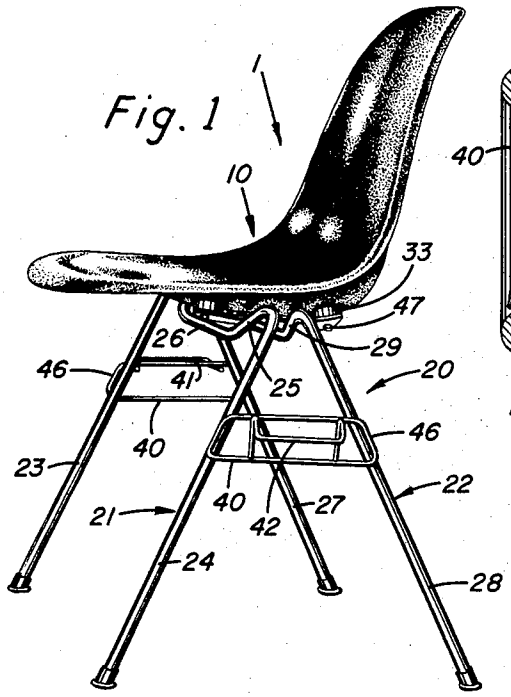
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CHAIRS

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Fig. 1



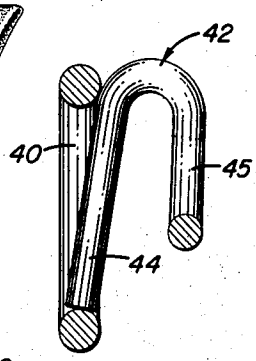


Fig. 3

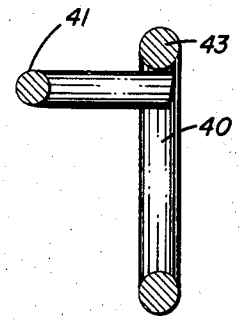


Fig. 4

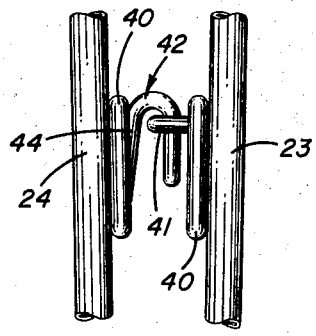


Fig. 5

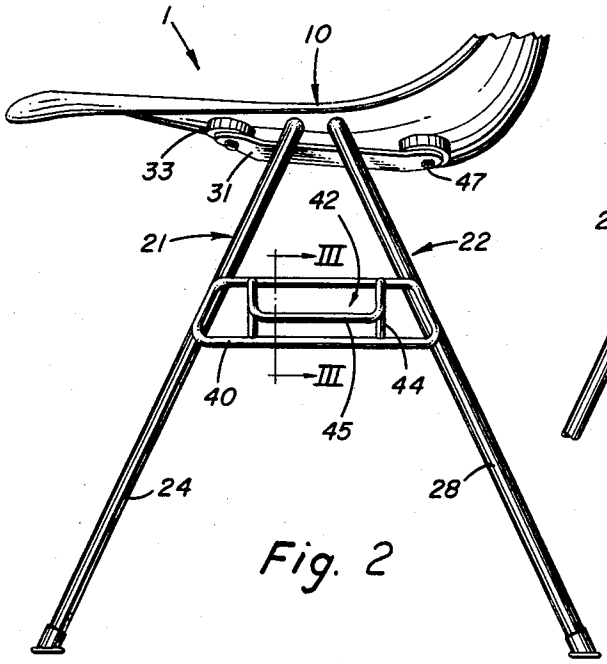


Fig. 2

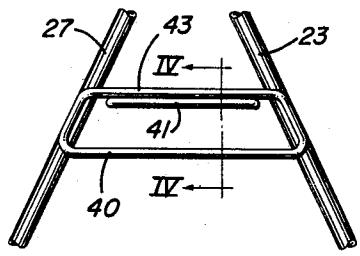


Fig. 6

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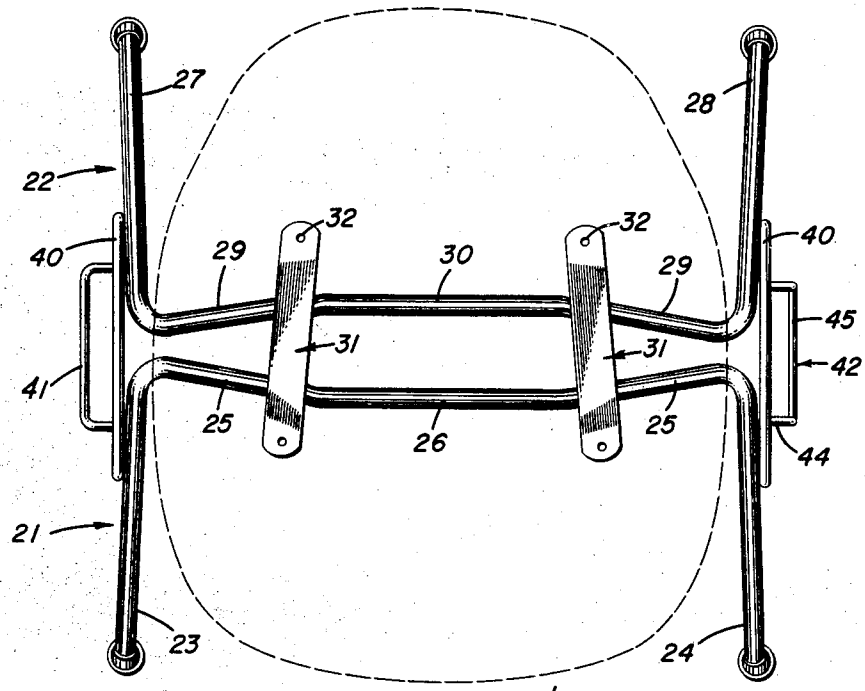


Fig. 7

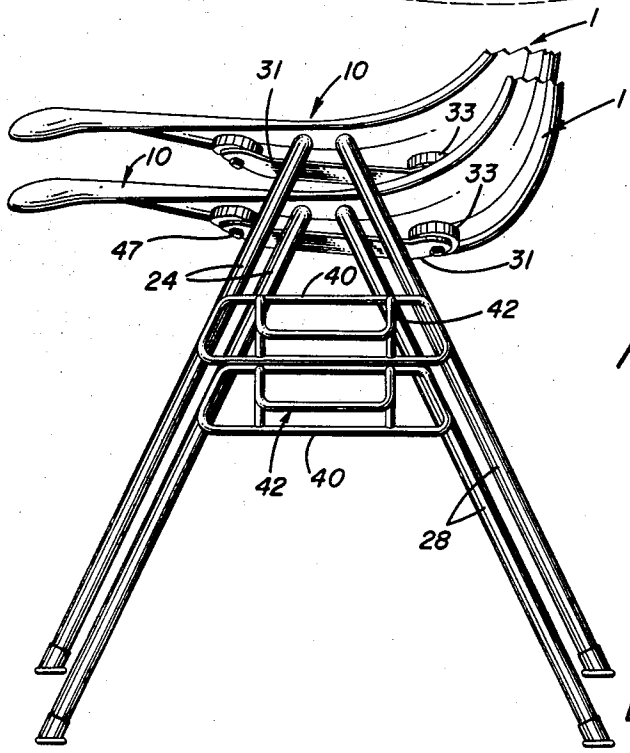


Fig. 8

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CHAIRS

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Original application Mar. 5, 1956, Ser. No. 569,424. Divided and this application July 23, 1958, Ser. No. 750,369

6 Claims. (Cl. 155—130)

This invention relates to furniture construction and more particularly to an improved chair. This invention also applies to improved chairs capable of being vertically stacked one on another for storage purposes and which can be joined together in orderly rows when in use.

This application is a division of our co-pending application Serial No. 569,424, filed March 5, 1956, entitled "Chairs," now Patent No. 2,893,469, issued July 7, 1959.

The chair of this invention is suitable for public seating use, such as auditoriums, schools, meeting houses, and churches. In such institutional applications it is desirable to use a large group of chairs which can be temporarily placed and then removed for compact storage. Chairs suitable for this use are of numerous types and designs. One type is the folding chair. Another is adapted to being stacked one on another in vertical columns without folding. The stacking type of chair is preferable over the folding type because of its comfort. However, stacking chairs have not found ready acceptance because they lack certain essential features.

One disadvantage of stacking chairs is that they are usually heavier than folding chairs because of the structure required to stack them one on another. If the structure for supporting the chairs in a vertical stack is not sufficiently strong, it will not bear the load of the chairs it supports. Thus, stacking chairs have been considered either too heavy, too cumbersome for stacking vertically, or not sufficiently strong for making a high vertical stack. This invention is directed to providing a chair which is comparatively light and adapted both in strength and stability for stacking purposes.

