Nov. 15, 1966 R. BECKMAN ET AL 3,285,660

SEATING

Filed April 12, 1965 3 Sheets-Sheet 1

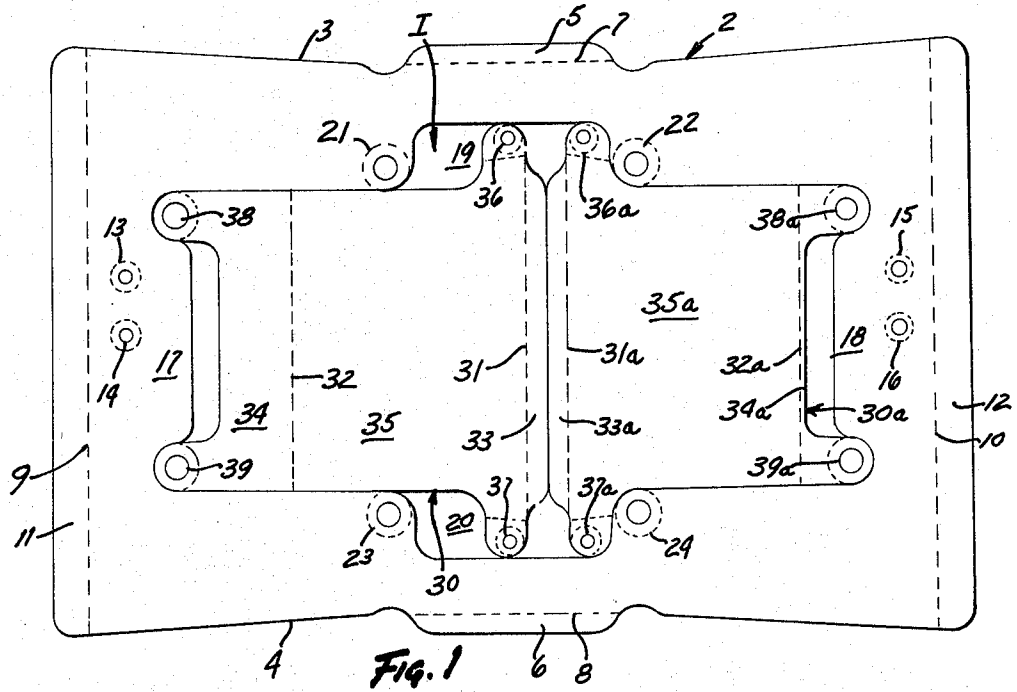


FIG. 1

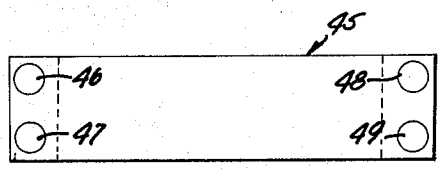


FIG. 2

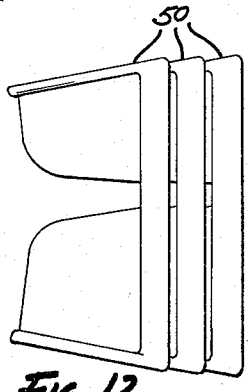


FIG. 12

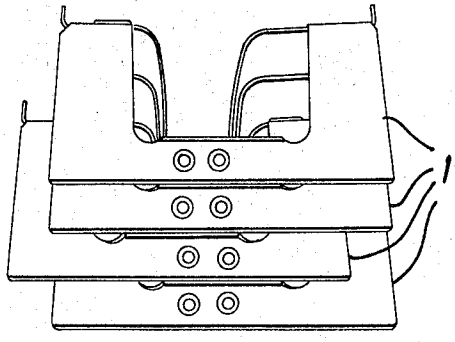


FIG. 6

INVENTORS
RONALD BECKMAN
HOWARD YARME

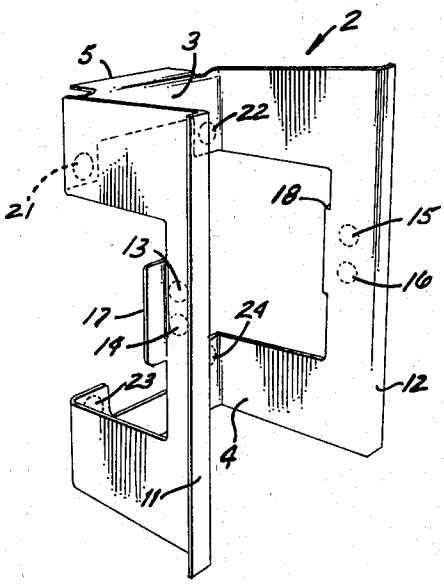
BY Price & Heneveld

ATTORNEYS

