

July 13, 1943.

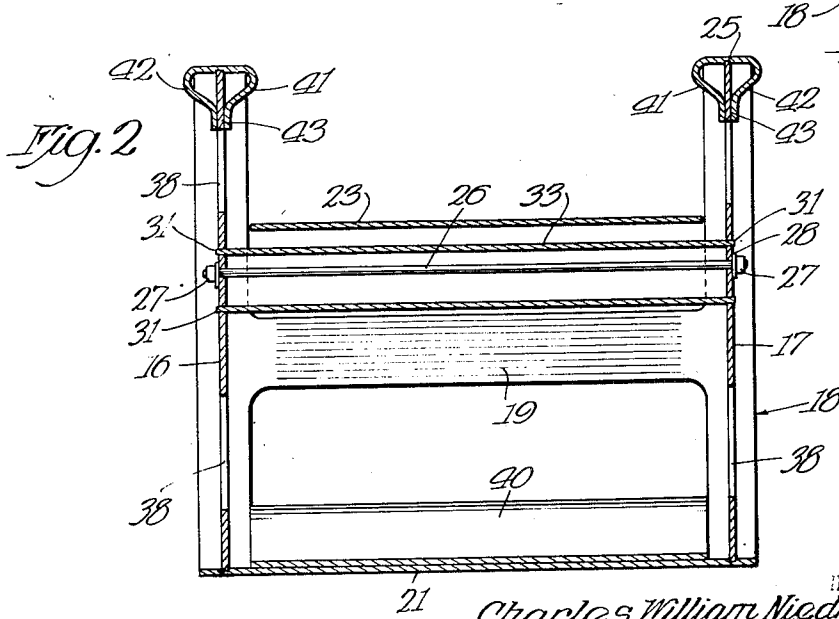
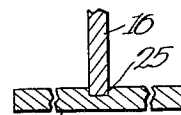
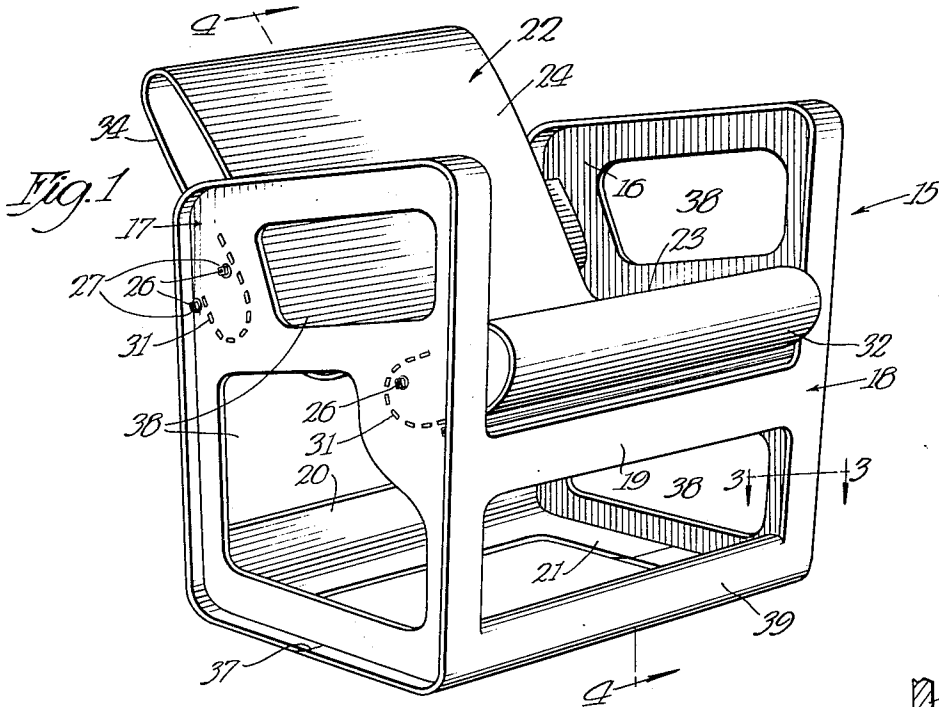
C. W. NIEDRINGHAUS

