June 27, 1961 M. KESSLER 2,990,007

FOLDING CHAIR ASSEMBLY

Filed Jan. 6, 1960

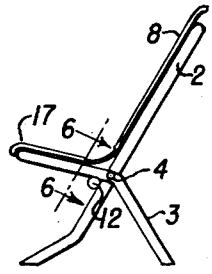


Fig. 1

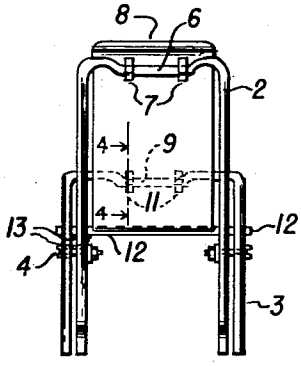


Fig. 2

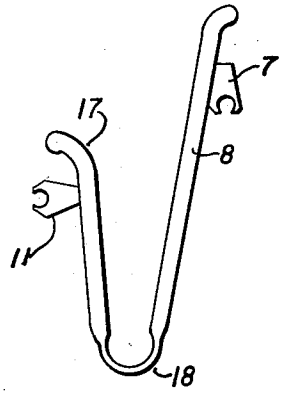


Fig. 3

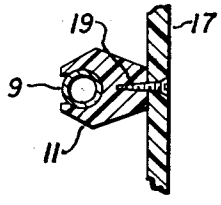


Fig. 4



Fig. 5

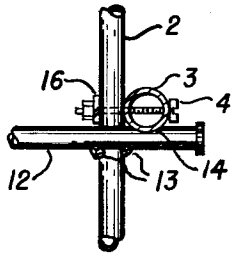


Fig. 6

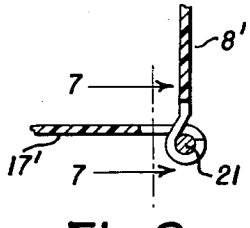


Fig. 8

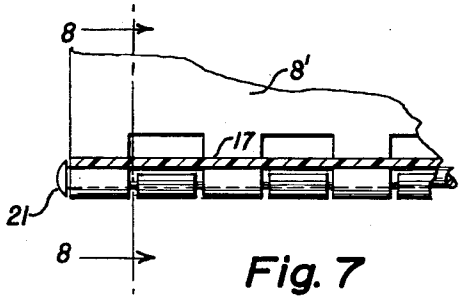


Fig. 7

INVENTOR

Milton Kessler

BY Max L. Libman

ATTORNEY

United States Patent Office 2,990,007 Patented June 27, 1961

2,990,007

FOLDING CHAIR ASSEMBLY

Milton Kessler, 4535 Grove Drive, Youngstown, Ohio

Filed Jan. 6, 1960, Ser. No. 830
4 Claims. (Cl. 155—143)

This invefition relates to a folding chair assembly comprising a foldable frame, preferably made of metal, and a unitary seat and back member which can be quickly and securely fastened to and removed from said frame.

It is a primary object of the invention to provide a sturdy but inexpensive folding chair having a simple frame which can be readily fabricated by mass production methods and a readily removable back-and-seat assembly of sturdy construction which can also be manufactured by mass production methods and of inexpensive materials.

Another object is the provision of a unitary plastic seat-and-back assembly provided with clips or other simple fastening means whereby it can be assembled to the folding frame in a very simple manner, and can also be disassembled for replacement of the seat-and-back assembly when this becomes desirable due to wear and tear or due to weathering.

The above objects are achieved according to the invention by the provision of a unitary molded plastic member made in one piece, having a seat portion and a back portion interconnected by a hinge portion of the same material, the seat and back portions being considerably thicker than the hinge portion, whereby they are sufficiently rigid to support the weight of a person without substantial deformation, and the hinge portion being of the same material and homogeneously merging into said seat and back portions, and being sufficiently thin to be readily flexible, whereby it serves as a hinge when the seat and back portions are folded together.

