Aug. 5, 1969 L. H. KLAUSEN 3,459,449

ONE-PIECE MOULDED STACKING CHAIR

Filed Aug. 7, 1967 2 Sheets-Sheet 1

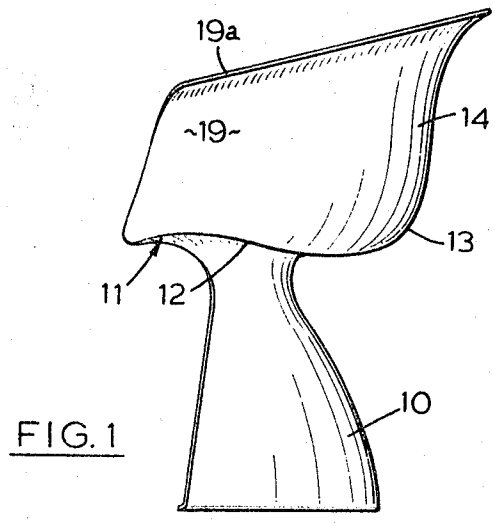


FIG. 1

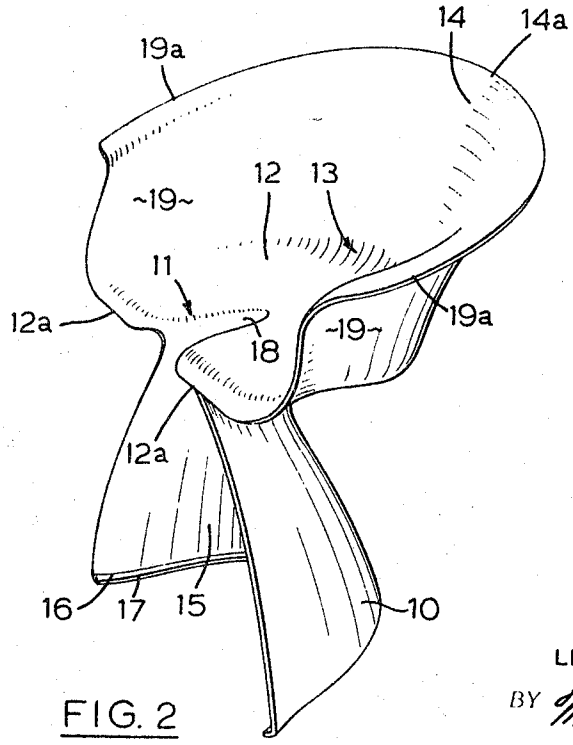


FIG. 2

INVENTOR.
LEO HERMAN KLAUSEN
BY Maybee & Legris
ATTORNEYS

Aug. 5, 1969 L. H. KLAUSEN 3,459,449

ONE-PIECE MOULDED STACKING CHAIR

Filed Aug. 7, 1967 2 Sheets-Sheet 2

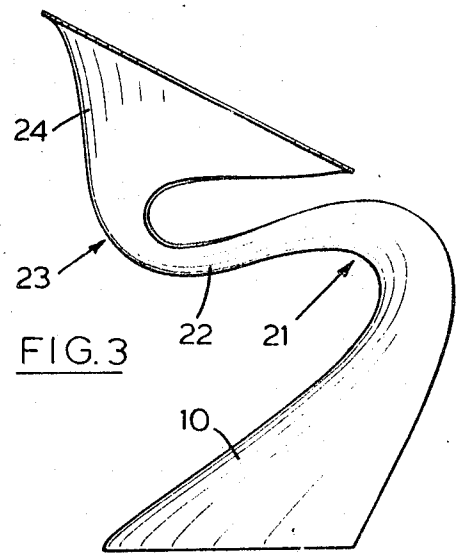


FIG. 3

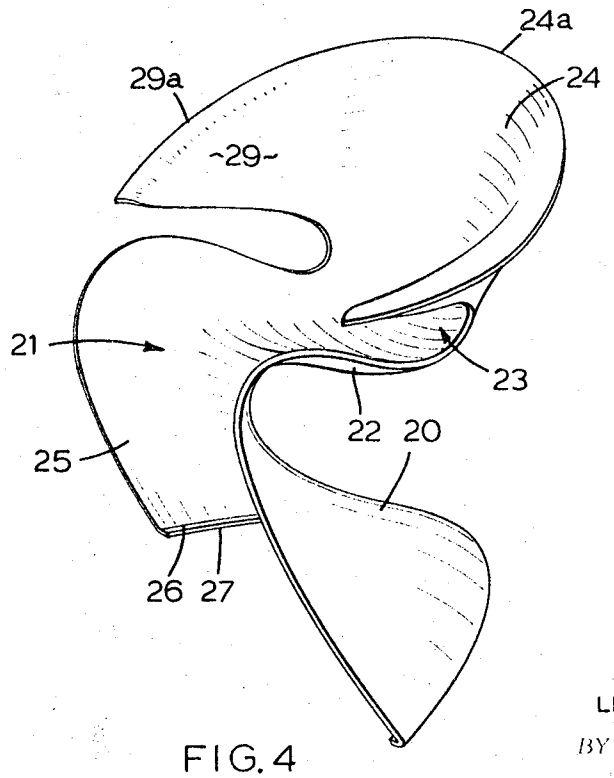


FIG. 4

INVENTOR.
LEO HERMAN KLAUSEN
BY Maybee & Legris
ATTORNEYS

United States Patent Office 3,459,449
Patented Aug. 5, 1969

3,459,449

ONE-PIECE MOULDED STACKING CHAIR

Leo Herman Klausen, 338 Hillcrest Ave.,
Willowdale, Ontario, Canada

Filed Aug. 7, 1967, Ser. No. 658,835
Int. Cl. A47c 3/04, 5/12
U.S. Cl. 297—239 4 Claims

ABSTRACT OF THE DISCLOSURE

A one-piece, moulded, stacking chair which obtains its structural strength from its configuration, without reinforcing elements.

This invention relates to chairs and, in particular, to a one-piece, moulded, stacking chair which obtains its structural strength from its configuration, without reinforcing elements.

Background of the invention

One-piece, moulded, stacking chairs are, in a number of forms, known to the prior art. For example, United States Patent 3,285,660 of Nov. 15, 1966, to R. Beckman et al. discloses, in FIGURES 7 to 12 inclusive, a one-piece, moulded, stacking chair of a kind over which the present invention is considered to be an improvement from several points of view.

