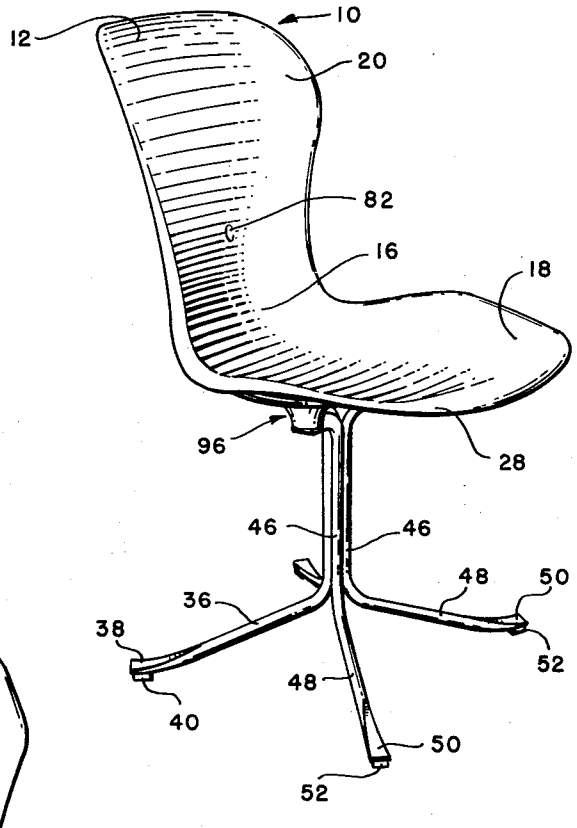
May 19, 1964 G. A. KRAMER 3,133,765

CHAIR

Filed Aug. 30, 1962

3 Sheets-Sheet 1

FIG. 1



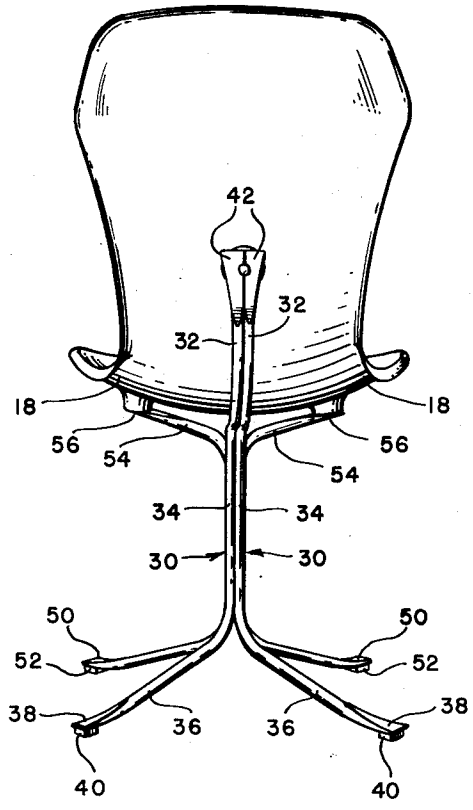


FIG. 2

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FIG. 3

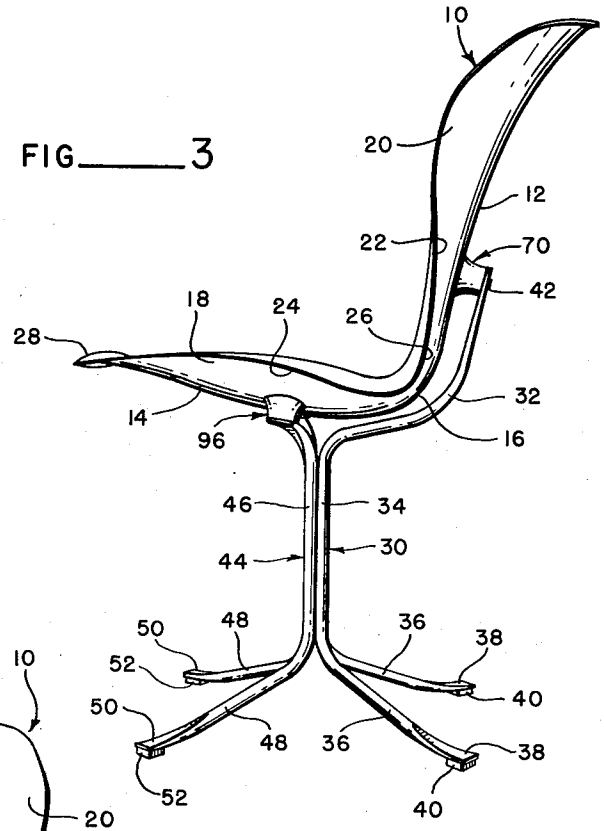
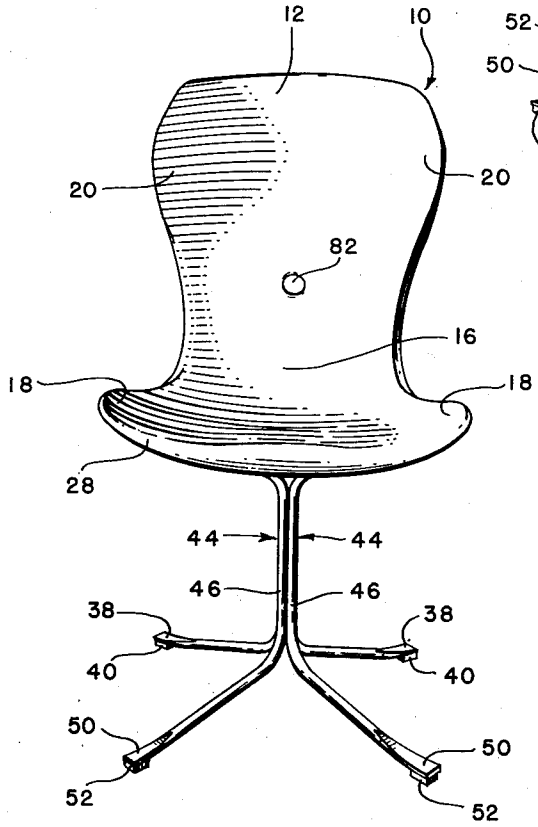