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SEATING

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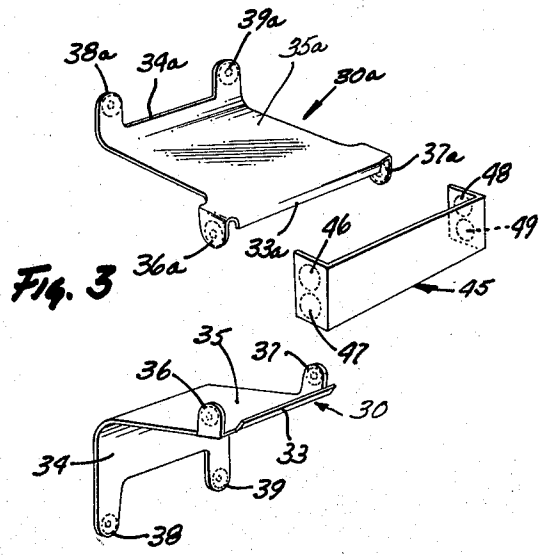


Fig. 3

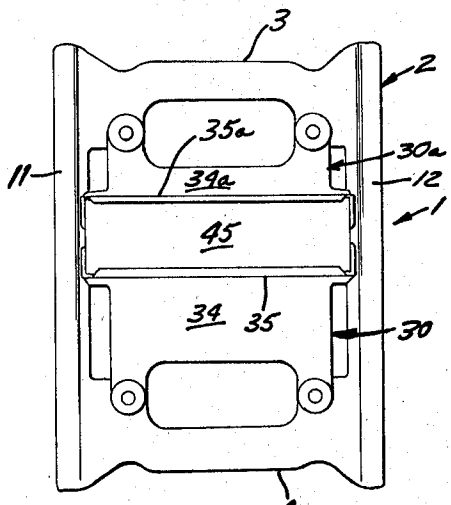


Fig. 4

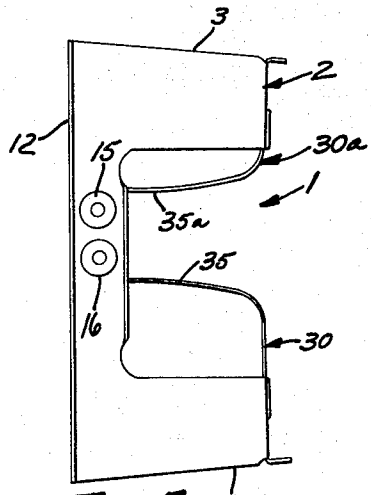


Fig. 5

INVENTORS
RONALD BECKMAN
HOWARD YARME

BY Price & Heneveld

ATTORNEYS

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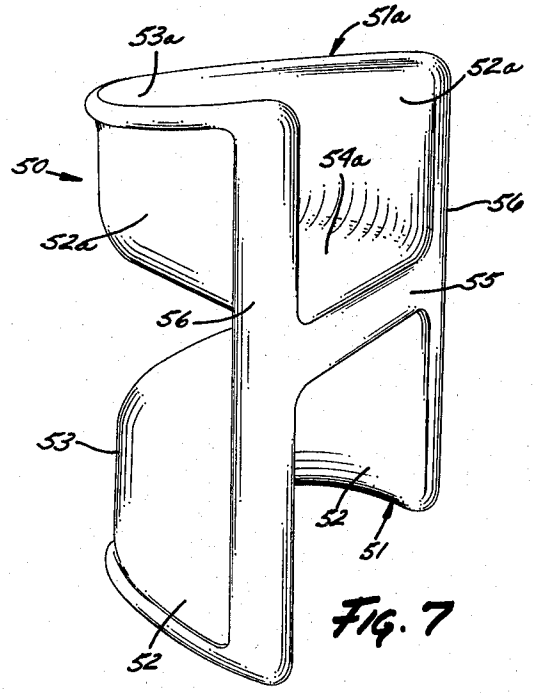