First, moulded, one-piece stacking chairs of the prior art have, for the most part, employed reinforcing elements of one kind or another in order to enable the moulded chair producing contour to obtain the required structural strength and rigidity. In the above mentioned United States patent, for example, the edges of the chair are thickened and are of double-wall construction with internal braces so as to provide rigidity which would not otherwise be adequately provided by the moulded chair forming contours.

Other less desirable moulded chairs are not really one-piece chairs at all, but are moulded elements which may be secured together by a structural frame which serves both a reinforcing and a supporting function.

Summary of the invention

The present invention proposes a construction in which a one-piece, moulded chair may be formed in a manner which will permit close and efficient stacking of a plurality of chairs while, at the same time, enabling such chairs to enjoy all of the advantages of a simple, one-piece moulding which achieves its required strength and rigidity from its configuration and from the contours of the surfaces constituting the chair without the need for reinforcing elements attached to the mouldings and without the need for double thicknesses, reinforcing struts or webs of any kind.

Brief description of the drawings

FIGURE 1 is a side elevation view of a first embodiment of a one-piece moulded stacking chair embodying the present invention;

FIGURE 2 is a perspective view of the chair of FIGURE 1;

FIGURE 3 is a side elevation view of a second embodiment of the present invention, and

FIGURE 4 is a perspective view of the chair of FIGURE 3.