FIG. 4



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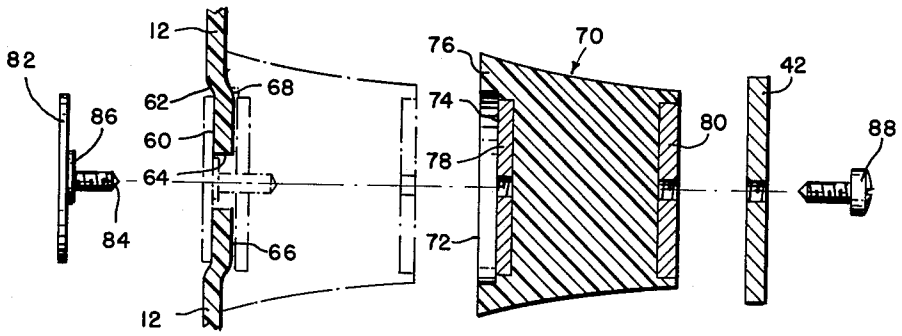


FIG. 5

FIG. 6

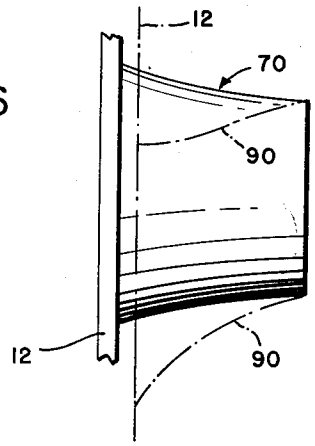


FIG. 7

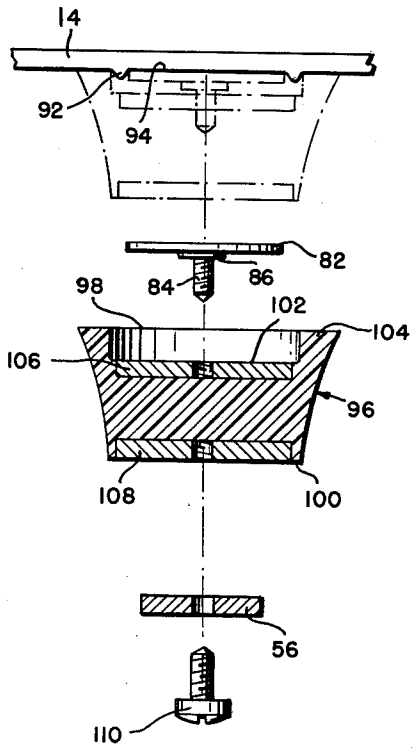
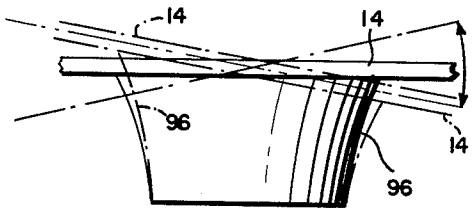


FIG. 8



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3,133,765

CHAIR

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Filed Aug. 30, 1962, Ser. No. 220,381
17 Claims. (Cl. 297—445)

This invention relates to a new and novel concept in an organic chair construction and more particularly to a chair construction involving a minimum number of support points on the chair shell itself with relation to its supporting frame and in which frictional contact between the chair shell and its supporting means is eliminated.