FIG. 7

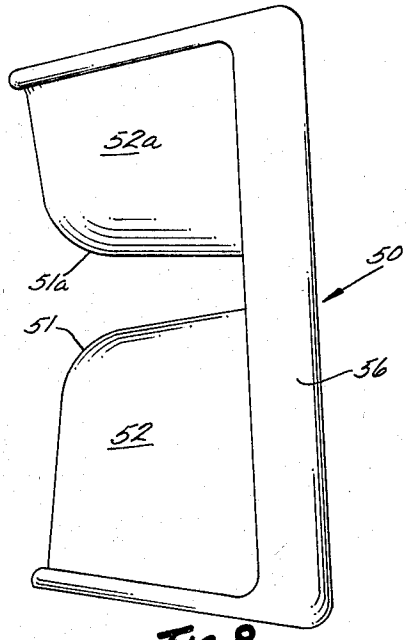


FIG. 8

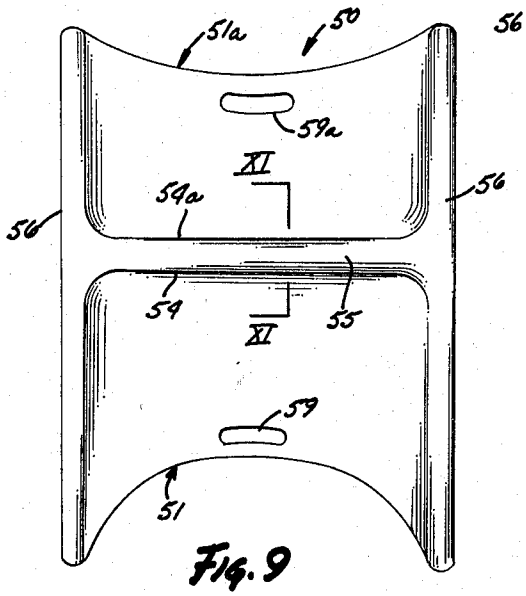


FIG. 9

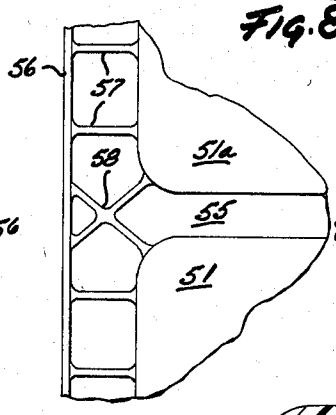


FIG. 10

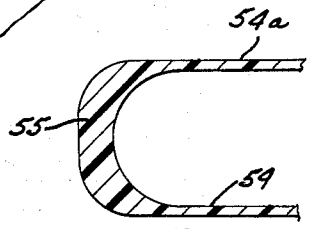


FIG. 11

INVENTORS
RONALD BECKMAN
HOWARD YARME

BY Price & Heneveld

ATTORNEYS

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SEATING

Ronald Beckman, 27 Bank St., New York, N.Y., and Howard Yarme, 93 Sanford St., Yonkers, N.Y.

Filed Apr. 12 ,1965, Ser. No. 447,420
14 Claims. (Cl. 297—445)

This invention realtes to seating. More particularly, this invention relates to a seat which is uniquely adapted to stack one upon the other.

This invention is designed to provide inexpensive, yet durable seating and is in some ways an improvement over our patent No. 3,121,588 issued February 18, 1964. A primary object of this invention is to provide inexpensive, yet durable seating which permits stacking both vertically and horizontally. That is to say, the chairs can be horizontally stacked when in their normal sitting position by pushing one into the back of the next. They can be vertically stacked by tipping the chair over and placing other chairs on top of it to create a vertical stack. This means that this chair can be economically shipped assembled. It should be noted that the chair of this invention is so simply constructed that it may be assembled after shipment with ease, permitting completely flat shipment. However, the chairs stack so well one into another that assembled shipping is entirely practical.