Referring now to FIGURES 1 and 2, the chair of the present invention may be seen, in this first embodiment, to be a one-piece moulded, stacking chair comprising a base portion **10**, a fold region **11**, a seat portion **12**, a transition region **13** and a back-rest portion **14**.

The base portion **10** comprises a moulded shell presenting a forwardly opening concave surface **15** which extends and converges upwardly from an arcuate base line **16** towards and to the fold region **11**. The arcuate base line **16** is, as illustrated, defined by an inwardly turned narrow flange **17** lying in the plane which contains the base line **16**. The narrow flange **17** serves the purpose of increasing the bearing area of the base portion **10** upon a supporting surface so as to minimize damage and wear to the supporting surface such as a carpet or the like.

The forwardly opening concave surface **15** of the base portion **10** subtends an angle of less than 180° throughout its length from the base line **16** to the fold region **11** so that, throughout its length, it is a forwardly opening concavity within which may be received an identical base portion **10** of another chair in stacked relationship.

The fold region **11** which lies at the upper extremity of the base portion **10** constitutes the region within which the moulded shell constituting the base portion **10** merges smoothly with the generally horizontal seat portion **12**. The curve by means of which the base portion and the seat portion are integrally joined together presents a convex surface along the fold region between the seat portion **12** and the base portion **10** and, in addition, defines a forwardly opening concave surface **18** which subtends an angle of less than 180° so that it, like the base portion **10**, may receive the fold region of an identical chair in stacked relationship with the chair illustrated.

From the fold region **11**, the seat portion **12** extends rearwardly in a generally horizontal position and, in addition, extends laterally to the side to an extent sufficient to form a seat portion **12** of appropriate size. The precise size and shape of the forwardly opening concave curve **18** in the fold region **11** is not critical and will depend upon the precise configuration of the base portion **10** and upon the size of the seat portion **12** which it is desired to support. What is essential, however, is that the curve **18** be a forwardly opening concave curve subtending an angle of less than 180°. This is essential both for the provision of a stacking feature and for structural rigidity.

At the rear of the seat portion **12**, the transition region **13** constitutes the smooth merging curve between the back-rest portion **14** and the seat portion **12**; the transition region **13** is a compound curve defined by two concave surfaces, formed about vertical and horizontal axes as will be clear from the drawings.

Both the concave surfaces, which together form the compound curve of the transition region **13**, open forwardly and subtend angles of less than 180° so that the forwardly opening concavity in the transition region will receive an identical transition region of a second chair in stacked relationship to the chair illustrated.

The back-rest portion **14**, formed integrally with the remainder of the chair extends upwardly in a generally vertical position and, as illustrated, may also extend forwardly in a smooth curve on each side of the seat portion to partially or entirely embrace the area above the seat portion so as to provide side walls to the seat portion and so that the upper free edge of the forward extension may constitute arm rests for the chair. The upper free edge **14***a* of the back-rest may be outwardly flared as may be the upper free edges **19***a* of the forwardly extending portion **19** which provide the arm rest. Similarly, the forward edges **12***a* of the seat portion may be downwardly flared to provide an appropriately comfortable edge to the seat portion.

It is to be noted that no where it is *necessary* to provide localized reinforcing elements or localized thickening of material for the purpose of strengthening the chair structure. The outwardly flared upper edge of the back-rest and arm rest portions of the chair and the downwardly

flared forward edge of the seat portion may be omitted if it is felt desirable to do so without impairing the structural strength by this omission.

Although several methods of producing the structure illustrated in the drawings are contemplated, it is perhaps, most convenient to consider the structure as being derived from a substantially semi-cylindrical blank which may be considered as having been deformed so as to provide the configuration shown. This analogy is not intended to be construed as indicating that it is considered either practical or desirable to form the chair from a semi-cylindrical blank, but the geometry of the chair and the structural rigidity which it enjoys is analogous to that of a semi-cylindrical element which has been deformed to provide the configuration shown without departing significantly from the strength of such a semi-cylindrical blank. Further, the construction provided retains the stacking compatibility of a plurality of semi-cylindrical blanks.

