United States Patent

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[33] **Germany**
[31] **B86208**
Continuation-in-part of application Ser. No. 622,736, Mar. 13, 1967.

[54] **SEATING ARRANGEMENT**
12 Claims, 10 Drawing Figs.

[52] **U.S. Cl.** **297/248,** 297/239
[51] **Int. Cl.** **A47c 1/124**
[50] **Field of Search** ..... 297/239, 248, 249; 108/64; 24/81 CC, 81C, 81DH, 81 E, 81 T, 81 PBS; 248/188.9

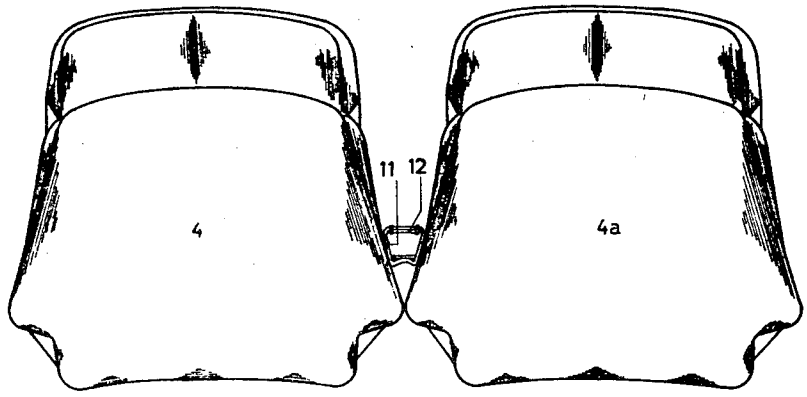
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ABSTRACT: A one-piece stackable chair consists of reinforced synthetic plastic material having a wall thickness of at least 3 mm., and preferably ranging between at least 3 and 6 mm. Coupling means is provided for coupling any two such chairs releasably to one another so that at the will of a user such chairs may be arranged side-by-side in coupled relationship, or the coupling may be disengaged and the chairs may be stacked.



