface of the support member **22**, thereby to maintain the engagement of the lip **26** of the seat support strap **25** in one of the notches **24**.

At the upper end of the back rest support **38** (see Figures IX, X and XI) there is fixed a horizontally extending resilient bow **41** which at each end terminates in a pin **42** (see Figure XI) engageable in either of a pair of spaced holes **43** in each of two inserts **44** which are molded into opposite sides of an oval, horizontally extending back rest **45**. The oval back rest **45**, like the seat **32**, may be molded from resin impregnated laminated fabric or from similar material or these two parts may be made from molded plywood or they may be merely fabricated from metal as by stamping. The particular material used for the shaped seat **32** and back rest **45** again is a matter of choice, although the drawings illustrates the seat **32** as being made from molded synthetic resin and the back rest **45** as being fabricated from similar material.

Because of the resiliency of the back rest supporting bow **41**, the back rest **45** may be easily disengaged therefrom by flexing the bow **41** and withdrawing the pins **42** from that pair of the holes **43** in which they are inserted. This arrangement provides for quick and simple adjustment of the height of the back rest **45** relative to the seat **32**. The two pairs of holes **43** are positioned, for example, one-quarter inch and three-quarters inch away from the horizontal center line of the back rest. Thus, with the back rest bow **41** engaged in the nearer pair of holes **43**, its position can be quickly changed by disengaging it and inserting the pins **42** in the more removed pair of holes **43**. If this adjustment is not appropriate two adjustments on the other side of the center line are provided by disengaging the back rest **45** from the bow **41** rotating it 180 degrees and re-engaging the pins **42** in the holes **43**. By spacing the holes **43** off the horizontal center line of the back rest four adjustments in height can be provided with only two pairs of holes **43**. If still more adjustments are desired, the inserts **44** may be equipped with three or fours holes each, thereby increasing the positions relative to the center line of the back rest **45** in which the pins **42** on the bow **41** may be positioned.

Not only does the resiliency of the bow 44 provide for the removal and adjustment of the back rest 45 but it also makes the chair more comfortable by flexing slightly whenever the back of a person is pressed against the back rest.

The modification of the invention illustrated in Figures V, VI, VII and VIII employs a considerably simplified construction and is designed particularly for use as a factory chair, a chair for telephone switchboard operators or, possibly as a bar stool or chair seated adjacent to counters. Many draftsmen also find high chairs of this type comfortable when working at large, elevated drawing boards.

In common with the modification of the invention illustrated in Figures I through IV, the chair illustrated in Figure V has a frame with a base section 46 made from tubing bent into a generally rectangular open peripheral frame and adapted to lie flat on the floor. The base section 46 has side portions 47 (see also Figure VI) which turn inwardly toward each other at the front and integrally connected to a pair of rearwardly and upwardly sweeping members 48 constituting the support section of the chair. The members 48, in common with the members 17, are parallel to and spaced from each other, sweeping upwardly and rearwardly on curves of large radius which blend into substantially straight parallel portions 49 extending more nearly vertically upward to form the seat support.

In a factory chair, bar stool, or draftsman's chair, because the occupant is positioned so high above the floor level, there also is provided a foot rest 50, which is illustrated as being made from a curved piece of tubing mounted by welding or otherwise in a formed metal bracket 51 which also serves to tie the two support members 48 together.

The upper ends of the straight portions 49 are tied to each other by means of a formed sheetmetal cap 52 which serves the function of a seat support member and also finishes off the upper open ends of the tubes forming the portions 49 of the support section of the chair. The cap 52 is shaped to fit around each of the upper ends of the straight portions 49 and has a rear web 53 extending across between its two partially cylindrical wings 54 that slide over the ends of the tubes. The rear web 53 has a series of centrally located vertically spaced holes 55 for the reception of a pin 56 welded or otherwise secured on a seat support strap 57. The support strap 57 (which is similar to the support strap 25 in the embodiment illustrated in Figures I through IV) has an upper end 58 which is bent forwardly and down in front of the cap 52 and a lower end 59 which extends down between the straight portions 49 of the chair and is bent forwardly to serve as a support for a seat 60. The end portion 58 of the seat support strap is secured by means of a thumb screw 61 to a horizontally extending bow 62 serving to support a formed back rest 63.

In this embodiment of the invention the back rest 63 is illustrated as being non-adjustably mounted on the bow 62 by means of pins 64 inserted through ears 65 on the back rest. Of course, if it is desirable that the back rest 63 be adjustable in the manner in which the back rest 45 in the earlier embodiment of the invention is adjustable, the same type of pin and hole adjustment can be provided. The thumb screw 61, in addition to locking the bow 62 to the end 58 of the seat support strap 57, also serves to react

against a front web 66 of the cap 52, flexing the seat support strap 57 and retaining the pin 56 in that one of the holes 55 in which it is positioned.

Figure VII illustrates these parts with the seat support strap 57 in its lowermost position. In order to raise the seat 60 relative to the rest of the chair, the thumb screw 61 is loosened to an extent sufficient to allow the seat support strap 57 to be displaced rearwardly, the pin 56 is withdrawn from that one of the holes in which it is engaged, and the entire assembly lifted, the pin 56 is re-engaged in the selected one of the holes 55 and then the screw 61 is retightened.

The lower end 59 of the seat support strap 57 may be welded or otherwise secured to a seat support ring 67 and the seat 60, which is shown as consisting of a soft rubber pad 68, base 69 and cover 70, may be secured thereto in any conventional manner.