One of the most common and widely recognized defects inherent in hitherto known chair construction has been the failure of designers to provide a chair which adjusts automatically to the physical characteristics and changing needs of the user. Those changing needs are both static and dynamic. For instance, many people have short legs yet in most of the chairs in which they sit the seat has no capability for pivoting or moving or adjusting itself to permit the short legged person to rest his or her feet on the floor. Failure of the chair seat to adjust to the requirements of a short legged person result in his or her legs dangling from the chair thus placing an uncomfortable pressure on the underside of the leg disturbing the blood circulation.

On the other hand, long legged people find themselves sitting in conventional chairs with much of the back or thigh area of the legs above and out of contact with the seat. Thus all of the body weight is supported on the itchial tuberosities. This leads to the tall person's slumping in the chair in order to find better weight distribution and comfort. Ideally the thing sought in chair design is a seat which moves about a horizontal axis about halfway between the front and back of the seat to produce more pressure under the tuberosities yet still support the thighs. Thus if weight distribution on the chair seat were to be represented graphically the weight curve would increase from the front edge to the back area. Ability of the chair seat to pivot about a horizontal axis or line entails additional design problems in that the seat must not pivot too easily nor should it pivot with too much resistance. In the former case the user is given a feeling of instability and consciously or unconsciously employs muscle power in order to steady the seat thus reducing his or her ability to relax. On the other hand, the chair seat with too much resistance resembles a fixed seat and the purpose of pivoting the chair seat is either partially or totally defeated.

The instant invention, in summary, involves a plastic, compound-formed, unitary chair shell having a seat and back portion. The chair shell has mounted thereon resilient mountings, such as rubber or neoprene or the like, which are also attached to a frame comprising the supporting structure for the chair shell. There is, of course, a certain amount of resilience in the chair shell itself as well as a limited amount of resilience or springiness in the frame. The method of mounting the chair shell on the chair frame is such that there is no frictional contact between the chair shell and the chair frame. Resistance to deformation and the "springback" ability of the chair design results not only from the chair shell and the chair frame but in the mountings which connect the chair and

the shell. The mountings are a crucial feature. By far the greatest amount of deformation is in the mounting, however, in which there is no friction in the conventional sense but only a deformation of a resilient body. The mountings are softer than normal but also larger, thus combining strength with flexibility. It is this unique organic design from which this chair obtains its highly unusual adaptability and desirable comfort characteristics. Thus, this invention succeeds in supporting the body properly according to orthopedic standards and yet simultaneously allows freedom of movement and changes in sitting posture.

Accordingly, it is an object of this invention to provide a unitary chair body, which is compound-formed in construction, to build resilience and resistance to deformation into the chair body itself.

Another object of this invention is to provide a chair construction which eliminates frictional contact between the interrelated parts of the overall chair construction.

Yet another object of this invention is to furnish a chair which contains resistance to deformation from the interaction of the chair body, its mountings and its frame support.

Still another object of this invention is to supply a chair which minimizes the number of support points required between the unitary chair body and its supporting frame means, and yet which is also light, rugged and durable.

A further object of this invention is to provide a chair in which there is no movement between the chair shell and the mountings or between the mountings and the supporting frame but rather in which movement comes about by the interaction of the mountings, body and frame.

An even further object of this invention is to provide a chair in which the mountings, in being rigidly attached to the chair body, actually become an integral extension of the chair body.

An even further object of this invention is to provide a unitary chair shell construction in which the back is permitted a certain degree of vertical and horizontal motion while at the same time the seat of the chair is able to pivot around a line running generally under the seat from side to side about half way between the front and back of the seat.

Still another object of this invention is to provide a chair which in supporting the human anatomy is highly conducive to proper posture and maximum comfort.

Another object is to furnish a chair which is self-adjusting to the length of the leg of the user and which is also simple in design, aesthetically pleasing to the eye, yet economical to produce.

These, together with other objects and advantages which will be subsequently apparent, reside in the details of construction and operation as more fully hereinafter described in claims, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a view in perspective, taken generally from a front side angle, showing the general design of chair mountings and frame;

FIGURE 2 is a back view of the chair;

FIGURE 3 is a side view of the chair;

FIGURE 4 is a front view of the chair;

FIGURE 5 is an exploded cross-sectional view of the design of the back mounting;

FIGURE 6 is a diagrammatic representation of the movement inherent in the back mounting between the chair shell and its frame;

FIGURE 7 is an exploded cross-sectional view of the seat mountings for the chair; and

FIGURE 8 is a diagrammatic representation of the movement generally ascribed to the interrelation of the chair seat and its mountings.