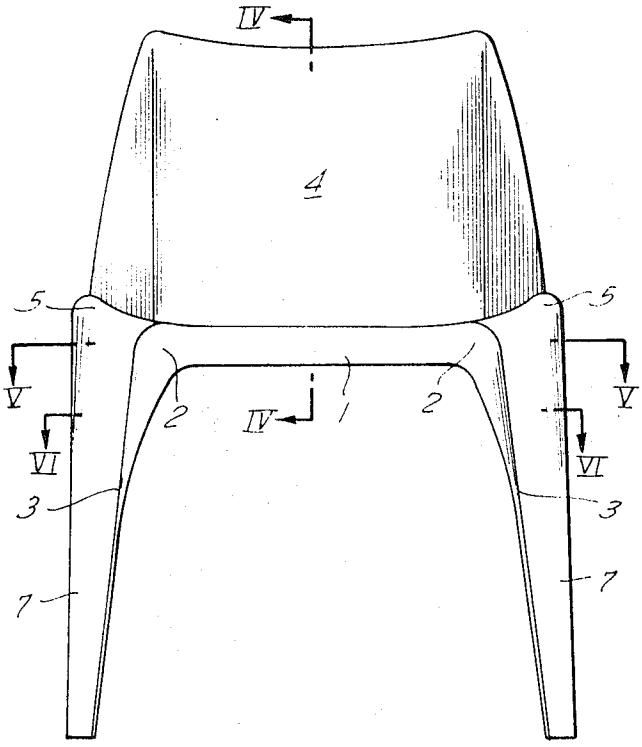


FIG. 1

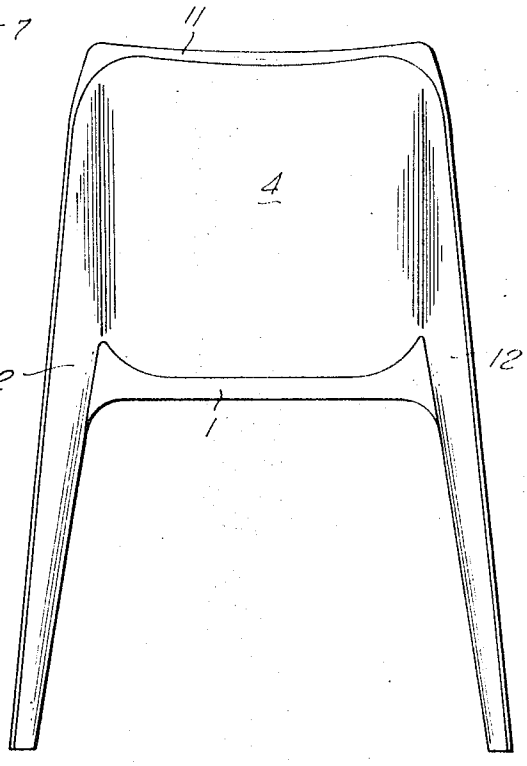


FIG. 2

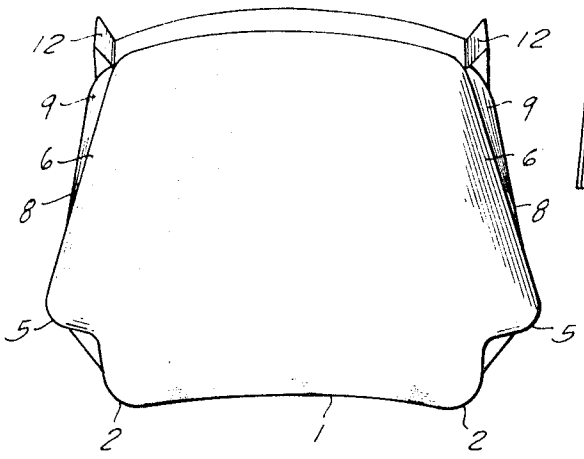


FIG. 5

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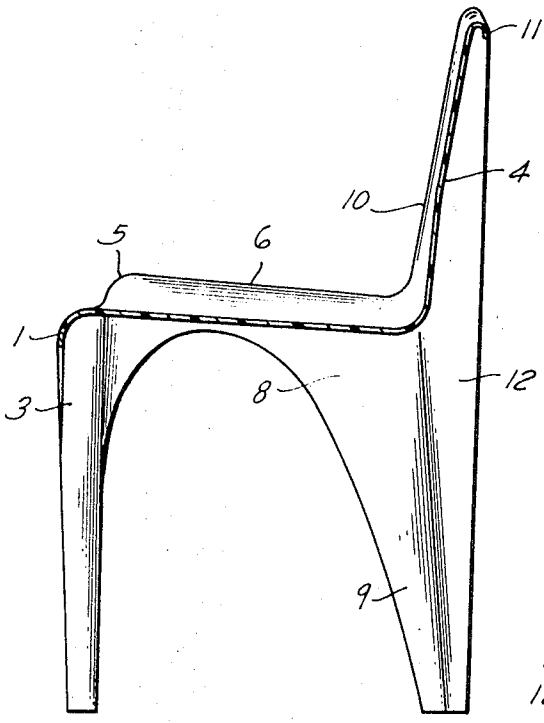
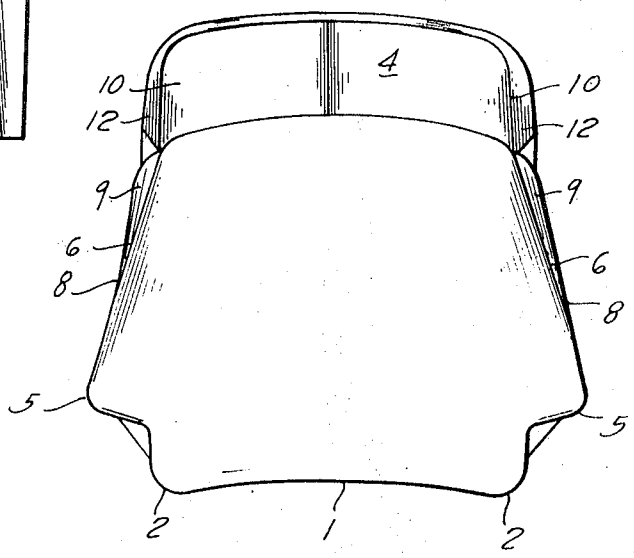