2,324,318

ARTICLE FORMED FROM RELATIVELY THIN RESILIENT SHEETS

Filed May 13, 1940

2 Sheets-Sheet 1



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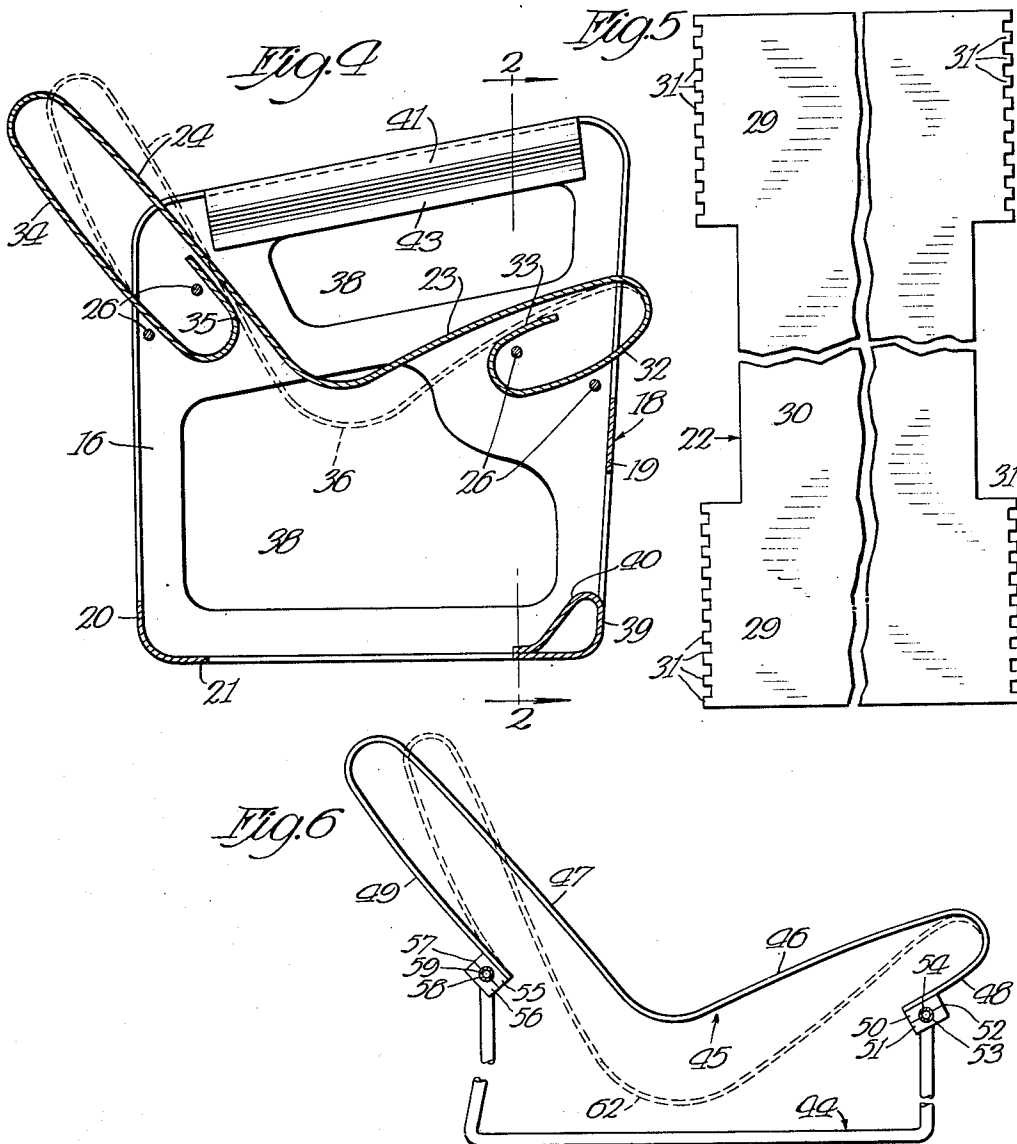
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UNITED STATES PATENT OFFICE

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ARTICLE FORMED FROM RELATIVELY THIN RESILIENT SHEETS

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5 Claims. (Cl. 155—119)

The development of art in the past few years has resulted in some very startling changes. Introduction of the so-called modern design, at first was faced with considerable opposition from the public, but it has pushed itself forward and today has established itself as a definite period of architecture and design right along with Chip- pendale and the many classical periods.

One of the fundamental principles of the modern theory of design deals with functionality. The design must be functional, that is, the article is designed so that it is most useful in serving its intended purpose.

In the past, room furnishings had consisted of large bulky chairs, tables and other pieces of furniture so heavy and awkward to carry that the housekeeper's task on cleaning days was a real one. The chairs consisted of heavy frames, elaborately upholstered with heavy metal springs, padding and a bulky covering, so that the completed product was not only clumsy to move, but also was costly to build.