Referring now to FIGURE 1 through 4 it will be seen that the chair body or shell is of unitary, compound-formed construction. In effect it is made of sheet material and could be of various thermosetting, plastic compositions. Particularly fine results have been achieved with glass fiber reinforced polyester resin. Other suitable materials having strength and resiliency would be sheet metal or laminated wood products such as plywood. It has been found that a plastic shell thickness of about .140 inches is preferable though this is by no means considered to be a limitation. With adequate beading of the plastic shell structure the thickness could be as little as .030 inches. It will be appreciated that a thickness of .030 inches would easily be possible with a metal shell. The shell construction generally is of uniform thickness throughout.

The chair shell, generally referred to be the number **10**, has a substantially upright or vertical back portion and a substantially horizontal seat portion. Between the back portion **12** and the seat portion **14** is the generally rounded, interconnecting area **16**, conforming generally to the contour of the human body. It can be seen that the entire chair shell does have a slight curvature from side to side. In short, the body-contacting surface of the shell from the top of the back portion to the end of the seat portion is concave. The side-to-side curvature by which concave chair shell seat and back surfaces are presented to the human body is the feature which accounts for the chair's compound form. Such side-to-side curvature imparts a partial beam effect so that the flexibility which is inherent in flat sheet material is avoided in areas that this is not desired and is controlled to a predetermined and variable degree at various other points and areas of the shell.

The seat portion **14** has outwardly and upwardly flaring side portions **18** and the back portion **12** has forwardly and outwardly flaring side portions **20**. Both side portions **18** and **20** are in effect continuations of the concave shell. It will be seen with reference to FIGURES 2 and 4 that as to both the back portion and the seat portion the chair shell flares outwardly so that the side-to-side dimension through the rounded central section **16** is less than a side-to-side dimension taken either through the widest part of the seat **14** or through the widest part of the back portion **12**. The widest seat dimension is also wider than the widest back dimension. Thus, referring to each of the FIGURES 1 to 4, it is to be seen that gentle, eye appealing curvatures are used to define the general overall configuration of the chair shell. For instance, the forwardly flaring side portions **20** of the back **12** and the upwardly flaring side portions **18** of seat **14** are in reduced manner carried through the intermediate section **16** on a deemphasized scale to impart rigidity and flexing strength to the chair shell. In this manner there is less tendency for the seat and the back portions to vary too readily from each other in angle by virtue of weight stresses on the chair itself. In short then, the chair shell is a compound-formed, L-shaped body designed for strength and yet having the desired amount of resiliency.

It will also be seen by reference to FIGURES 1 through 4 that, beginning at the widest point of the seat and back, that a flange is formed by reverse-forming the material downwardly or backwardly to enhance the beam effect imparted by the compound form. Thus, flanges **22** on the sides of back portion **12** extend down and actually increase their depth through the intermediate section **16** to form flanges **26**. Flanges **26** continue around to the seat forming flanges **24** on the sides of the seat.

The front edge of the seat is formed downwardly, resulting in the flange **28**. It is to be recognized, of course, that in any case where the material is bent to form flanges that an added strength factor is given to that particular portion of the chair as a whole. Flange **28**, in addition to strengthening the chair shell side-to-side, also forms a smooth transitional area for the edge of the seat bearing against the legs.

The chair frame has, like the chair shell itself, been designed to provide maximum strength and flexibility while at the same time presenting an aesthetically pleasing appearance. The frame is composed of four tubular pieces of metal such as steel or aluminum or the like to support the seat and to lend support to the back of the chair. The rear frame pieces, generally shown by the number **30**, each have an upper section **32** which extends roughly from about half way up the center back of the chair and which curves downwardly under the seat in conformance with the configuration of the chair. The supporting frame pieces are spaced from the chair shell and at no point do they contact said shell. A vertical or perpendicular middle section **34** of pieces **30**, which comprises the central supporting column of the chair frame, is located under the seat approximately one-third the distance from back to front of said seat. The two pieces **30** are joined together, beginning at the upper end thereof and continuing to the bottom of vertical section **34**. The lower portion of members **30**, beginning at the bottom of vertical section **34**, are separated from each other to form legs **36**.

As can be seen, the legs **36** slant outwardly and downwardly and away from each other. The legs **36** at the very end thereof have generally flat portions **38**. On the floor side of the flat portions **38** are the feet **40** made of rubber or neoprene or other suitable resilient material. As explained above, the rear support members **30** are connected together except where they diverge to form the rear legs **36**. Since members **30** are welded together, beginning with the bottom of the vertical section **34** and extending up through the curved area **32**, the support column formed by the two members **30** is strong and yet contains resilience. FIGURES 2 and 3 show that the upper ends of the rear supporting members **30**, behind the back of the chair, are also flattened as at **42** so as to permit an attractive and firm connection with the mounting between the supporting frame member and the chair shell.

