April 19, 1966 E. J. KLASSEN 3,246,927

STACK CHAIR

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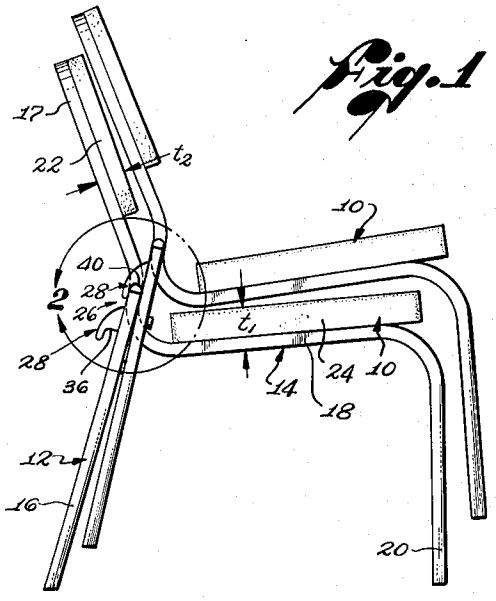


Fig. 1

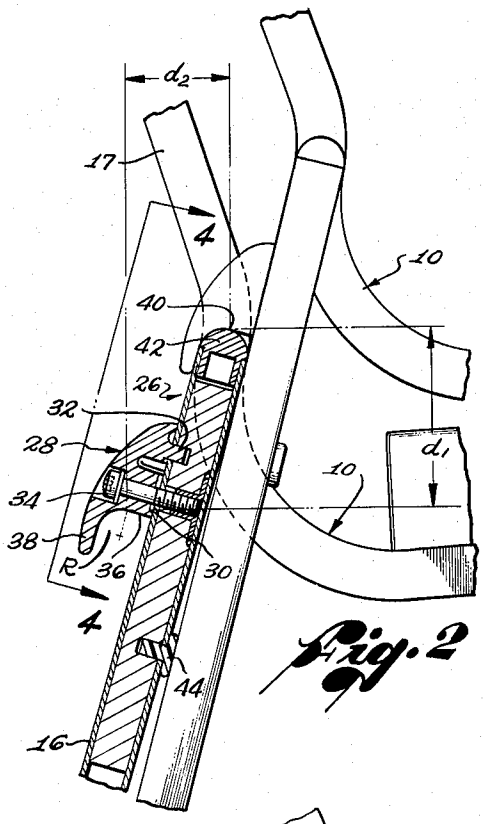


Fig. 2

