

[54] **MOULDED CHAIRS**

[75] Inventors: **Harry Sebel**, Bankstown; **Dillon Charles Furey**, North Sydney, both of New South Wales, Australia

[73] Assignee: **Sebel Limited**, Bankstown, New South Wales, Australia

[22] Filed: **Apr. 27, 1973**

[21] Appl. No.: **355,210**

[30] **Foreign Application Priority Data**

Sept. 28, 1972 Australia..... 633/72

[52] U.S. Cl. .... **297/239**

[51] Int. Cl. .... **A47c 3/00**

[58] Field of Search ..... 297/239, DIG. 2, 216, 452, 297/445, 458

[56] **References Cited**

**UNITED STATES PATENTS**

2,541,835 2/1951 Saarinen ..... 297/DIG. 2  
 2,936,826 5/1960 Reineman ..... 297/DIG. 2

3,165,355 1/1965 Hitchcock et al. .... 297/216  
 3,586,371 6/1971 Baetzner ..... 297/239  
 3,637,256 1/1972 Harty ..... 297/DIG. 2  
 3,784,254 1/1974 Longato ..... 297/DIG. 2

**FOREIGN PATENTS OR APPLICATIONS**

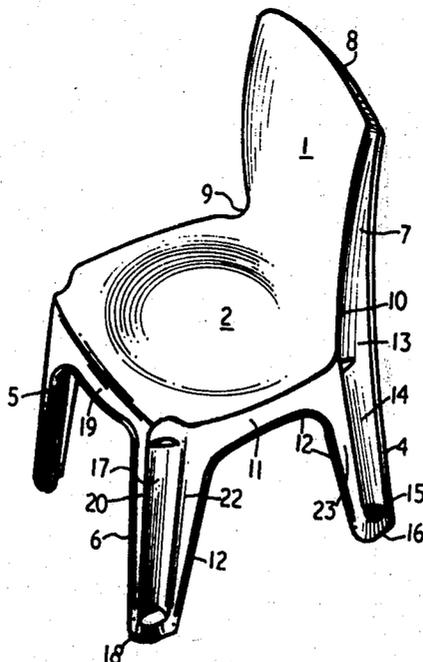
267,796 1/1969 Austria ..... 297/DIG. 2

*Primary Examiner*—Paul R. Gilliam  
*Assistant Examiner*—Doris L. Troutman  
*Attorney, Agent, or Firm*—Robert E. Burns;  
 Emmanuel J. Lobato; Bruce L. Adams

[57] **ABSTRACT**

A chair moulded in one piece from a suitable plastics material stacks vertically, and has a seating area nearly as great as the plan area of the seat, by waisting the back support at its junction with the seat and rear legs, providing the rear legs with an internally directed channel over the greater part of their length which merges at the tops of the legs into the said waisted portion, and making the side edges of the legs in the side planes of the chair substantially vertical.