In common with the embodiment of the invention disclosed in Figures I through IV, the seat illustrated in Figures V through VIII provides for a simple seat height adjustment; cantilever support of the seat; and resiliency in supporting the weight of the person caused by flexure of the support section both in its curved portion and at the junction between the curved portions 48 and the side portions 47 of the base 46. The resiliency of the seat support section of the chair derives from the torque applied to the tubing at the connection between the rearwardly curving portions 48 and the side portions 47 of the base and from flexure of the rearwardly curving portions 48 themselves. This is illustrated in Figures II and V by the exaggerated showing of the broken line beneath the support sections 17 and 48 respectively. Because of these actions of deflection in the curved portions 17 and 48 and twisting at the junction between these portions and the side portions 18 and 47 of the base, the seats 32 and 60, respectively, actually remain almost precisely horizontal when the chairs deflect under weights of persons seated on them. In each of the modifications of the invention the rear of the seat frame 33 or 61 bears against the portions 18 or 48 respectively. There is, therefore, no feeling of "loss of support" experienced by a person seating himself in a chair embodying the invention.

The modification of the uppermost portion of the chair, illustrated in Figures XIII and XIV, serves to show how a chair embodying the invention may be adapted for use as a baby's high chair. In these figures the only portion of the chair frame shown is an uppermost straight portion 71 of the support section of the frame. In this embodiment of the invention, as in the embodiment illustrated in Figures V through VIII, a formed sheetmetal cap 72 may be telescoped over the upper ends of the two straight portions 74 of the support section. The formed cap 72 may be provided with a series of depressions 73 similar to those in the embodiment illustrated in Fig. II, or the structure of Fig. VII may be employed. In either case a finger 74 formed on the lower end of a seat support strap 75 is engageable therein. The seat support strap 75 also has a second end 76 which extends downwardly in front of the cap 72 and is bent forwardly forming a support for a seat 77. When it is desired to raise or lower the position of the seat 77 the finger 74 is disengaged from the depression 73 by separating the ends of the seat support straps 75 and shifting the seat vertically,

thereupon re-engaging the finger **74** in its new position. The forward end of the seat support strap **75** may be connected by means of side straps **78** to a horizontal pipe frame **79** which also is secured to a back **80** of the seat **77**. The pipe frame **79** may also be welded or otherwise secured, as at **81**, to the looped over portion of the seat support strap **75**. The pipe **79** serves thus as an integral frame element in the baby's chair and its front portion **82** may also serve to support a tray **83** which may be welded or otherwise secured thereto, for example, for feeding the child.

The spacing between the two arms of the strap **75** may be adjusted by a screw **84** which extends through the rear arm of the strap **75** and is threaded into the front arm of the strap **75**.

The several modifications of chairs embodying the invention are disclosed to illustrate the novelty comprising the instant invention. The particular shape of seat or back rest, the particular arrangement of seat support strap and back support elements or the means of mounting the several types of seats and back rests shown, are details in the instant invention; but the invention consists primarily in a redesign of chair frames which provides a generally horizontal base section and a rearwardly and upwardly extending seat support section that is connected to the base section only at the forward portion of the base section and from which support section a seat is cantilevered forwardly of the support section, the seat generally overlying the base section and the rearwardly and upwardly sweeping portion of the support section.

Having described the invention, I claim:

1. A chair comprising, in combination, a frame having a horizontal base section lying generally in a single plane, said base section consisting in a rear cross portion and side portions joined to said cross portion and extending generally forwardly and being laterally spaced from each other, said side portions being turned inwardly toward each other at the front and then generally at the center being turned backward generally parallel to each other, and a support section consisting in portions joined to the backward extending parts of said side portions of said base section and sweeping rearwardly and upwardly in a curve of relatively large radius and culminating in substantially parallel, substantially straight portions inclined rearwardly to the plane of said base section at an angle of less than 90 degrees; a generally horizontal, forwardly extending seat; and a seat supporting frame underlying said seat and connected to said support section at the rear of said seat.

2. A chair comprising, in combination, a frame having a horizontal base section lying generally in a single plane, said base section consisting in a rear cross portion and side portions joined to said cross portion and extending generally forwardly and being laterally spaced from each other, said side portions being turned inwardly toward each other at the front and then generally at the center being turned backward generally parallel to each other, and a support section consisting in portions joined to the backward extending parts of said side portions of said base section and sweeping rearwardly and upwardly in a curve of relatively large radius and culminating in substantially parallel, substantially straight portions inclined rearwardly to the plane of said base section at an angle of less than 90 degrees; a generally horizontal, forwardly extending seat; a seat supporting frame underlying said seat and connected to said support section at the rear of said seat; and means for holding the portions of said support section in predetermined lateral spaced relation to each other.

3. A chair comprising, in combination, a frame having a horizontal base section lying generally in a single plane, said base section consisting in a rear cross portion and side portions blendingly joined to said cross portion and extending generally forwardly and being laterally spaced from each other, the forward ends of said side portions being turned inwardly toward each other and then generally at the center being turned backward generally parallel to each other, and a support section consisting in a pair of generally parallel portions joined to the backward extending parts of said side portions of said base section and sweeping rearwardly and upwardly in a curve of relatively large radius and culminating in substantially parallel, substantially straight portions inclined rearwardly to the plane of said base section at an angle of less than 90 degrees; a generally downward extending seat support adjustably supported from the top of said straight portions, and a horizontal forwardly extending seat supported on said seat support.

4. In a chair according to claim 1, an improvement in the means for connecting the seat supporting frame to the seat support section that consists in a seat support member secured to the upper end of each of the straight portions of said seat support section and serving to laterally space and secure said portions together and that has a vertical row of spaced recesses located between said upper ends for engagement with means on the seat supporting frame.

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