FIG. 4

FIG. 3



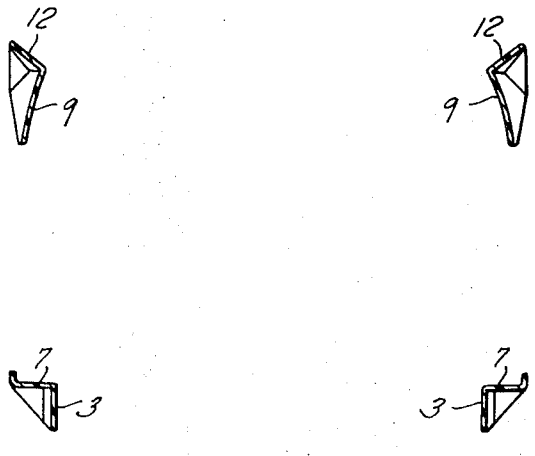


FIG. 6

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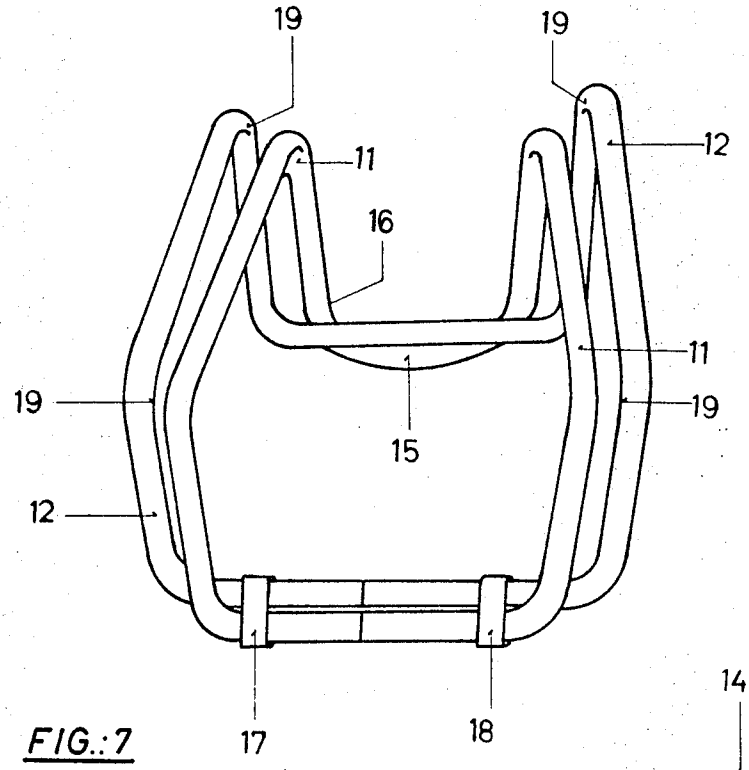