The chair seat is supported by two forward frame members generally referred to by number **44**. The forward frame support members **44** are joined to the rear frame members **30** along the length of their vertical section **46**. The bottom portions of frame members **44** flare outwardly and downwardly to form forward legs **48** in the same manner in which legs **36** are formed on the rear members. The extreme bottom end of each of the forward support members **44** is flat, as at number **50**, and on the bottom side of said flat portion **50** are the toes or feet **52**. The upper portions **54** of forward support members **44** flare outwardly, nearly horizontally, from the top of the vertical section **46** and angle very slightly in a forward direction. The ends of the upper portions **54** terminate at a point which is somewhat shy of the side portions **18** of the chair. It can be seen that the said ends of the upper portions **54** are so positioned that a line running through the ends is between one-third and one-half the distance from the back of the seat to the lip **28**. Stated another way, the ends **56** of the support members **44** are slightly forward of the column but rear of the front-to-back midline.

Said ends **56** are positioned to receive mountings which in turn are connected to the chair body at a location which is best calculated to support the body weight and yet permit motion of the seat **14** around its mountings. FIGURE 2 shows that the upper portions **54** of the forward support members **44** are, like the curved section **32** of rear

members 30, in spaced relation to the bottom surface to the chair shell. It will be understood that the various vertical sections 34 and 46 of the four frame pieces are attached securely together as by welding. Thus, a single unitary vertical column is provided from which the various leg members and the various upper chair support sections extend.

Another essential feature of this invention is the mountings best shown in FIGURES 5 to 8. It will be noted, particularly by reference to FIGURES 5 and 6, that at a point in the middle and slightly less than halfway up is a round depressed area 60 on the front of said chair back 12. Said depressed area 60 is formed by the shallow inwardly offset circular wall 62. In the center of the depressed area 60, which is about as large as a silver dollar, is a hole 64 perhaps half an inch in diameter. The depressed area 60, on the front side of the chair back 12, results in a raised area 66 on the backside and at the same time results in an annular outwardly offset surface 68 around the periphery of said raised area 66.

The mounting itself is formed of rubber or neoprene or other suitable resilient material which has good resistance to deformation. A durometer rating of 35 to 50 provides excellent results with a value of 40 apparently optimum. Said mountings, generally shown by the number 70, are essentially frustro-conical in shape although there may be some concavity to the wall of the truncated cone. The large end 72 of said mounting is provided with a round or circular recesed area 74 which is slightly greater in depth than the height of the raised portion 66 on the chair back 12. The diameter of said recessed portion 74 is just great enough to clear the offset walls 68. The overall diameter of the large end of said mounting is, of course, substantially in excess of the overall diameter of the raised portion 66 and annular offset wall 68. Thus, there is formed around the periphery of the large end of said mounting 70 a thick shoulder 76 which contacts the rear surface of back 12.

At the bottom of recessed area 74 is a heavy metal insert 78 which is round in shape with a threaded hole in the center thereof. Said metal insert 78 is actually bonded to the material from which the mounting 70 is made. The top surface of the metal insert 78 forms the bottom of the recessed area 74. The small end of the mounting 70 is also provided with an insert 80 in the same manner in which insert 78 is provided on the large end. Said insert 80 is also round, has a threaded hole in the center thereof, and bonded to the resilient material forming the mounting 70. The outer surface of said insert 80 forms, and is flush with, the rear surface or the small end surface of said mounting 70.

The mounting is actually attached to the chair back 12 by virtue of a disk 82 which conforms generally in diameter to the recessed area 60. Said disk 82 is provided with threaded stud 84 and shoulder 86 on the stud side of the disk. Said shoulder 86 conforms in diameter to the hole 64 through the chair back. It can be seen, through the use of dotted lines in FIGURE 5 that the disk fits into the recessed area 60; that the shoulder area 86 is positioned in the hole 64; and that the threaded stud 84 extends on through to the rear side of the back 12. Mounting 70 is then brought to stud 84, large end first, and said mounting is threaded on said stud and snubbed up tightly against the back surface of the back 12. The recessed area 74 fits over the raised area 66 and the broad shoulder section 76 extends beyond the annular raised offset wall 68.

Attachment of the chair body to the chair frame is achieved by attaching the flat end 42 of member 30 to the mounting 70 through the medium of insert 80 by inserting screw 88 into the hole between the two ends 42 and threading the said screw 88 into the threaded hole of insert 80.

FIGURE 6 shows diagrammatically the extent to which the back mounting 70 may be deformed, as indicated by the dotted lines 90. The mounting is capable of deforming about 5/8 inch up and approximately 5/8 inch down or approximately 1¼ to 1½ inches overall.

FIGURES 7 and 8 show the manner in which the chair seat is attached to the bottom mountings. The seat 14 is shown to have at the two locations where the mountings are attached an annular ridge 92 forming a round circular area 94 which is just large enough to accommodate disk 82. The disk 82 is attached to the under surface of seat 14 within the circular area 94 by a high strength bonding agent, or adhesive, such as an epoxy resin. Actually any adhesive material which would create an essentially permanent bond between the disk 82 and the lower seat surface would be acceptable. It is found, however, that a thermosetting resin, such as polyepoxide resin, produces the best results.