Another object of this invention is to provide chairs which can be easily and temporarily joined together, thus, automatically controlling their alignment and spacing.

A further object of this invention is to provide a lightweight yet strong and comfortable chair requiring a minimum of servicing since it is not readily subject to damage or breakage.

A still further object of this invention is to provide a chair having a supporting frame constructed of a minimum number of parts, thus being capable of easy fabrication, assembly, handling, and replacement of parts.

Still another object of this invention is to provide a construction for chairs permitting the chairs to be compactly stacked one upon another. The stacks formed by these chairs are relatively stable, thus reducing the danger of the stack's collapsing or tipping over.

Another object of this invention is to provide chairs having a simple means for locking them together without the use of tools.

Other objects of my invention will become obvious upon reading the following specification in conjunction with the accompanying drawings wherein:

Fig. 1 is an oblique side elevational view of the chair.

Fig. 2 is a partial, side elevational view of the chair showing the supporting and locking structure.

Fig. 3 is a fragmentary, front, elevational, sectional view of a hook taken along the plane III—III of Fig. 2.

Fig. 4 is a fragmentary, front elevational, sectional view of a loop taken along the plane IV—IV of Fig. 6.

Fig. 5 is a fragmentary, front elevational view of the side legs of two chairs illustrating the means for hooking chairs together.

Fig. 6 is a fragmentary, side elevational view of the supporting structure illustrating a leg brace having a loop extending therefrom.

Fig. 7 is a plan view of the supporting structure for the chair seat showing the seat in phantom.

Fig. 8 is a fragmentary, side elevational view of two chairs stacked one upon another.

Briefly, this invention concerns chair construction. The construction is simple including identical front and rear leg structures, each having a pair of legs connected together at the top by a cross piece. The seat of the chair is supported by these cross pieces. A brace is fixedly secured to each side between the front and rear legs. The side braces are secured to the legs at points spaced outwardly from the marginal side edges of the seat. Thus the legs are permitted to pass on each side of the marginal edges of the seat. The leg braces extend outwardly from the outer sides of the legs to provide a supporting surface on which corresponding leg braces can rest. Thus, the seats can be stacked, one upon another, to form a compact and stable stack of chairs.

Throughout this specification, in describing the chair the words "inwardly" and "outwardly" are used. "Inwardly" shall be taken to means away from the center of the seat. "Front" means toward the front of the chair or to the left as shown in Fig. 2. "Rearward" of the chair means toward the back of the chair or to the right as shown in Fig. 2. Other terms such as "horizontal" and "vertical" are used as meaning horizontal or vertical to the floor or surface on which the chair rests.

Referring to the drawings, reference numeral **1** indicates one of the chairs including the seat or shell **10** and the support structure **20**.

The shell **10** is of a reinforced synthetic fiber resin. It is molded under heat and pressure to give the desired shape. Preferably the edges are additionally reinforced to prevent splitting. The resins most conventionally used are polyesters of various colored pigmentation. The fibers most commonly used are filamentary glass. The shell **10** is shaped to conform to the body contour of an average person. The material is somewhat resilient, making the chair comfortable.

The plastic material from which the chair is made is relatively light. It is not readily subject to damage or breakage because of its resiliency. It has high impact and surface abrasion resistance. Changes in moisture content of the air will not affect it. It is vermin proof and may be readily cleaned with soap and water or a damp cloth.

The base or supporting frame **20** includes a front standard or leg structure **21** and a rear standard or leg structure **22**. Each of these structures is identical. Each is formed from a single piece of tubular metal. The front leg structure **21** includes the two legs **23** and **24** joined at the top by a cross piece consisting of the downwardly and inwardly extending side portions **25** and the intermediate horizontal straight portion **26** (Figs. 1 and 7). The rear leg structure **22** consists of the two rear legs **27** and **28** connected at their tops by the cross piece including the downwardly extending end portions **29** and the horizontal intermediate portion **30**.

Mounting straps **31** are secured by welding or any other suitable means to the cross pieces of the front and rear leg structures **21** and **22**. The mounting straps **31** are secured to the downwardly extending end portions **25** and **29** immediately adjacent the point where the end portions merge with the intermediate straight portions **26** and **30**.

The ends of the mounting straps are bent upwardly and slightly twisted to provide a supporting surface conforming with the contoured bottom surface of the shell **10**. Holes **32** are provided in the ends of the mounting straps through which a screw can be inserted for securing the seat to the mounting straps and thus to the supporting frame.