**4 Claims, 8 Drawing Figures**



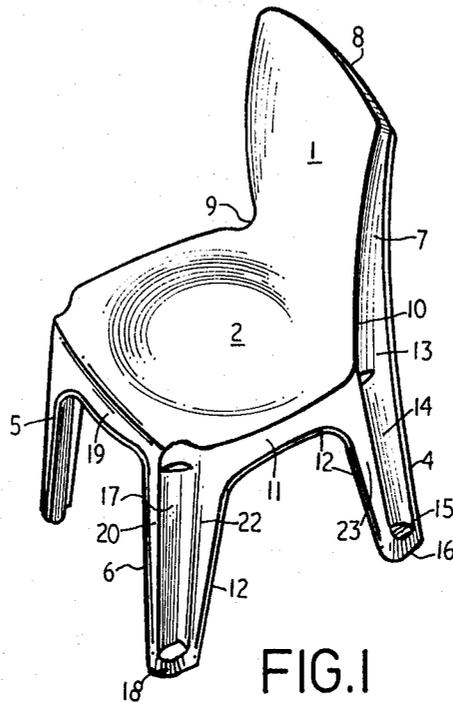


FIG. 1

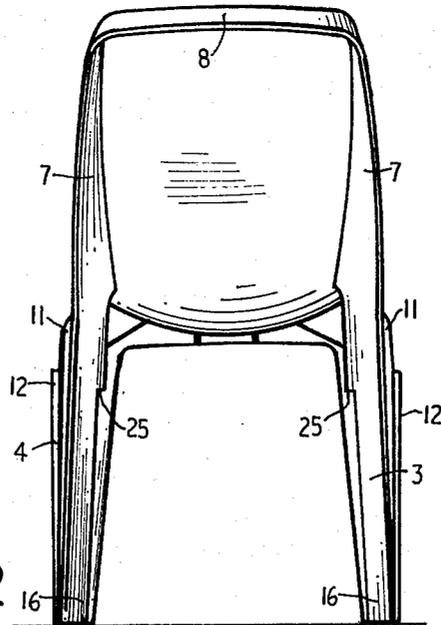


FIG. 2

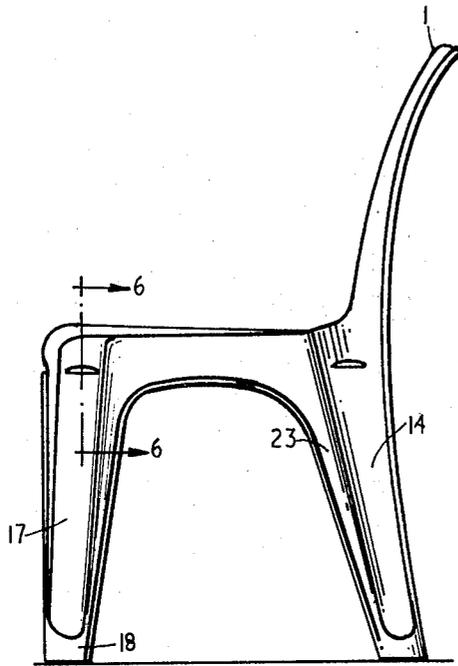


FIG. 3

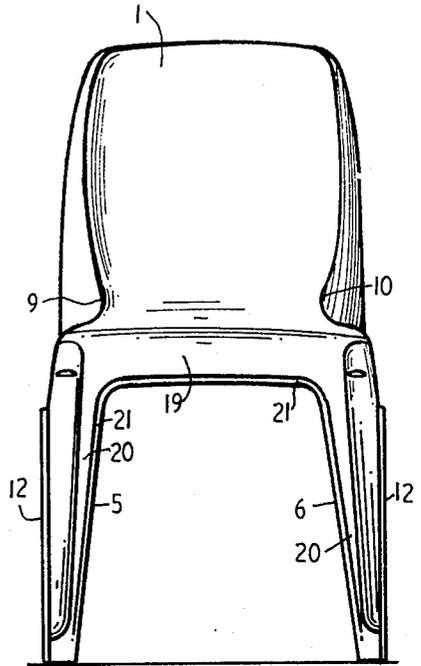


FIG. 4

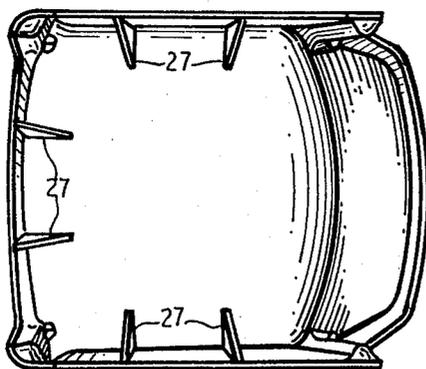


FIG. 5

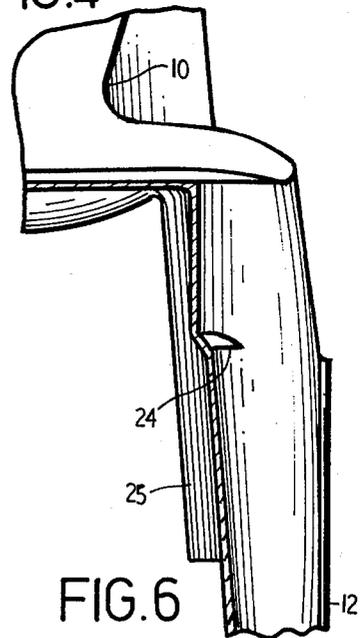


FIG. 6

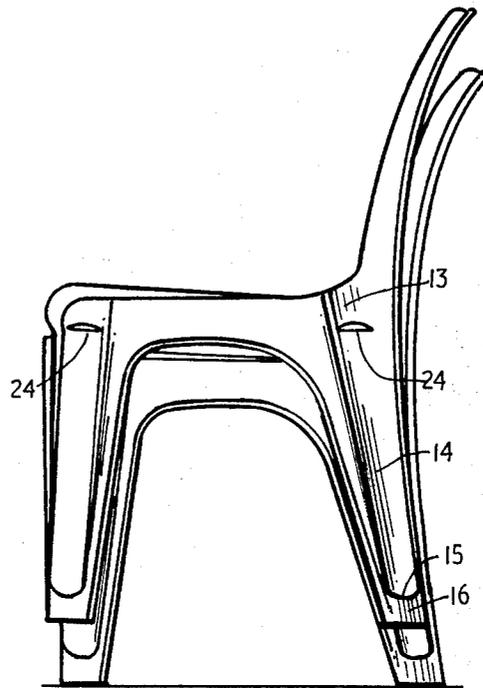


FIG. 7

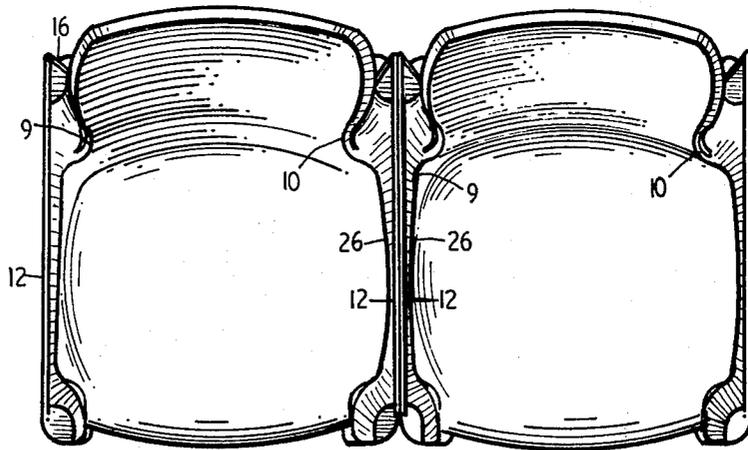


FIG. 8

## MOULDED CHAIRS

This invention relates to moulded chairs, and more particularly to a substantially vertical-stacking chair moulded in one piece from plastics materials.

While chairs are known which stack almost vertically and are moulded in one piece from plastics material, they do not give the maximum desirable seating area for their overall dimensions in plan. Accordingly for a chair of given maximum dimensions in plan, and it is usually desirable not to exceed a maximum width of nineteen inches for a chair used in public places such as auditoriums, comfort is reduced, chairs also present problems when arranged in rows due to the substantial gap between the chairs at the seat level. This is due to the fact that the legs of conventional, moulded chairs are splayed outwardly. For example, it is a not uncommon requirement for public auditoriums that when chairs are arranged in rows, the chairs must be connected together in groups of, say, five. The purpose of this is to reduce the likelihood of a chair being knocked over in panic situations, such as in the case of fire, and blocking a row. The substantial gap at seat level introduces difficulties in connecting the chairs together in groups as part of the rows.

The present invention provides chairs which stack substantially vertically, which are moulded in one piece from a plastics material, and in which the seating area is nearly as great as the plan area of the chair. The sides of adjacent chairs at seat level are close together when put in rows, giving a more convenient row, and making it easier to connect chairs together.

The objects of the present invention are achieved by making the chair legs in at least the planes of the chair sides substantially vertical, providing waist-like junctions of the backrest with the seat and rear legs, and into shaping of the rear legs in to merge the contracted waist-like junctions. By having the legs substantially vertical as described the seating area is maximized, while the waist-like shaping of the backrest and rear legs still permits nearly vertical stacking.