FIG.: 7

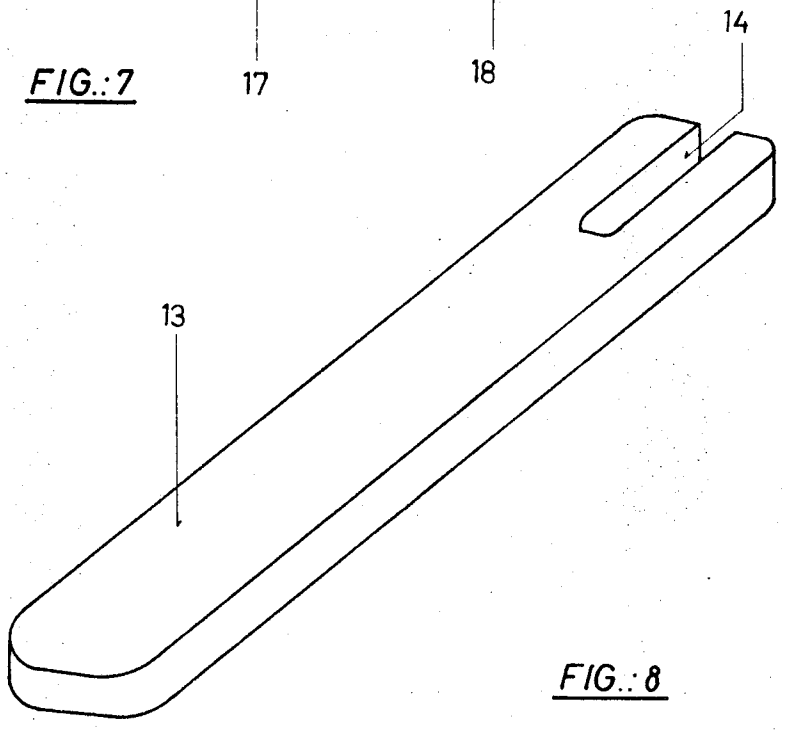


FIG.: 8

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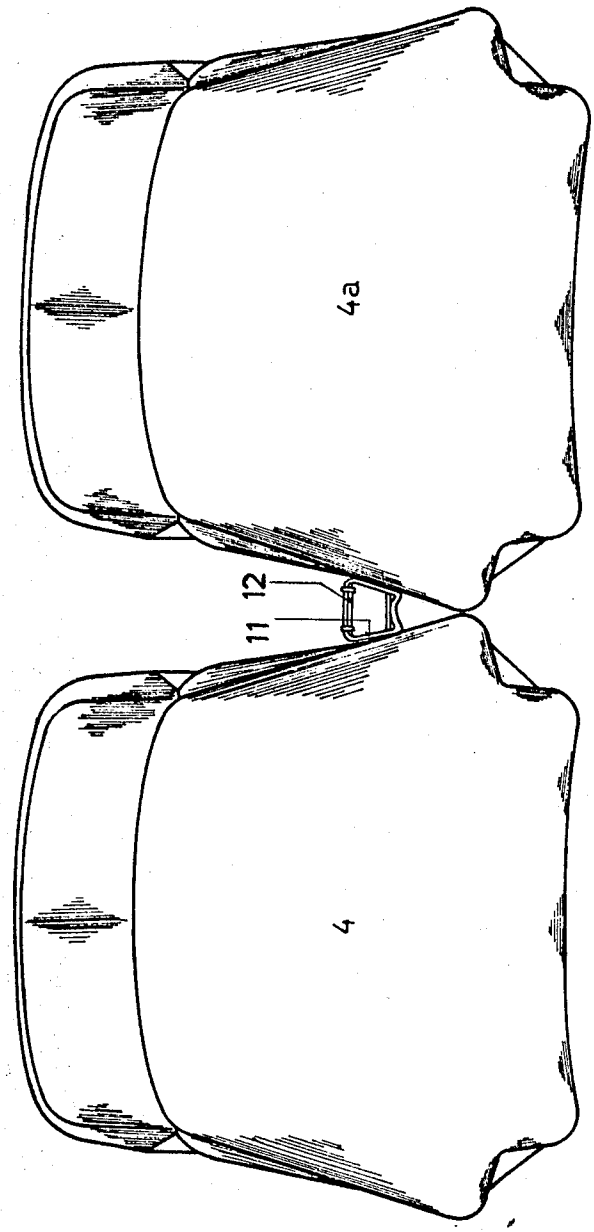
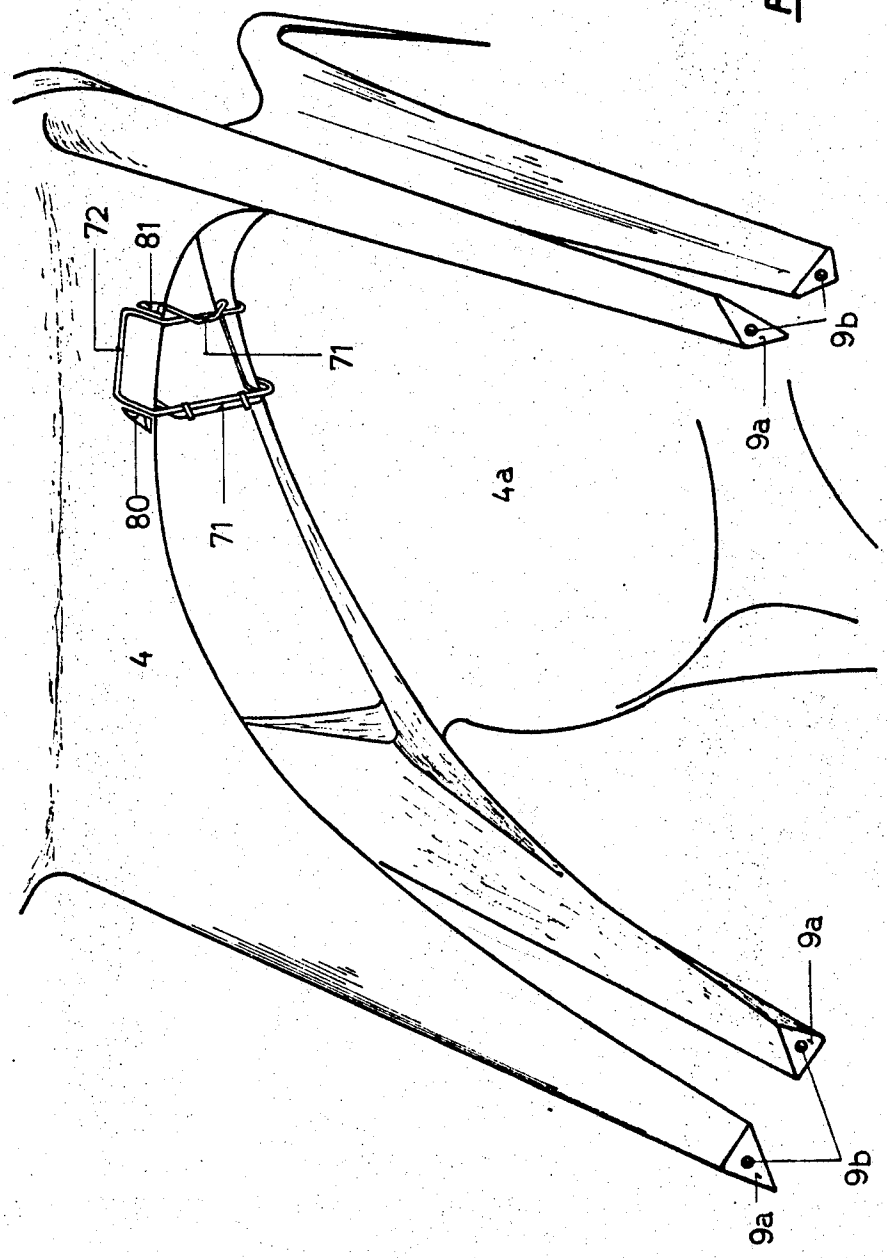