The specific nature of the invention, as well as other objects and advantages thereof, will clearly appear from a description of a preferred embodiment as shown in the accompanying drawing, in which:

FIG. 1 is a side view of a chair according to the invention;

FIG. 2 is a rear view of the same chair in folded condition;

FIG. 3 is a side view of the seat-and-back assembly in folded condition;

FIG. 4 is an enlarged sectional detail view taken on line 4—4 of FIG. 2;

FIG. 5 is a side view of the chair of FIG. 1 in folded condition;

FIG. 6 is an enlarged detail view of the frame, partly broken away, taken on line 6—6 of FIG. 1;

FIG. 7 is a plan view, partly broken away, of a modified form of back-and-seat assembly using a piano hinge, taken on line 7—7 of FIG. 8; and

FIG. 8 is a sectional view of the same construction taken on line 8—8 of FIG. 7.

As best shown in FIGS. 1 and 2, the chair frame is comprised of two crossed members 2 and 3, pivotally hinged at 4. The back-supporting frame member 2, as viewed in FIG. 2, is generally of inverted U-shaped construction, and preferably has a depressed top bar as shown at 6, for the reception of clips 7, 7 of the back rest 8, whereby the back rest is prevented from sliding laterally on the frame when assembled.

The seat-supporting frame member 3 is similarly a U-shaped member of smaller dimensions, and has a similar depressed portion at 9 for receiving clips 11, 11 of the seat portion and preventing this portion from sliding laterally. A cross-bar 12, which is preferably of the same tubular construction as the frame members, is welded or otherwise suitably fixed to frame member 2 as indicated at 13, 13. Cross-bar 12 thus prevents frame member 3 from collapsing when the chair is opened, and retains this member in the correct position for the seat to be properly positioned. As will be seen in FIG. 6, cross-bar 12 is preferably recessed at 14, where it contacts frame member 3, so as to securely and rigidly hold frame member 3. The weight of the chair's occupant only serves to more firmly wedge frame member 3 into engagement with recess 14, and thus provides added rigidity exactly when it is needed, namely, when the seat is being occupied. A lock washer 16 is preferably provided in the pivot screw assembly 4 whereby friction is maintained at all times between the members 2 and 3, so that when they are folded in the position shown in FIGS. 2 or 5, they tend to remain in the folded position without opening until some slight force is exerted to separate the frame members. Alternatively, the bottoms or leg portions of frame members 2 and 3 can be made to rub against each other to provide friction for this purpose.

The seat-and-back assembly is preferably formed as a unitary member having a rigid back portion 8 (FIG. 3), a rigid seat portion 17, and a flexible hinge portion 18 between these two members, preferably formed in unitary fashion of the same plastic material as the seat and back portions. The entire assembly can thus be formed of plastic material in a single forming operation by the use of heat and pressure, by standard plastic molding techniques. A sutiable plastic material for this purpose is polypropylene, as sold by the Hercules Powder Company of Wilmington, Delaware. This material, in suitable thicknesses, has sufficient rigidity for the seat and back, but if the hinge portion is made considerably thinner than the seat and back, it is very flexible at this area, yet retains sufficient tensile strength to readily support the necessary weight for the present purpose. Members made of this material have been folded more than a million times without significant loss of flexibility or strength. By taking advantage of this property of the material, I am able to form a unitary, inexpensive, yet sturdy member providing rigid support for both seat and back portion, but which can be readily folded up so that the entire chair assembly can lie flat for stacking or shipping purposes.

Instead of relying upon increased thickness alone for the rigidity of the seat-and-back component, a more rigid geometry may be employed, as by curving the sides, using webs extending from the rear sides, or employing a body-conforming surface contour, as is well known in the sheet metal art for increasing the rigidity of a member.