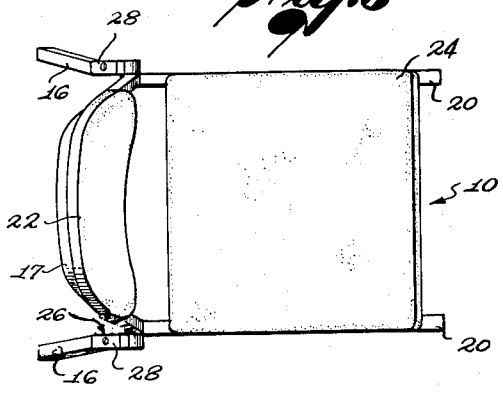


Fig. 3

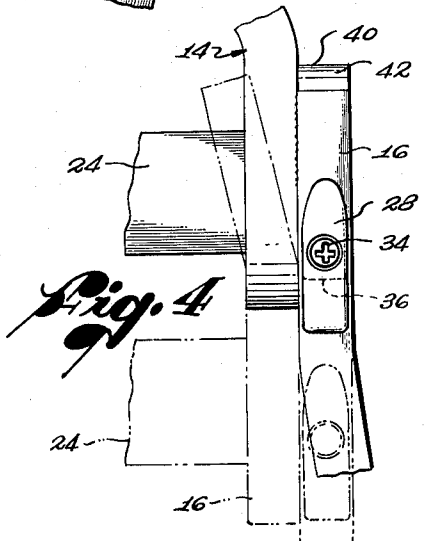


Fig. 4

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Fig. 5

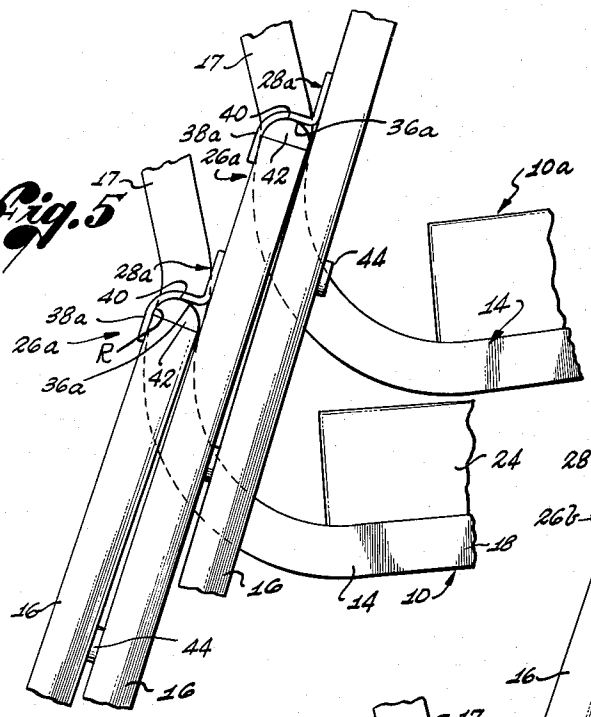
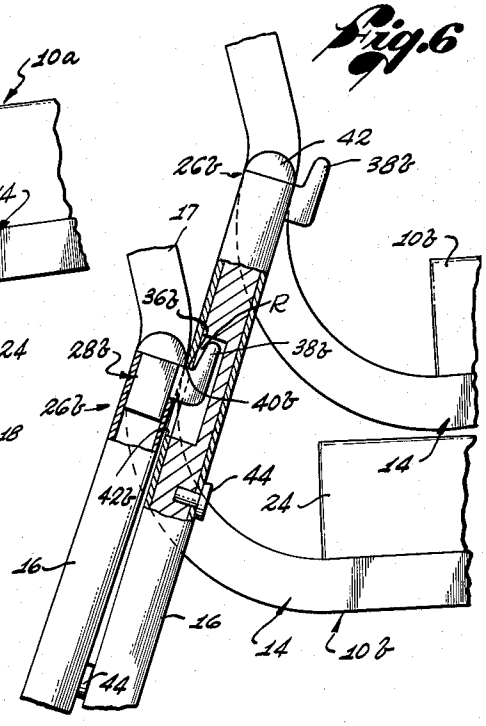