A further object of the invention is the provision of such a chair which provides two heights for seating by simply turning it upside down. The stackability of these chairs, both vertically and horizontally, is possible regardless of which seat is up.

A further object of this invention is the provision of such a chair which provides limited spring and resilience which provides greater comfort, aids in the stacking described and protects the structure from impact loads.

An additional object of the invention is to provide such a chair which includes a rigid beam at its maximum loaded hinge point.

An additional object of the invention is the provision of such a chair which may be fabricated from sheets of material, utilizing almost square stock. It has been found that the chair can be fabricated from sheets of vulcanized fiber with essentially no waste. Within the broadest aspects of the invention, the chair may be molded from a suitable plastic.

An additional object of this invention is the provision of such a chair which includes natural openings in the seat to provide ventilation.

Although the primary object of the seating is extremely low cost, the blanks are adaptable to receive fabrics with foam backing bonded to the sheets of material before stamping, automatically upholstering the chair prior to erection and assembly.

A still further object of the invention is the provision of such a chair which may be fabricated from sheets of material, all folds in the blank folding downwardly and away from the punch so that the unit can be die-cut, punched and bent in one operation.

A still further object of the invention is the provision of such a chair which is extremely light in weight, further facilitating economical shipment.

These and other objects of this invention will become apparent to those skilled in the relevant arts upon reading the following specification in conjunction with the accompanying drawings, wherein:

FIG. 1 is a plan view of blanks utilized in assembling an embodiment of the chair of this invention cut from a single sheet of stock;

FIG. 2 is a plan view of an additional blank utilized in conjunction with the blanks of FIG. 1;

FIG. 3 is an exploded view of the blanks shown in FIGS. 1 and 2 folded to position for assembly;

FIG. 4 is a front view of the chair assembled from the blanks shown in FIG. 3;

FIG. 5 is a side view of the chair shown in FIG. 4;

FIG. 6 shows the chairs of FIGS. 4 and 5 stacked one upon the other;

FIG. 7 is a front and side perspective view of another embodiment of the chair of this invention;

FIG. 8 is a side view of the chair shown in FIG. 7;

FIG. 9 is a front view of the chair shown in FIG. 7;

FIG. 10 is a rear view of the rear side of the chair shown in FIG. 7 in the area of the hinge thereof;

FIG. 11 is a cross-sectional view taken along the plane XI—XI of FIG. 9; and

FIG. 12 shows the chairs of FIG. 7 in stacked position.

Briefly, this invention relates to a chair characterized by including an upper and a lower sling-like portion, said portions facing in opposite directions and forming the support, sides and backs of a pair of seats, the portions spaced from one another and joined at their fronts. Another aspect of this invention relates to a chair formed from a first sheet of material characterized by having the interior thereof removed therefrom. The first sheet of material is folded into a generally channel shape to include a pair of upstanding sides and a top and a bottom of generally U-shape extending rearwardly from the sides. A second sheet of material, characterized by being folded into generally a U-shaped configuration, is positioned between the sides of the first sheet. The bight portion of the second sheet lies between the sides of the first sheet and the legs of the second sheet are secured to the top and bottom of the first sheet.

Referring more specifically to the drawings, the reference numeral **1** designates an embodiment of a chair utilizing the teachings and principles of this invention (FIGS. 4 and 5). The chair **1** is assembled from the blanks shown in FIGS. 1 and 2. The blank **2** is cut from a sheet of stock which is almost rectangular (FIG. 1). As has already been noted hereinbefore, it has been found that vulcanized fiber is an ideal material from which to fabricate the chair **1**. The top **3** and the bottom **4** of the blank **2** slope toward the middle, terminating at the middle with the respective flaps **5** and **6**, joined by the respective fold lines **7** and **8**. At the sides of the blank **2**, fold lines **9** and **10** define panels **11** and **12**, respectively. Reference numerals **13**, **14**, **15** and **16** define areas where grommets, or like fastening means, are to be used in the assembly of the chair **1**, a pair of these grommets positioned adjacent each of the fold lines **9** and **10** offset between the top **3** and the bottom **4** of the blank. The interior I of the blank **2** is cut therefrom, forming flaps **17** and **18** at the interior sides and indentations **19** and **20** at the interior top and bottom. Reference numerals **21**, **22**, **23** and **24** define areas where grommets, or like fastening means, are to be used in the assembly of the chair **1**.