FIG. 9

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FIG. 10



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SEATING ARRANGEMENT

CROSS-REFERENCE TO RELATED APPLICATIONS

The present application is a continuation-in-part of our copending application, entitled "Chair" and filed on Mar. 13, 1967 under Ser. No. 622,736.

BACKGROUND OF THE INVENTION

Generally speaking, the present invention relates to chairs. More specifically, the present invention relates to one-piece stackable chairs, and still more particularly the invention relates to a seating arrangement wherein any two of such chairs may be releasably coupled to one another so that at the will of the user they may be arranged side-by-side in coupled relationship, or may be stacked when the coupling is disengaged.

SUMMARY OF THE INVENTION

The present invention provides a seating arrangement including at least two one-piece chairs of reinforced synthetic plastic material, and releasable coupling means for coupling such chairs together.

The seating arrangement in accordance with the present invention may be simply and quickly manufactured and is relatively inexpensive.

By virtue of their particular configuration the individual chairs according to the present invention have a high resistance to breaking stresses and can be stacked very readily. On the other hand, the provision of our novel coupling means makes it possible for any two of such chairs to be releasably connected in side-by-side relationship to provide two adjacent chairs or, if additional chairs or additional coupling means are provided, to provide one or more rows of such chairs which are firmly connected with one another until the coupling means is released. Thus, a seating pattern can be readily established, for instance in a large space such as an auditorium or the like, and yet all of the chairs can be readily disengaged from one another by release of the coupling means and can then be stacked to save space and to again afford open floor space in the area previously used for the seating pattern, when the seating pattern is not needed.

In accordance with the above features, and others which will become apparent hereafter, we provide a seating arrangement which comprises a pair of stackable chairs of synthetic plastic material each having a wall thickness ranging between substantially 3 and 6 mm. Each of the chairs includes a seat, a set of legs which extend downwardly from the seat by a predetermined distance, and which each have a downwardly tapering outwardly open angle profile, and sidewall portions which also extend downwardly from the seat by a distance which is a fraction of the aforementioned predetermined distance.