Therefore according to this invention a substantially vertical stacking chair moulded in one piece from plastics material and having a back support, a seat, rear legs and front legs, is characterized in that the side edges of the legs in the side planes of the chair are substantially vertical, the back support at its junction with the seat and the rear legs is contracted in waist-form, and the rear legs have internally directed channels over at least the greater part of their length which merges at the tops of the legs into the contracted portions.

Reference will now be made to the accompanying drawings in which:

FIG. 1 is a perspective view of a chair according to this invention,

FIG. 2 is a rear elevation of the chair,

FIG. 3 is a side elevation,

FIG. 4 is a front elevation,

FIG. 5 is a bottom plan,

FIG. 6 is a section, to an enlarged scale, in the line 6-6 of FIG. 3,

FIG. 7 is a side elevation showing two chairs according to FIGS. 1 to 6 with one chair stacked on another, and

FIG. 8 is a top plan showing two chairs according to FIGS. 1 to 6 placed side by side.

The chair shown in the drawings may be moulded in one piece from a suitable plastics material such as acrylonitrile-butadiene-styrene. The chair consists essentially of a back support 1, seat 2, rear legs 3, 4 and front legs 5, 6. The perimeter of the back support has a rearwardly directed strengthening flange 7 which at the top 8 is also directed downwardly as well as rearwardly. The back support is shaped to conform to the shape of the back of a seated person, and at the bottom, where the back support of the new chair merges with the seat and rear legs, it is waist-shaped at 9, 10 as is best seen in FIGS. 4 and 8. The flanges 7 continue downward past the seat as rear flanges of the rear legs 3, 4. The sides of the seat are turned down as skirts 11 with reinforcing beads 12 which beads also extend down the insides of the front and rear legs. The skirts 11 merge into the flanges 7 by way of the waist portions 9, 10 so as to form channels 13 which extends down the rear legs at 14 with a slightly diminishing, channel-like cross-section until near the bottoms of the rear legs where the channels cease at 15 and the bottommost portion of the leg is moulded as a solid piece 16.