The mounting straps **31** are secured to the circular shock mounts **33** which preferably are adhesively secured to the bottom of the shell. Shock mounts **33** each have an internally threaded female insert adapted to receive a screw. This shock mount is of similar construction to that described and claimed in Patent No. 2,649,136.

In the preferred form of this invention, the front legs **23** and **24** extend downwardly and forwardly. The rear legs **27** and **28** extend downwardly and rearwardly. The legs are held and supported in this position by the leg braces **40** secured to the outer sides of the legs and by the straps **31**. The leg braces **40** are fabricated of a heavy gauge wire formed into an elongated ring.

A loop **41** is secured to one of the braces **40** (Figs. 4 and 7). It extends outwardly from the brace and is adapted to receive a hook **42** mounted to the other brace **40** (Figs. 2, 3 and 5). The loop **41** is a U-shaped, heavy gauge wire secured to the top cross wire **43** of one of the rings **40** (Fig. 4). The hook **42** is also a heavy gauge wire having two legs **44** parallel to each other and connected by the U-shaped hook **45**. The hook **45** extends outwardly from the legs. The legs **44** are secured to the top and bottom cross wires of one of the rings **40**. The width of both the loop **41** and the hook **45** is such that the hook **45** fits within the loop (Fig. 5). The loop **41** and hook **42** are secured to their respective braces **40** by a resistance weld or any other suitable means.

The entire supporting frame **20** may be of aluminum or any other material but it is more commonly of tubular steel. The side braces are usually of a steel wire, however, aluminum or any other suitable material can be used. The mounting straps can be made of any suitable material. All of these parts can be suitably plated as with chrome. The shock mounts **33** are of rubber or any other resilient material.

The assembled chair

It should be evident that the chair of this invention is made with a minimum number of parts. These include the identical front and rear leg structures **21** and **22**, the shell **10**, the mounting straps **31**, the shock mounts **33** and the side leg braces **40** also identical except for the means for joining two or more chairs together. The supporting frame **20** is preferably of an all welded construction and it is secured to the shell by screws **47**.

The assembled supporting structure is best shown in Figs. 1 and 7. The front and rear leg structures **21** and **22** are arranged with the front legs **23** and **24** extending downwardly and forwardly. The rear legs **27** and **28** extend downwardly and rearwardly. The cross pieces **26** and **30** are spaced one from another (Fig. 7) and are held in that position by the mounting straps **31** secured thereto by welding or any other suitable means. The forward and rearward positions of the legs are maintained by the side braces **40**, secured at their side portions to the front and rear legs. This attachment is made by welding or any other suitable means. The hook **42** and loop **41** extend outwardly from the side braces.

The shock mounts **33** are adhesively secured to the bottom surface of the seat **10** at points which will permit a screw passing through the hole **32** of the mounting strap to be secured in the internally threaded female insert of the shock mount. With these shock mounts **33** properly located, the seat is placed on the shock mounts with the internally threaded female inserts aligned with the holes **32**. The screws **47** extending through holes **33** are threaded into the inserts of the shock mounts, securing the seat to the supporting frame **20**.

The width of the supporting frame, that is, the width of the front and rear leg structures, and the lateral positioning of the side leg braces relative to the side marginal edges of the seat **10** are important. Fig. 7 illustrates this relationship. The support frame **20** is shown wider than the seat. This is necessary to permit the frame to pass over the seat or shell **10** of another seat.

The vertical spacing of the side braces **40** is important. Both the upper and lower limits of their vertical position on the legs is established at the point which provides effective cross-bracing for the legs and at the same time provides a means for supporting a chair stacked above it. The side braces index the chairs providing a vertical and stable stack in such a manner that the chair shells are spaced from one another and from the frames for protecting the shells against abrasion.

In the preferred form the angular relationship of the legs to each other and their lateral spacing is limited only by two factors. The legs must be able to pass about the shell **10** to permit stacking and the legs of one chair must not spread laterally sufficiently to interfere with the joining of one chair to another. However, where the loop and hook arrangement is not used and the chairs are not to be joined, this latter limitation does not apply.

The position and shape of the side leg braces are important. The braces are elongated and secured to the legs at approximately the same vertical position one-third down the legs. In other words the points of attachment of the leg braces to the legs lie substantially in horizontal plane. This gives symmetry to the chair and at the same time contributes to the stability of a stack formed by such chairs. The side braces, being located approximately one-third down the leg, provide a support surface on which the brace of the upper chair can rest upon the brace of the chair beneath. This support surface is long enough in a horizontal direction to prevent the stacked chairs from tipping forwardly or backwardly.