The various items disclosed herein show numerous embodiments of the invention, all of which were developed under this modern theory of design. The pieces of furniture are extremely light in weight and their cost to manufacture is only a small fraction, of that required to build like furniture of the more conventional type. They are strong and durable and provide for maximum comfort to the user since they are designed to conform to the individual requirements of each person using them.

The above constitute some of the principal objects and advantages of the present invention, others of which will become apparent from the drawings and the following description, in which:

Fig. 1 is a perspective view of an arm chair embodying the present invention;

Fig. 2 is a vertical sectional view through the chair taken on the line 2—2 of Fig. 4;

Fig. 3 is an enlarged detail view showing the connection between one of the sides and the front of the chair taken on the line 3—3 of Fig. 1;

Fig. 4 is a vertical sectional view through the chair taken on the line 4—4 of Fig. 1, but showing a modified arm rest;

Fig. 5 is a fragmentary plan view of the seat and back portions of the chair as they are first cut out and before they are bent into shape; and

Fig. 6 is a fragmentary vertical sectional view

of a modified form of the invention, but corresponding to the view shown in Fig. 4.

For the purpose of complying with section 4888 of the Revised Statutes, specific embodiments of the present invention have been chosen. Obviously many modifications may be made without departing from the spirit of the present invention.

Referring to Fig. 1, an arm chair generally indicated at 15 comprises a frame made up of three parts, namely a pair of sides 16 and 17 and a transverse connecting member 18 forming a front 19, the back 20 and the bottom 21 of the chair. A sheet 22 is bent to form a seat portion 23 (Fig. 4) and back 24.

For the purpose of illustration, the pieces of furniture forming the subject matter of the present invention are described as being made of plywood, but obviously sheets of material having like flexible characteristics will serve equally well. Sheet metal and various plastics are two satisfactory materials.

The spaced sides 16 and 17 are secured to the transverse member 18 in some suitable manner and as shown in Fig. 3, the transverse member may be grooved at 25 and the sides 16 and 17 may extend into these grooves and may be glued or otherwise securely fixed in place. Metal rods 26 (Fig. 2) tie the two sides 16 and 17 together to provide bracing and nuts 27 are threaded onto the opposite ends of each rod. Washers 28 are inserted between the nuts 27 and the corresponding side.

Referring to Fig. 5, the integral seat and back member 22 is cut out of a sheet of plywood (or other suitable material), and at each end of this member 22 is a portion 29 of greater width than the central portion 30. Along the opposite edges of each enlarged portion 29 are a plurality of tenons 31 which fit into corresponding mortises in the sides 16 and 17 (Fig. 1). After the sheet is cut to shape it is bent as shown in Fig. 4 to provide a seat portion 23 and a back portion 24, the sheet extending beyond the forward edge of the seat 23 and folding back on itself at 32 below and spaced from seat 23, and then the member again folds back on itself at 33 to form a bearing surface directly below the seat portion 23 about which the seat fulcrums when the load is applied to the seat. Similarly the sheet 22 extends beyond the back 24, folding back on itself at 34 behind the back portion 24 and then slightly above the lower portion of the back the member again folds back on itself at 35 to form

a bearing surface about which the back 24 fulcrums when the load is applied to the seat.

By bending the sheet back on itself at the forward edge of the seat and at the top edge of the back in the manner described, two spring members are provided, one at each of these positions, to give resiliency to the seat. The seat in this form conforms to the requirements of the occupant of the chair, because as the load is applied to the seat 23, the back 24 fulcrums about the bearing surface 35, and the seat 23 pivots about the bearing surface 33, until the integral seat and back assume a position indicated in broken lines at 36 in Fig. 4, the exact position of which will depend upon the weight and posture of the person using the chair.

In this form of the invention, all of the bending takes place in the sheet itself, as the multiple tenon and mortise joints at both ends of the seat member 22 prevent any twisting of the seat at these joints.

Obviously, the seat just described can be used in combination with a variety of different chair frames. Metal tubing throughout may be used in the frame and the pliable seat member 22 may be secured in some suitable manner to this frame.

The frame shown in Fig. 1 is particularly well suited however, for this form of seat. The transverse member 18 is made up of a single sheet of plywood properly cut according to the desired pattern and then steamed or otherwise bent and wrapped around the spaced sides 16 and 17 and joined at the bottom as indicated at 37 in Fig. 1. Cut-outs 38 are made in the sides and in the transverse connecting member wherever possible to lighten the weight of the chair. In order to strengthen the lower horizontal strip 39 at the front of the chair, it may be found desirable to bend a portion of the material cut out inwardly as indicated at 40 in Fig. 4 and secure it to the base to reinforce this strip.