We further provide quick-release coupling means operative for engaging adjacent sidewall portions of the chairs when the latter are arranged side-by-side. In this manner the chairs may be releasably coupled in such side-by-side relationship when the arrangement of a seating pattern is desired. On the other hand, by release of the aforementioned coupling means, the chairs may be separated from one another and may then be stacked for storage purposes requiring very little space in this manner.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a front-elevational view of one chair of a seating arrangement according to the present invention;

FIG. 2 is a rear-elevational view of the chair of FIG. 1;

FIG. 3 is a top-plan view of the chair shown in FIGS. 1 and 2;

FIG. 4 is a section taken on the line IV–IV of FIG. 1;

FIG. 5 is a section taken on the line V–V of FIG. 1;

FIG. 6 is a section taken on the line VI–VI of FIG. 1;

FIG. 7 is a perspective view of a coupling means according to the present invention;

FIG. 8 illustrates an actuating member for operating the coupling means of FIG. 7;

FIG. 9 is a somewhat diagrammatic view showing two chairs of the seating arrangement connected by the coupling means; and

FIG. 10 is a fragmentary view of the seating arrangement of FIG. 9, but seen from below to further illustrate details of the coupling which is effected between the chairs of the seating arrangement.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Discussing now the drawing in detail it is firstly pointed out that in FIGS. 1—6 we have illustrated only a single chair of the seating arrangement, it being evident that the other chair, or the additional chairs if more than two constitute the seating arrangement, will be the same as the one that is illustrated.

The illustrated chair is of one-piece construction and, because of its particular configuration which is clearly shown in the drawing and which will be discussed in more detail, it is readily stackable.

Each of the chairs of the seating arrangement consists of a thermoplastic or thermosetting plastic material which is reinforced with a suitable filler or reinforcing material, such as glass fibers, textile fibers or synthetic fibers. The seat of the exemplary illustrated chair, and of all others, is configurated in form of a shallow depression which dips or decreases in the direction toward the rear of the chair and is bordered at the front of the seat and at the sides thereof by a shallow downwardly open bulge. The front edge portion of the seat is identified with reference numeral 1 and it will be seen that the opposite ends of this front edge portion 1, identified with reference numeral 2, merge substantially constantly into the respective sections 3 of the front legs of the chair, with the sections 3 of the two front legs facing one another as shown in FIG. 1. FIG. 6 shows particularly clearly that the front legs as well as the rear legs have an angular profile which tapers in downward direction (compare FIG. 1).

The lateral edge portions 6 of the seat have forward ends 5 which merge into the rearwardly facing sections 7 of the front legs which are located substantially in a common transverse plane with reference to one another. This is shown in FIG. 6 wherein it will also be seen that the sections 7 extend substantially at a right angle to the sections 3 of the respective front leg. The profile of all of the legs, whether the front or rear legs, is open in outward direction, that is in the direction away from the chair. This is clearly illustrated in FIG. 6 also. The lateral edge portions 6 of the chair seat extend downwardly below the level of the chair seat in somewhat sheet like configuration, as evident from FIG. 4 which is a section on the line IV–IV of FIG. 1. Reference may also be had to FIGS. 3 and 5 for an illustration of this feature.

Intermediate the respective associated front and rear legs the downwardly extending portions of the lateral edge portions 6 are provided with cutouts of substantially parabolic contour. The front edge portion 1 of the chair set is similarly extended downwardly below the level of the seat, as shown in FIG. 1, and is also provided with a cutout of substantially parabolic contour but of course located between the two front legs of the chair. The downwardly extending sheet portions of the respective side edge portions 6 merge into leg-supporting portions 8 which taper downwardly and in turn merge into the outwardly facing sections 9 of the rear legs. In the upward direction, the portions 8 merge into the respective rearwardly open lateral bulge 10 of the backrest 4 which, as evident from FIGS. 1, 2 and 4, is formed of a transversely concave configuration.

It has already been pointed out that the shallow depression of the seat dips towards the rear, so that the lowest point of the depression in the chair seat is located adjacent the backrest 4. The chair seat rises from this lowest point to merge with the backrest 4 and this configuration conforms closely to the human anatomy and makes the chair particularly comfortable. The transverse extending upper edge portion 11 of the backrest 4 is bent rearwardly and downwardly and forms a downwardly open through with which the rearwardly extending sections 12 of the back legs of the chair and of the backrest 4 merge more or less gradually.