When the chairs are stacked one upon another as shown in Fig. 8, the bottom cross-piece of the side braces **40** of one chair rests directly on the top cross-piece of the side braces of the chair beneath it. The side braces **40** have an adequate cross section so that they extend a sufficient distance outwardly from the leg to provide an adequate supporting surface.

A plurality of these chairs may be joined together, while in use, depending upon the wishes of the user. If they are to be joined, the user simply lifts one chair a short distance and engages the hook **45** into the loop **41** of the adjacent chair. Any number of chairs can be hooked together in this fashion. When joined together, the spacing and alignment of the chairs is automatically determined. This has several obvious advantages. On the other hand, the chairs can be used individually and despite the joining feature, having a pleasing appearance.

It is significant that the braces on the side of the legs serve several functions while at the same time giving a good and pleasing appearance to the chair. The braces provide means for joining several chairs together in orderly manageable rows. They serve as braces for the legs. They index, support, and provide clearance for the various components of the chair when stacked in vertical rows.

The plastic seat of this chair is more attractive than conventional chairs designed for temporary use and stored. It requires no maintenance such as re-upholstering or spring replacement.

After the chairs have been used and it is desired to store them in a compact storage area, the chairs are quickly separated simply by lifting and stacking one on another in a manner shown in Fig. 8. The leg braces rest on each other, maintaining positive spacing between the shells and preventing any scratching or marring of the shells. At the same time, a compact stack of chairs is obtained since the side braces, collectively, form a supporting column on each side of the stack. Because of the strength of the chair and the features previously de-

scribed, the stack is stable allowing the stack to be made relatively high without danger of tipping or collapsing.

Another advantage of this invention is the structural disassociation of the leg structure or base from the seat structure. Should either be damaged, it alone may be replaced without the expense of purchasing the other component. The substitution is both quick and simple since only the four screws 47 are involved.

Having described our invention, it should be realized that there is provided a simple, strong and lightweight chair made with a minimum of parts adapted to quick and inexpensive mass assembly methods. The chair can be used with other chairs and locked thereto for forming straight rows of chairs and for preventing the chairs from being dispersed throughout the entire hall in which they are being used.

It should be understood that in describing this invention certain features have been described which do not necessarily constitute a part of this invention. Further, various other embodiments can be made of this invention which will be entirely within the spirit of this invention. These embodiments and modifications are covered by this invention unless the appended claims expressly state otherwise.

We claim:

1. In a chair construction of the type having a seat and a pair of legs extending downwardly from each side thereof, means for detachably securing such chairs in a row, comprising: a hook means rigidly supported by each leg of one of said pairs of legs; said hook means being rigid and having a first portion projecting generally horizontally from the plane passing through said one pair of legs and a second portion extending from said first portion in a direction generally parallel to said plane; said second portion of said hook means including at least two spaced surfaces, each of said surfaces positioned generally equidistantly outwardly from said plane and generally equidistantly from the bottoms of said legs; a hook receiving means rigidly supported by each leg of the other of said pairs of legs; said hook receiving means being rigid and positioned in generally the same horizontal plane as said hook means whereby said hook receiving means receives therebehind a second portion of a similar hook means of an adjacent chair upon vertical movement of one chair with respect to the other, at least said hook receiving means being elongated and extending a major distance between the legs by which it is supported whereby easy two point engagement of the spaced surfaces of said hook means with said hook receiving means is facilitated.

2. A chair construction as defined in claim 1, said second portion comprised of an elongated wirelike member bent such that the extremities thereof extend generally perpendicularly from the body thereof, and said first portion comprises the ends of said extremities, bent to extend toward said plane.

3. The chair construction of claim 1 in which the hook means is one piece and elongated and extends a major distance between the legs by which it is supported.

4. The chair construction of claim 1 in which there is a pair of brace means, one brace means extending between and secured to each leg of one of said pairs of legs and the other brace means extending between and secured to each leg of the other of said pairs of legs; said hook means formed to extend outwardly from the one brace means and said hook receiving means being formed to extend outwardly from the other brace means.

5. The device of claim 4 in which the braces are constructed of wire and said hook means and hook receiving means are wire elements separate from the wire braces but secured thereto.

6. The device of claim 5 in which the braces are wire rings; the hook means is a U-shaped wire member having its extremities secured to one wire brace and the bight portion bent to form a hook; and said hook receiving means is a U-shaped wire member having its extremities secured to the other wire brace with the bight portion formed into a loop.

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