From the interior I of the blank **2**, blanks **30** and **30***a* are formed. Referring first to the blank **30**, fold lines **31** and **32** define flaps **33** and **34** on either side of the panel **35**. Tabs **36** and **37** extend outwardly from the panel **35** adjacent the fold line **31**. Tabs **38** and **39** extend from the end of the flap **34** from the sides thereof. It should now be noted that the blank **30***a* includes like reference numerals with the suffix "*a*" for similar parts. All parts of the blanks **30** and **30***a* are similar except for the fact that the flap **34** is of greater length than the flap

34*a*, the purpose of which will be more fully explained hereinafter.

Blank **45** (FIG. 2) is used in association with the blanks **2**, **30** and **30***a* described hereinbefore in the assembly of the chair **1**. It will be noted that the blank **45** is rectangular in configuration which means that no material is wasted as it is cut. Thus, it will be seen that very little material is wasted in the cutting of the blanks **2**, **30**, **30***a* and **45**. Reference numerals **46**, **47**, **48** and **49** designate areas in which grommets or like fastening means are to be used in assembly of the chair **1**.

Referring now to FIG. 3, assembly of the chair **1** will be described in detail. First of all, the blank **2** is folded into generally a channel shape as shown, the panels **11** and **12** folded to extend outwardly from the front side edges. Thus, it will be seen that a pair of upstanding sides are provided, braced by the flanges formed by the panels **11** and **12**. The top **3** and the bottom **4** of the blank **2** thus positioned form generally U-shaped members extending rearwardly from the sides thus formed. The flaps **5** and **6** are folded rearwardly as shown and the flaps **17** and **18** are folded outwardly as shown. Next, the blanks **30** and **30***a* are folded. Looking first at the blank **30**, tabs **36** and **37** are folded upwardly as is the flap **33**. The flap **34** is folded downwardly, causing the tabs **38** and **39** to project downwardly. Blank **30***a* is folded in a similar manner, except that the directions of extension of the various parts are reversed. It is significant to note again at this point that the flap **34** is of a length greater than the flap **34***a*. The ends of the blank **45** are pointed rearwardly as shown.

In actual assembly, the blanks **30** and **30***a* are moved between the sides formed by the folded blank **2**, the blank **45** also being moved between these sides and between the blanks **30** and **30***a*, as best illustrated in FIG. 4. It will now be seen that grommets, or some similar fastening means, secures these panels together as follows. Areas **21** and **22** are secured to tabs **38***a* and **39***a*. Areas **23** and **24** are secured to tabs **38** and **39**. Tabs **36** and **37** and **36***a* and **37***a* are positioned between the sides of the blank **2** and the edges of the blank **45**. Areas **13** and **15** are secured to **36***a* and **37***a* respectively, both being respectively secured to areas **46** and **48**. Areas **14** and **16** are secured to tabs **36** and **37** respectively, both being secured to areas **47** and **49**. With these simple folding operations and attachments, the chair is completely assembled.

It will be noted that the blanks **30**, **30***a* and **45** when secured together form generally a U-shaped member secured between the sides of the blank **2** as folded. Panels **35** and **35***a* each define a seating area, with respective sides and backs. The sloping of the top and botton of the blank **2** causes the chair to slope slightly rearwardly. Due to the fact that the areas **13**, **14**, **15** and **16** are closer to the top **3** than the bottom of the blank **2**, chairs for different age groups of children have been provided. This is further accomplished due to the difference in length of the panels **34** and **34***a* of the blanks **30** and **30***a*. It will now be seen that the objects and advantages specifically pointed out hereinbefore are achieved in the structure disclosed.

It should be specifically pointed out that this chair is especially adapted to be stacked as described. Referring now to FIG. **6**, the front of one chair slides into the back of another chair, being received thereby. This is true regardless of which seat is upstanding. This is an extremely important part of this invention as noted in the objects hereinbefore.