In accordance with out invention the thickness of the material utilized for making the novel chair is substantially constant throughout and is at least 3 mm., but preferably is on the order of between 3 and 6 mm. As pointed out before, both thermoplastic and thermosetting plastic materials are suitable for constructing the chair, and textile fibers, plastic synthetic fibers and glass fibers are suitable as reinforcing materials. Depending upon the type of plastic material which is used as a base material, the percentage of fibers used for reinforcing the base material may be between 20 and 70 percent of the total.

An example of a possible specific mixture suitable for making the chair in accordance with the present invention—but which example is not to be considered limiting and only illustrative—is a mixture consisting of ⅓ glass fibers, ⅓ polyester material and ⅓ powdered filler material. This relationship can be changed depending on the mechanical forces to which the finished chair is to be subjected and other materials can of course be used, as pointed out earlier.

The chair disclosed herein can be manufactured in a mold, by an extrusion process or manually. Depending upon the method of production which is chosen, pressures upwardly of 10 kg. are necessary. The use of a hardening material as an additive to the basic mixture depends upon the method of manufacture employed. Again, in dependence upon the method of manufacture the time needed for production of an individual chair ranges between 0.5 and 20 minutes.

While in FIGS. 1—6 we have illustrated a single chair of the novel seating arrangement, FIGS. 7 and 8 illustrate a coupling means and an actuating member for the coupling means for coupling any two chairs together, and FIGS. 9 and 10 illustrate a seating arrangement wherein two such chairs are coupled by the coupling means of FIGS. 7 and 8.

Discussing firstly FIG. 7 it will be seen that this illustrates a coupling means 70 consisting of two clamping members 71 and 72, respectively. The coupling means 70 is illustrated in its operative position in FIG. 1. It will be seen that each of the clamping members has a holding portion, that of the clamping member 1 being identified with reference numeral 75 and that of the clamping member 2 being identified with reference numeral 76. The holding portion 75 is bent somewhat downwardly and inwardly with respect to the holding portion 76. Two rodlike portions of the clamping members 71 and 72 extend in parallelism with one another, as illustrated, and are hingedly connected by two straps 77 and 78 which are looped about the rodlike portions, as illustrated in FIG. 7. The straps 77 and 78 are rigid with one of the rodlike portions, for instance in the illustrated embodiment with the rodlike portion associated with the clamping member 72, and the clamping member 71 thus can hingedly turn with respect to the clamping member 72.

When the clamping members are in the position illustrated in FIG. 7, the portion 75 will snap below and somewhat behind the portion 76 and will thus prevent undesired turning of the members 71 and 72 with reference to one another.

As illustrated in FIGS. 9 and 10, to connect two chairs of the seating arrangement in the manner under discussion, one of the lateral edge portions 6 of each of two chairs, illustrated in FIGS. 9 and 10 and identified with reference numerals 4 and 4*a*, respectively, is located in the gap between the lateral upwardly extending portions of the clamping members 71 and 72. Advantageously but not necessarily the inner face of the upwardly extending portion of the clamping member 72—or that of the clamping member 71 or of both clamping members—may be provided with serrations or like roughnesses identified with reference numeral 79 for the purpose of gripping the plastic material of these lateral edge portions 6 more tightly. A top view of a seating arrangement connected in this manner is shown in FIG. 9 and a view from below as shown in FIG. 10 to more clearly illustrate the relationship and the manner in which the chairs are engaged by the clamping means 70. The actuating member shown in FIG. 8 is identified with reference numeral 73 and may consist of wood, synthetic plastic material, metal or the like, having an incision or recess 74 which, when the coupling means 70 is to be operated, may be placed about the two portions 74 and 76 whereupon, in response to a turning movement of the member 73 about the turning axis constituted in this manner by the portions 75 and 76, the portion the portion 75 will be snapped downwardly and behind the portion 76 or, if the turning movement is reversed, the portion 75 will be released from the portion 76.

Of course it will be appreciated that by providing more than one of the coupling means 70, more than two of the chairs can be connected so that the seating arrangement can be made larger or smaller, as desired. When the chairs are disconnected they can be readily stacked as mentioned before. Each of the chairs 4, 4*a* is provided with inner projections or noses 80 and 81 (compared FIG. 10) which serve to define the intended location of the coupling means 70 when the chairs are being coupled together, and to prevent the coupling means from sliding out of its allocated position.