The front legs 5, 6 are also moulded with channels 17 whose cross-section diminishes slightly from top to bottom, the channel ceasing near the bottom of the legs which finish as a solid piece 18. The front of the seat also has a downwardly directed skirt 19 which merges with the front flanges 20 of the front legs. The perimeter of the skirt 19 and flanges 20 is also provided with a thickened strengthening beading 21.

The side skirts 11 also merge with the side flanges 22, 23 of the front and rear legs respectively - these flanges narrow toward the bottom and nearly disappear at the bottom.

A small outward projection 24 extends across each leg channel near the top of the leg, and these projections form stops on which internal projections or ribs 25 of each leg rest when one chair is stacked on another.

An essential feature of the invention is that the edges of the legs, in the planes of the two sides, are substantially vertical. This can be seen in FIGS. 2 and 4 where the beadings 12 of the rear legs 3,4 as well as those of front legs 5,6 lie in a vertical plane. As a consequence two chairs can be placed side by side as shown in FIG. 8 with the vertical and horizontal beadings 12 in contact, or nearly so. The adjacent edges 26 of the seats are then about one half inch apart at their closest points. The necessary moulding draft angle in the legs to permit withdrawal of a chair from a mould is provided in the front and rear planes of the legs. This construction enables the seat to occupy most of the space of the chairs and tends to maximize the seat area for a given overall width of chair. Despite the vertical nature of the legs in the side planes it is still possible to stack the chairs nearly vertically as in FIG. 7. The stacking height is determined by projection 24 and cooperating rib 25 - by providing a positive stacking height by these means jamming of chairs when stacked is virtually eliminated.

Strengthening ribs are shown at 27, FIG. 5.

A central cavity can be provided in each solid foot 16 extending upwardly from the bottom of the foot. Plastic glides or inserts can be provided each of which has an upwardly directed part which fits into the cavities, and an inverted mushroom base. The inserts may be a force fit into the cavities, or be screwed or otherwise secured

in place. For a general purpose chair the bases of the inserts will be about 2½ centimetres thick, and the leading edge of the chair will then be about 44 cms. from the floor. However, either the front or rear inserts can be replaced by inserts having bases of greater height or thickness, say 5 cm., to give a more relaxed or more vertical seating posture respectively.

The chair can readily be adapted for people shorter than normal, for example those wishing to have a leading edge of 42 cms. from the floor, by fitment of inserts which are only ½ cm thick. Postural adjustment can be provided by use of the 2½ cm. inserts in either front or rear legs.

When two or more chairs are to be joined together when placed side by side (as in FIG. 8), which is commonly known as rowing, the side skirts 11 can be used with whatever joining means are used. Outwardly projecting stubs can be moulded into the skirts which abut against each other when the chairs are rowed. One possible joining means are bolts passing through the stubs.

The front legs of the chair are the same width as the rear legs - it is impossible to keep chairs tidy in an auditorium where the back legs are spaced apart more widely than the front legs.

We claim:

1. A chair stackable and rowable with an alike chair, comprising a single body moulded from plastic material and defining a back support, a seat, rear legs and front legs; the rear and front legs having side edges which de-

fine lower parts of side planes of the chair and said edges and planes being substantially vertical to facilitate rowing of the chair with an alike chair; each rear and front leg defining a channel which, in cross-section, is convex toward the inside of the chair, over an upper and at least a greater part of its length, for receiving a corresponding channel-like rear leg of an alike chair stacked thereon; the back support having contracted waist portions adjacent the seat and the rear legs, and the channel defined by the rear legs having top end portions merging into respective, contracted waist portions to facilitate stacking of the chair.

2. A chair as claimed in claim 1 wherein said channelshaped cross-sections defined by the legs extend, and have diminishing cross-sections, from the top of each leg downwards to adjacent a lower end of the leg; a portion of the leg adjacent the lower end being a solid piece of said plastic material.

3. A chair as claimed in claim 1 wherein an outward projection extends across the channel of each leg adjacent the top of the leg, and each leg has internal substantially vertical rib means, near its top, for resting the lower ends of the rib means of one chair on the outward projections of a lower chair when the chairs are stacked.

4. A chair as claimed in claim 1 in which the seat has downwardly extending front and rear skirts and the legs have flanges merging with said skirts.

\* \* \* \* \*

30

35

40

45

50

55

60

65