When the disk with its threaded stud 84 is attached to the underside of the seat 14, it is then ready to receive the seat mounting generally shown by the number 96. Mountings 96 are essentially the same as mounting 70 except that they are not as deep. Mountings 96 are also frusto-conical in shape, with the wall of said truncated cone being very slightly concave as can be seen in FIGURE 7. The mounting has a large end 98 and a smaller end 100. A circular recess area 102 is formed into the large end and is recessed to nearly twice the depth of the sunken area 74 in mounting 70. Said recessed area 102 forms thick annular shoulders 104 which actually contact the underside of the seat 14 around the outside of annular ridge 92. A round metal insert 106 is formed and bonded into the mounting itself so that its outside or exposed surface is flush with the bottom of the recessed area 102. Again it has the threaded hole through the center thereof. In like manner, insert 108 is provided on the small end of the seat mountings 96 and is vulcanized or bonded in some suitable fashion to the material forming the mounting. It, too, has a threaded hole through the center. With the disk 82 and its threaded stud 84 bonded into position, the mounting 96 is threaded onto the insert 106. Then the flat ends 56 of the upper portion 54 of the front frame support members 44 are brought up to the mounting and secured thereto by screws 110.

FIGURE 8 is a diagrammatic representation of the manner in which the mounting 96 reacts when the chair is being used. It will be seen by the dotted lines that, when the seat is tilted in one direction or another about a line generally running from side to side and under the chair seat through the upper center portion of said mountings 96, the mountings are deformed to some extent.

The mountings 70 and 96 are here, as shown, separate elements which are attached to the shell and frame structure to produce an organic integral unit. Because the mountings are in essence integral it can easily be seen that the mountings can be formed as part of the chair shell in the molding process, thus eliminating their separate manufacture.

Since the back mounting 70 permits up and down movement of the back of the chair as well as horizontal movement around an essentially vertical axis taken through mounting 70, and since the seat generally pivots about an axis or line extending from side to side of the chair seat through the seat mountings, it will be understood that there is some flexing in the curved section 16 of the chair body. At the same time there will be, of course, a certain amount of flexing in the frame pieces 30 and 44. The lack of frictional movement between any given part of the chair construction causes all parts of the chair to interact; that is, the chair shell, the mountings, and the frame interact and react as a single unit. Some lateral flexing of the chair back is realized because of shell resiliency and the nature of the single back support point. That is, if the user turns to the side, the back 12 will twist in conformity with the purpose of the chair to adjust to all positions of the user and yet provide ade-

quate support. The net result of this unique design and construction is a chair which adapts itself to the requirements of the anatomy of the particular user. This chair can be used as comfortably by short people as by those who are tall.

The foregoing is considered as illustrative only of the principle of this invention. Since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit this invention to the exact construction and operation shown and described, and, accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.

What is claimed is:

1. A chair, comprising: a generally L-shaped unitary chair shell forming a seat and back, the body-contacting surface of said shell being concave from side to side and said shell including forwardly and outwardly extending side portions on the back thereof and upwardly and outwardly extending side portions on the seat thereof, and said side portions having reverse formed flanges thereon to enhance the rigidizing beam effect of said concavity and side portions, said flanges extending along the sides of said shell between the seat and back; first resilient mounting means secured to the rear of said chair back and second resilient mounting means secured to the underside of said chair seat; and chair supporting frame means having a central supporting column including legs and having supporting frame members securely connected to said first and second resilient mounting means.

2. A chair, comprising: a unitary, generally L-shaped chair shell forming a seat and back and being curved in the area intermediate said seat and back, the body-contacting surface of said shell being concave from side to side, said chair shell having upwardly and outwardly extending first side portions on the seat thereof and forwardly and outwardly extending second side portions on the back thereof, the sides of said shell having reverse-formed flanges thereon for enhancing the rigidizing beam effect of said concavity and first and second side portions, said flanges extending along the sides of said shell between the seat and back; first resilient mounting means secured to the rear of said chair back and second resilient mounting means secured to the underside of said chair seat; and chair shell supporting frame means having a central supporting column including legs and having supporting frame members securely connected to said first and second resilient mounting means.

3. A chair, comprising: a unitary, generally L-shaped chair shell forming a seat and back and being curved in the area intermediate said seat and back, the body-contacting surface of said chair shell being concave from side to side, said chair shell having reverse-formed flanges on each side thereof extending from back to seat and including said curved intermediate area to impart a rigidizing effect to said chair shell, said chair shell being wider through said back than through said curved intermediate area and being larger through said seat than through said back; first resilient mounting means secured to the rear of said chair back and second resilient mounting means secured to the underside of said chair seat; and chair shell supporting frame means having a central supporting column including legs and having frame members securely connected to said first and second resilient mounting means.