The legs are provided at their lower ends with transversely extending supporting plate portions 9*a* which serve to prevent damage to the ground on which the legs rest. Advantageously we provide upwardly extending recesses 9*b* in the supporting plate portions 9*a* and these recesses may accommodate plugs of suitable protective material, for instance of elastomeric material which further serves to protect the floor or ground on which the chairs rest.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of constructions differing from the types described above.

While the invention has been illustrated and described as embodied in a seating arrangement, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

What we claim as new and desire to be protected by Letters Patent is set forth in the appended claims.

1. A seating arrangement comprising, in combination, a pair of stackable chairs of synthetic plastic material and each including a seat, a set of legs extending downwardly from said seat by a predetermined distance and respectively having downwardly tapering outwardly open angle profiles, and sidewall portions also extending downwardly from said seat by a distance which is a fraction of said predetermined distance; and quick-release clamping means for coupling said chairs when the latter are arranged side-by-side with respective sidewall portions in facing but spaced relationship, said clamping means comprising a first clamping section having two clamping portions each adapted to engage a sidewall portion of one of said chairs at a side facing away from the other chairs, a second clamping section arranged to extend between said facing sidewall portions for engaging the latter at the facing sides thereof and for clamping a part of each of said facing sidewall portions against the respective clamping portion of said first clamping section, and hinge means hingedly connecting said first and second clamping sections for movement between an inoperative and an operative position in which latter said sections clamp said parts of said facing sidewall portions.

2. A seating arrangement as defined in claim 1, said first and second clamping sections including respective barlike elongated portions extending in parallelism with one another; and

wherein said hinge means comprises hinge straps encircling said elongated portions.

3. A seating arrangement as defined in claim 2, said straps being rigid with one of said elongated portions.

4. A seating arrangement comprising, in combination, a pair of stackable chairs of synthetic plastic material, each of said chairs including a seat, a set of legs extending downwardly from said seat by a predetermined distance and each having a downwardly tapering outwardly open angle profile, and sidewall portions also extending downwardly from said seat by a distance which is a fraction of said predetermined distance, and quick-release coupling means comprising hinged first and second coupling sections hingedly turnable relative to one another between an inoperative position and an operative position in which said first section engages sidewall portions of said chairs and said second section engages opposite sidewall portions of said chairs so as to clamp between each other adjacent sidewall portions of said chairs when the latter are arranged side-by-side with said adjacent sidewall portions in nonabutting relationship, whereby said chairs may be releasably coupled in fixed side-by-side relationship when desired and may, by turning of said coupling sections to said inoperative position, be stacked for storage purposes.

5. A seating arrangement as defined in claim 4, wherein the wall thickness of said plastic material of said chairs is between substantially 3 and 6 mm. and substantially constant throughout each of said chairs.

6. A seating arrangement as defined in claim 4, the seats of said chairs each being provided with a downwardly concave shallow depression.

7. A seating arrangement as defined in claim 6, each of said chairs further comprising a front and a rear wall portion extending between the respective sidewall portions in downward direction; and wherein said front and sidewall portions of each chair define respective upwardly convex shallow bulges.

8. A seating arrangement as defined in claim 7, each of said bulges being provided at the underside thereof with a downwardly open trough-shaped complementary cavity.

9. A seating arrangement as defined in claim 4, said set of legs of each chair including a pair of rear legs and a pair of front legs, each front leg having an inner angle portion directed toward the corresponding inner angle portion of the other front leg in substantial parallelism therewith; and wherein each of said front wall portions has opposite ends which respectively merge substantially continuously into one of said inner angle portions.

10. A seating arrangement as defined in claim 4, each of said sidewall portions being further provided with an upwardly extending cutout of substantially parabolic contour.

11. A seating arrangement as defined in claim 4, each of said chairs further comprising a back rest extending upwardly from the respective seat.

12. A seating arrangement as defined in claim 4; said legs of said chairs each having a lower edge; and further comprising a ground-contacting supporting plate portion provided at the lower edge of each of said legs and extending transversely to the direction of elongation of the respective leg.