The precise configuration of the chair illustrated in FIGURES 1 and 2 may be appropriately employed with a cushion occupying a position upon the seat portion **12** if the size of the concave surface **18** within the fold region **11** is such that a cushion appears to be desirable.

Turning now to FIGURES 3 and 4, a second embodiment of the present invention is illustrated and although the configuration and appearance of this second embodiment may, superficially, seem distinct from that of FIGURES 1 and 2, it is, nevertheless, essentially the same concept expressed in a chair differing primarily in appearance.

In FIGURES 3 and 4, the chair comprises a base portion **20** presenting a forwardly opening concave surface **25** converging upwardly from an arcuate base line **26** to a fold region **21**.

The fold region **21** constituting the merger between the seat portion **22** and the base portion **20** presents a convex curve about a horizontal axis and a concave curve about a vertical axis and, by this curvature and configuration, provides for adequate rigidity in the seat portion **22** and in its juncture to the base portion **20**. As in the first embodiment, the base line **26** of the base portion **20** may be provided with an inwardly turned narrow flange **27** for the purpose of increasing the bearing area of the base portion **20** upon a supporting surface.

The chair of the second embodiment is provided with a back-rest portion **24** integrally joined with a seat portion **22** through a transition region **23** and, as in the chair of the first embodiment, the back-rest portion **24** may extend forwardly to embrace the area above the seat portion **23** as shown at **29** and the free upper edge of the back-rest portion and the forwardly extending portion **29** may be outwardly flared as at **24***a* and **29***a* respectively.

As in the first embodiment, all forwardly opening concave surfaces of the chair subtend an angle of less than 180° so that the chair may be placed in stacking relationship with a plurality of identical chairs.

While two embodiments of the invention have been described with particular reference to the accompanying drawings, it is to be understood that minor modifications in the configuration of chairs embodying the invention are contemplated within the spirit of the invention.

What I claim as my invention is:

1. A one-piece, moulded, stacking chair capable of formation from a blank of sheet material consisting of a base portion, a fold region, a seat portion, a transition region and a back rest portion, the base portion comprising a moulded shell presenting a forwardly opening concave surface converging from an arcuate base line which subtends an angle of less than 180° to an upper fold region defined by a forwardly opening curve about a vertical axis subtending an angle of less than 180° within which region the moulded shell constituting the base portion merges smoothly with an integral rearwardly and laterally extending seat portion, the fold region comprising the rigidly and integrally joined adjacent portions of the base portion and the seat portion, the seat portion extending in a generally horizontal position rearwardly and laterally from the fold region to a transition region within which the periphery of the seat portion merges with an integral backrest and arm rest portion in a smooth compound curve made up of a surface formed in a forwardly opening concave curve about a horizontal axis and a forwardly opening concave curve about a vertical axis about which axis it subtends an angle of less than 180°, the integral back rest and arm rest portion extending upwardly in a general vertical position from the transition region to a free upper edge.

2. A one-piece, moulded, stacking chair as claimed in claim **1** wherein the back rest portion extends forwardly in a smooth curve on each side of the seat portion to partially embrace the area above the seat portion, the free upper edge of the forwardly extending portions of the back rest portion constituting arm rest segments for the chair.

3. A one-piece, moulded, stacking chair as claimed in claim **1** wherein the free upper edge of the back rest portion and the forward edge of the seat portion may be rearwardly and downwardly flared respectively.

4. A one-piece, moulded, stacking chair as claimed in claim **1** wherein the arcuate base line of the moulded shell constituting the base portion may be provided with an integrally formed flange lying in a plane containing the base line so as to increase the bearing area of the base portion upon a supporting surface.

References Cited

UNITED STATES PATENTS

D. 194,497	2/1963	Miller	D15—11
2,936,826	5/1960	Reineman	297—239
3,006,688	10/1961	Ouellette	297—457
3,285,660	11/1966	Beckman et al.	297—445

JAMES T. McCALL, Primary Examiner