4. A chair, comprising: a unitary, generally L-shaped chair shell forming a seat and a back and being curved in the area intermediate said seat and back, the body-contacting surface of said chair shell being concave from side to side and the sides of said chair shell having reverse-formed rigidizing flanges extending from seat to back and along said curved intermediate area; first resilient mounting means secured to the rear of said chair back and second resilient mounting means secured to the underside of said chair seat; and chair shell supporting frame means having a central supporting column including legs and having frame members securely connected to said first and second resilient mounting means.

5. A chair, comprising: a generally L-shaped unitary chair shell forming a seat and back, the body-contacting surface of said shell being concave from said to side and said shell including forwardly and outwardly extending side portions on the back thereof and upwardly and outwardly extending side portions on the seat thereof, and said side portions having reverse formed flanges thereon to enhance the rigidizing beam effect of said side-to-side concavity and said side portions, said flanges extending along the sides of said shell between the seat and back; a first resilient mounting means secured to the approximate center rear of said chair back, a pair of second resilient mounting means secured to the underside of said chair seat and being located slightly to the rear of the front-to-rear midline, said pair of second resilient mounting means, being in spaced apart relationship so that each is near a side portion; and chair shell supporting frame means including legs and having members securely connected to each of said first and second mounting means.

6. A chair, comprising: a unitary, generally L-shaped chair shell forming a seat and back and being curved in the area intermediate said seat and back, the body-contacting surface of said shell being concave from side to side, said chair shell having upwardly and outwardly extending first side portions on the seat thereof and forwardly and outwardly extending second side portions on the back thereof, the sides of said shell having reverse-formed flanges thereon for enhancing the rigidizing beam effect of said concavity and said first and second side portions, said flanges extending along the sides of said shell between the seat and back; a first resilient mounting means secured to the approximate center rear of said chair back, a pair of second resilient mounting means secured to the underside of said chair seat and being located slightly to the rear of the front to rear midline, said pair of second resilient mounting means being in spaced-apart relationship so that each is near a side portion; and chair shell supporting frame means including legs and having members securely connected to each of said first and second mounting means.

7. A chair, comprising: a unitary, generally L-shaped chair shell forming a seat and back and being curved in the area intermediate said seat and back, the body-contacting surface of said chair shell being concave from side to side, said chair shell having reverse-formed flanges on each side thereof extending from back to seat and including said curved intermediate area to impart a rigidizing effect to said chair shell, said chair shell being wider through said back than through said curved intermediate area and being larger through said seat than through said back; a first resilient mounting means secured to the approximate center rear of said chair back, a pair of second resilient mounting means secured to the underside of said chair seat and being located slightly to the rear of the front to rear midline, said pair of second resilient mounting means being in spaced-apart relationship so that each is near a side portion; and chair shell supporting frame means including legs and having members securely connected to each of said first and second mounting means.

8. A chair, comprising: a unitary, generally L-shaped chair shell forming a seat and back and being curved in the area intermediate said seat and back, the body-contacting surface of said chair shell being concave from side to side and the sides of said chair shell having reverse-formed rigidizing flanges extending from seat to back and along said curved intermediate area; a first resilient mounting means secured to the approximate center rear of said chair back, a pair of second resilient mounting means secured to the underside of said chair seat and being located slightly to the rear of the front to rear midline, said pair of second resilient mounting means being in spaced-apart relationship so that each is near

a side portion; and chair shell supporting frame means including legs and having members securely connected to each of said first and second mounting means.

9. A frictionless mounting construction for a chair, comprising: a unitary chair shell having a back and seat; a first resilient means secured to the rear surface of said back generally in the center thereof, a pair of second resilient mounting means secured to the underside of said seat, said pair of resilient mounting means being located slightly to the rear of the midpoint of said seat and in spaced-apart relationship so that each is near a side edge; and chair shell supporting frame means including legs and having supporting members securely connected to each of said mounting means, each said supporting member of said supporting frame being connected to a mounting means so as to be spaced from said chair shell by the interpositioning of said mounting means, and the securement of each mounting means to said chair shell being independent of the connection of the mounting means to a supporting member.

10. A frictionless mounting construction for a chair, comprising: a unitary chair shell having a back and seat; a first resilient mounting means secured to the rear side of said back generally in the center portion thereof, a pair of second resilient mounting means secured to the underside of said seat, said pair of second resilient mounting means being located slightly to the rear of the front-to-rear midline of said seat and in spaced-apart relationship so that each is near a side edge; and chair shell supporting frame means including legs and having frame members securely connected to said mounting means independent of the securement of said mounting means to said chair shell and in spaced relation to said chair shell thereby providing a unitary chair construction whereby frictional contact between chair, mounting means and supporting frame is eliminated.