As shown in Fig. 2, flaps 41 and 42 may be provided along the sides of the arm rest. They are bent under and secured to their corresponding side 16 or 17 at 43 to serve as a reinforcement across the arm rest.

A modified form of the present invention is shown in Fig. 6. Here a frame 44 of metal tubing is employed and the integral seat and back portion of the chair is made of plywood or other suitable material. Here again a sheet 45 of plywood is bent to form a seat portion 46 and a back 47. The sheet at the forward edge of the seat 46 is bent back on itself at 48 and at the top edge of the back 47 the sheet is bent back on itself at 49 as previously described. Instead of again bending the sheet on itself, as was done in the embodiment shown in Figs. 1 and 4, in this instance the sheet at its forward end terminates after the first bend and is provided at its free end with a pair of wood blocks 50 and 51 glued or otherwise cemented or secured together at 52 and provided with an opening 53 which receives metal tubing 54 forming part of the chair frame. Likewise, behind the back portion 47, the sheet terminates after the first bend and is provided with a pair of blocks 55 and 56 glued or otherwise cemented or secured together at 57. These blocks are grooved at 58 to receive metal tubing 59 which forms the back horizontal member in the chair frame. When the load is applied to the seat 46, the seat and back yield to assume a position as indicated by broken lines 62 indicated in Fig. 6. The exact position assumed by

this member will depend upon the weight and posture of the individual occupying the chair.

I claim:

1. In a chair, a supporting frame, a relatively thin, stiff sheet of flexible material supported on the frame and bent to form the seat and back of the chair, the sheet at the top of the back folding back on itself and extending downwardly in parallel spaced relationship and terminating substantially midway between the seat and the top of the back, means for mounting the free end of the sheet at the back of the chair and substantially midway between the seat and the top of the back, the back being adapted to pivot forward and backward about the mounting means, and means for mounting the front portion of the sheet on the frame adjacent to the front of the chair, the seat having vertical movement when the back is pivoting forward and backward.

2. In a chair, a supporting frame including a horizontal front and a horizontal back member, a relatively thin, stiff sheet of flexible material supported on the frame and bent to form the seat and back of the chair, the sheet at the top of the back folding back on itself and extending downwardly in parallel spaced relationship and terminating substantially midway between the seat and the top of the back, the back horizontal frame member being disposed substantially midway between the seat and the top of the back, the free end of the sheet at the seat back being pivotally secured to the horizontal back frame member, the sheet at the front of the chair being secured to the horizontal, front frame member.

3. In a chair, a supporting frame, a relatively thin, stiff sheet of flexible material supported on the frame and bent to form the seat and back of the chair, the sheet at the top of the back folding back on itself and extending downwardly in parallel spaced relationship to a position below the center of the seat back and then again folding back on itself toward the seat back and terminating approximately midway between the seat and the top of the back, means for fixing the said terminating end of the sheet relative to the frame, the seat back being free to pivot about the said fixed terminating end, and means for mounting the front portion of the seat on the frame adjacent to the front of the chair, the seat having relative vertical movement.

4. In a chair, a supporting frame, a relatively thin, stiff sheet of flexible material supported on the frame and bent to form the seat and back of the chair, the sheet at the top of the back folding back on itself and extending downwardly in parallel spaced relationship and terminating substantially midway between the seat and the top of the back, means for mounting the free end of the sheet at the back of the chair and substantially midway between the seat and the top of the back, the back being adapted to pivot forward and backward about the mounting means, the flexible material at the front of the chair projecting beyond the supporting frame and folding back on itself below the seat in parallel spaced relationship, and means for mounting the free end of the sheet to the front portion of the supporting frame, the seat having relative vertical movement with respect to the frame.

5. In a chair, a supporting frame, a relatively thin, stiff sheet of flexible material supported on the frame and bent to form the seat and back of the chair, the sheet at the top of the back folding back on itself and extending downwardly

in parallel spaced relationship and terminating substantially midway between the seat and the top of the back, means for mounting the free end of the sheet at the back of the chair and substantially midway between the seat and the top of the back, the back being adapted to pivot forward and backward about the mounting means, the flexible material at the front of the chair pro-

jecting beyond the supporting frame and folding back on itself below the seat in parallel spaced relationship, and means for pivotally mounting the free end of the sheet to the front portion of the supporting frame, the seat having vertical movement with respect to the frame.

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