Suitable attachment means shown in the form of clips 7 and 11 are provided for rapidly assembling the seat-and-back members to the frame. One form of such clip is shown in detail in FIG. 4, and comprises a plastic clip 11, fastened to seat member 17 in any suitable manner as by screws 19, and having spring jaws adapted to snap over frame member 9 whereby the assembly may be readily performed without any special tools. It will be apparent that instead of plastic clips, metal clips could be employed, or alternatively, the clips could be molded from the same material as the seat member. Instead of clips, the free ends of 17 and 8 can be made thin, like hinge 18, and glued or otherwise fastened to the cross members 9 and 6. While a more permanent form of fastening could be employed than spring clips, such clips are preferred because of the ease of not only assembly but also removal of the seat-and-back member whereby the user can readily replace a seat-and-back assembly if it should become worn or weathered, at low cost and with little effort.

It will be apparent that the seat-and-back members can not only be made in a variety of colors, but also can readily be molded to different shapes, both to accommodate the body contours and for the sake of appearance.

FIGS. 7 and 8 show an alternative form of construction, whereby the back-and-seat members are sperately made of relatively rigid material, and are provided with hinge elements, preferably in the form of a piano hinge, for maximum strength. In this case, seat portion 17' corresponds to portion 17 of FIG. 1, and back portion 8' corresponds to the back portion 8 of FIG. 1. The two members are assembled simply by interlocking them and passing a pin 21 through them to constitute a hinge joint. Since the hinge in this modification is rigid, care must be taken in designing the seat to insure that the seat hinge lies close to the pivot axis 4 of the frame, in order that the seat and back elements shall fold flat when the frame is folded. Alternatively, a sliding pivot of conventional type could be employed instead of rigid cross-bar 9, as the attachment point of clips 11.

It will be apparent that the embodiments shown are only exemplary and that various modifications can be made in construction and arrangement within the scope of my invention as defined in the appended claims.

I claim:

1. A folding chair comprising a foldable frame member having at least two elements pivotally connected on a common axis for folding and unfolding, stop means for retaining said elements in unfolded relationship for use as a chair, seatrest-supporting means on one of said elements and backrest-supporting means on the other of said elements; and a foldable seat-and-back assembly comprising a one-piece component of molded plastic, the seat and back portions being sufficiently thick and rigid to support the weight of a person without substantial deformation, and the hinge portion being of the same material but sufficiently thin to be readily flexible; connecting means fixed to said seatrest portion and connected to said seatrest-supporting means, and other connecting means fixed to said backrest portion and connected to said backrest-supporting means, said hinge means constituting a load-bearing support when the chair is in use.

2. The invention according to claim 1, each of said frame elements being of substantially inverted U-shape consisting of two side pieces joined by a cross-bar, the ends of the side pieces constituting the legs of the chair, the back element being substantially longer than the seat element and the cross bars of the elements constituting the backrest-supporting means and the seatrest-supporting means respectively.

3. A homogeneous one-piece seat-and-back component of molded plastic having a seat portion, a back portion and a hinge portion connecting said seat and back portions, the seat and back portions being substantially thicker than the hinge portion so as to be sufficiently rigid to support the weight of a person without substantial deformation, and the hinge portion being of the same material and homogeneously merging into seat and back portions, but sufficiently thin to be readily flexible, attachment means on said seat portion for attaching same to a chair frame, and additional attachment means to said back portion for attaching same to a chair frame.

4. The invention according to claim 3, said attachment means being clip means for ready attachment to and removal from a chair frame.

References Cited in the file of this patent

UNITED STATES PATENTS

2,127,710	Baker	Aug. 23, 1938
2,470,113	Sebel	May 17, 1949
2,488,728	Kopplin	Nov. 22, 1949
2,572,482	Hoven et al.	Oct. 23, 1951
2,630,162	Rechler	Mar. 3, 1953
2,708,960	Shephard	May 24, 1955
2,791,956	Guest	May 14, 1957
2,830,350	Wootton	Apr. 15, 1958
2,878,861	Molla	Mar. 24, 1959
2,902,084	Stevens	Sept. 1, 1959

FOREIGN PATENTS

445,497	Italy	Feb. 17, 1949
671,980	Great Britain	May 14, 1952