Referring now to FIG. 7, an alternative embodiment of a chair including certain of the objects and principles of this invention is designated by the reference numeral **50**. Preferably, the chair **50** is molded from a suitable plastic, its construction being such that it is ideally moldable in a single operation. The chair **50** is characterized by including upper and lower sling-like portions **51** and **51***a*. The portion **51** includes sides **52**, a back **53** and a seat support **54**. Sling-like portion **51***a* is similarly referenced for similar parts with the inclusion of the suffix "*a*." It will be noted that sling **51** is of a height greater than the sling **51***a*. The two slings are spaced from one another by means of a hinge portion **55**, thickened as shown in FIG. 11. Flanges **56** extend outwardlly and back from each of the sides of the chair **50**. As shown in FIG. 10, webbing **57** is added for strength at the sides of the chair **50**, and a cross-bracing structure designated by the reference numeral **58** is added in the area joining the slings **51** and **51***a* together. Handles **59** and **59***a* are provided in the respective slings **51** and **51***a*.

It will be seen that this embodiment of the chair exhibits many of the objects and advantages noted with respect to the chair **1**, the chair **50** being adapted to be molded from a suitable plastic in a single operation. The structure of this chair permits stacking in any manner as described hereinbefore (FIG. 12). Additionally, limited spring and resilience is provided for comfort, aid of stacking and protection of the structure from impact loads. A rigid beam is provided at the maximum loaded hinge points and maximum strength is provided at the sides supporting the user. Two heights are provided for seating, the structure being lightweight and low in cost. The stackability provides the many savings noted with respect to shipment.

It will be seen that the objects and advantages just noted with respect to the chair **50** are also inherent in the structure of chair **1**. Additionally, chair **1** may be fabricated from sheets of material such as vulcanized fiber and its structure is so simple that assembly at the situs where it is to be used is possible, the cut blanks then being shipped flat.

While only certain embodiments of this invention have been shown and described, it might be possible to practice the invention through the utilization of other embodiments without departing from the spirit and scope thereof. Such other embodiments are to be included as part of this invention unless the following claims specifically state otherwise.

We claim:

1. A chair formed from a first sheet of material characterized by having the interior removed therefrom and folded into a generally channel shape to include a pair of upstanding sides and a top and bottom of generally U-shape extending rearwardly from said sides and a second sheet of material characterized by being folded into generally a U-shaped configuration positioned between said sides of said first sheet, the bight portion of said second sheet lying between said sides of said first sheet and the legs of said second sheet secured to said top and bottom of said first sheet.

2. A chair as defined in claim **1**, said bight portion of said second sheet spacing said legs of said second sheet from one another and the edges of said bight portion secured to said sides.

3. A chair as defined in claim **1** including a flange extending outwardly from the forward edge of each of said sides.

4. A chair as defined in claim **1**, said bight portion offset between said top and bottom.

5. A chair as defined in claim **2**, said bight portion offset between said top and bottom.

6. A chair as defined in claim **1**, tabs extending from the ends of said legs and secured to said top and bottom.

7. A chair as defined in claim **1**, tabs extending from the ends of said legs and secured to said top and bottom; and tabs extending from the sides of said legs and secured to said sides.

8. A chair as defined in claim **1**, said second sheet including a pair of panels forming said legs struck from said interior of said first sheet.

9. A chair as defined in claim **8**, one of said pair of panels being longer than the other.

10. A chair as defined in claim **8**, said second sheet including a third panel forming said bight portion posi-

tioned between the forward edges of said pair of panels forming said legs, said legs and said third panel secured to each other and between said sides.

11. A chair as defined in claim **10**, one of said pair of panels being longer than the other.

12. A chair as defined in claim **10** including a flange extending outwardly along the forward edge of each of said sides.

13. A chair as defined in claim **10**, tabs extending from the ends of said legs and secured to said top and bottom; and tabs extending from the sides of said legs and secured to said sides.

14. A chair as defined in claim **13**, one of said pair of panels being longer than the other.

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FRANK B. SHERRY, *Primary Examiner.*

CASMIR A. NUNBERG, *Examiner.*