11. A frictionless, flexible construction for a chair, comprising: a unitary chair shell having a back and seat; a first resilient mounting means secured to the rear of said back generally in the center thereof; a pair of second resilient mounting means secured to the underside of said seat, said pair of second mounting means being located slightly to the rear of the front-to-rear midline of said seat and in spaced-apart relationship so that each is near a side edge; and chair shell supporting frame means including a central supporting column located beneath said seat and having legs connected to the bottom thereof and having frame members connected to the upper end thereof for attachment to said first and second mounting means, said frame members being connected to said first and second mounting means independent of the securement of said mounting means to said chair shell and in spaced relation to said chair shell.

12. A chair and supporting structure therefor, comprising: a unitary chair shell having a back and seat; a first resilient mounting means secured to the rear surface of said back generally in the center thereof and a pair of second resilient mounting means secured to the underside of said seat in spaced-apart relationship so that said chair seat pivots about a line extending from side to side of said seat through second resilient mounting means, said first and second mounting means being generally frustro-conical in shape and including metal inserts on each end thereof; said inserts having threaded holes in the center thereof; disc means secured to said back and said seat having threaded stud means thereon, said stud means being received in the hole of one of said inserts of each of said mountings; and chair shell frame support means having legs and including supporting members attached to the insert in the other end of each said mountings.

13. A chair and supporting structure, therefor, comprising: a unitary, compound-formed chair shell having a back and seat; a first resilient mounting means secured to the rear surface of said back generally in the center thereof and a pair of second resilient mounting means secured to the underside of said seat in spaced-apart relationship so that said chair seat pivots about a line extending from side to side of said seat, said first and second mounting means being generally frustro-conical in shape and including metal inserts on each end thereof, said inserts having threaded holes in the center thereof; disk means secured to said back and said seat having threaded stud means thereon, said stud means being received in the hole of one of said inserts of each of said mountings; and chair shell frame support means having legs and including supporting members attached to the insert in the other end of each of said mountings, said supporting members being curved in accordance with and spaced from the figuration of said chair shell.

14. A chair, comprising: a generally L-shaped, unitary chair shell forming a seat and back, the body-contacting surface of said shell being concave from side to side and said shell including forwardly and outwardly extending side portions on the back thereof and upwardly and outwardly extending side portions on the seat thereof, and said side portions having reverse formed flanges thereon to enhance the rigidizing beam effect of said concavity and side portions, said flanges extending along the side of said shell between the seat and back; first resilient mounting means on the rear of said chair back and second resilient mounting means on the underside of said chair seat; and chair shell supporting frame means having a central supporting column including legs and having supporting frame members securely connected to said first and second mounting means.

15. A chair comprising: a unitary, generally L-shaped chair shell forming a seat and back and being curved in the area intermediate said seat and back, the body-contacting surface of said shell being concave from side to side, said chair shell having upwardly and outwardly extending first side portions on the seat thereof and forwardly and outwardly extending portions on the back thereof, the sides of said shell having reverse-formed flanges thereon for enhancing the rigidizing beam effect of said first and second side portions and said concavity, said flanges extending along the sides of said shell between the seat and back; first resilient mounting means on the rear of said chair back and second resilient mounting means on the underside of said chair seat; and chair shell supporting frame means having a central supporting column including legs and having supporting frame members securely connected to said first and second resilient mounting means.

16. A chair, comprising: a generally L-shaped, unitary chair shell forming a seat and back, the body-contacting surface of said shell being concave from side to side and said shell including forwardly and outwardly extending side portions on the back thereof and upwardly and outwardly side portions on the seat thereof, said side portions having reversed formed flanges thereon to enhance the rigidizing beam effect of said side-to-side concavity in said side portions, said flanges extending along the sides of said shell between the seat and back; a first resilient mounting means on said chair shell at the approximate center rear of said chair back, a pair of second resilient mounting means on the underside of said chair seat and being located slightly to the rear of the front to rear mid-line, said pair of second resilient mounting means being in spaced-apart relationship so that each is near a side portion; and chair shell supporting frame means including legs and having members securely connected to each of said first and second mounting means, said members being spaced from said chair shell.

17. A chair and supporting structure therefor, comprising: a unitary shell having a back and seat; a first resilient mounting means secured to the rear surface of said back generally in the center thereof, a pair of second resilient mounting means secured to the underside of said seat in spaced-apart relationship and being located slightly to the rear of the front-to-rear midline, each of said first and sec-

ond mounting means being generally frustro-conical in shape and including metal inserts attached to each end thereof, said inserts having threaded holes in the center thereof; disc means secured to said back and said seat having threaded stud means thereon, said stud means being received in the hole of one of said inserts of each of said mountings; and chair shell frame supporting means having legs, a central supporting column and including frame support members attached to the insert in the other end of each of said mountings, said frame support members being spaced from said chair shell.

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