Fig. 6



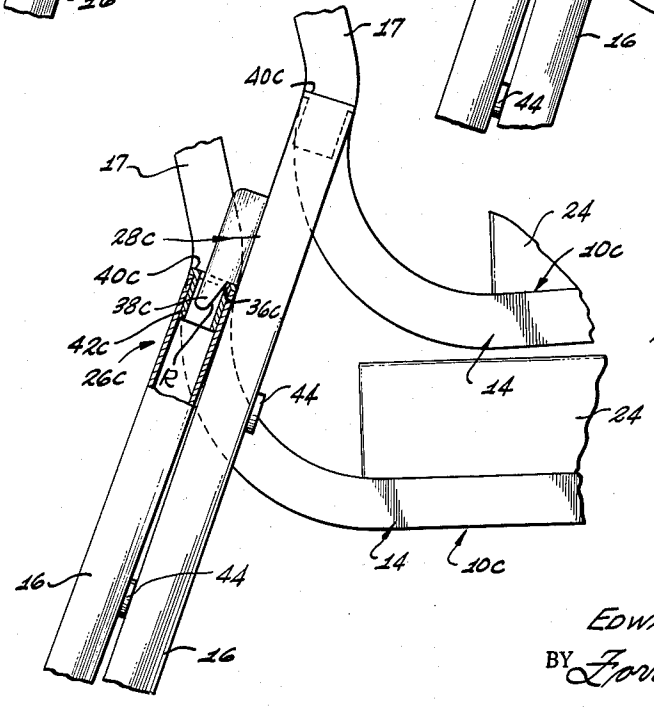


Fig. 7

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STACK CHAIR

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This invention relates generally to furniture and, more particularly, to an improved stack chair.

Most chairs of the type which are used to furnish temporary seating for auditoriums and other public meeting places are designed for compact storage when not in use. For example, some chairs of this type are so constructed that they may be folded, while other chairs, commonly referred to as stack chairs, are arranged so that they may be stacked one on top of the other.

My Patent No. 3,095,236 discloses a stack chair having several novel features of construction which uniquely adapt it for stacking. The present invention improves on this prior chair by providing stack chairs which utilize essentially the same stacking concept as the prior chair but are designed to attain a superior placement of the stacking means from the standpoint of appearance, a more effective and secure interlocking action between the engaged stacking means in a group of stacked chairs, a better angular position of the rear chair legs, whereby the present chairs are less prone to mar the walls of a room, and various other advantages.

A general object of this invention is to provide improved stack chairs of the character described.

Another object of the invention is to provide improved stack chairs which are so constructed that when several of the chairs are stacked one on top of the other, the center of gravity of the stack remains over the area bounded by the legs of the lower chair in the stack so as to assure a stable stack.

A further object of the invention is to provide improved stack chairs of the character described which are upholstered and arranged so that each chair in a stack of the present chairs is retained out of contact with the seat and back cushions of the adjacent lower chair, whereby compression of the cushions of the lower chairs in the stack by the weight of the upper chairs is avoided.

Other objects, advantages, and features of the invention will become evident as the description proceeds.

Certain presently preferred stack chair constructions according to the invention will now be described in detail by reference to the attached drawings, wherein:

FIG. 1 illustrates two stack chairs according to the invention stacked one on top of the other;

FIG. 2 is an enlargement, partially in section, of the area enclosed by the circular arrow 2—2 in FIG. 1;

FIG. 3 is a top plan view of one of the chairs shown in FIG. 1;

FIG. 4 is a view looking in the direction of the arrows on line 4—4 in FIG. 2;

FIG. 5 is a view similar to FIG. 2 illustrating modified stack chairs according to the invention;

FIG. 6 is a view similar to FIG. 2, and partly broken away, illustrating further modified stack chairs according to the invention; and

FIG. 7 is a view similar to FIG. 2, and partly in section, illustrating yet further modified stack chairs according to the invention.

The stack chair **10** illustrated in FIGS. 1–4 of these drawings comprises a rigid chair structure **12** including an upper frame **14** and rear upright members **16** which form the rear legs of the chair. The upper frame **14**

is fabricated from tubular metal stock which is bent to the configuration shown to provide an upright back frame section **17**, a generally horizontal seat frame section **18**, and front legs **20**. Attached to the back frame section **17** in any suitable manner is a back rest or cushion **22**. Attached to the seat frame section **18** is a seat, or seat cushion, **24**. The chair back including the back frame section **17** and back rest **22** inclines rearwardly at a small angle, and the chair seat including the seat frame section **18** and seat cushion **24** inclines upwardly at a small angle in the customary way to improve the seating comfort of the chair.

The rear members, or legs, **16** comprise metal tubes the upper ends of which are welded or otherwise rigidly joined to the sides of the upper frame **14** at the base of the back frame section **17**. These legs are located laterally outboard of the side edges of the chair seat, as shown best in FIG. 3. For reasons which will become apparent shortly, the spacing between the rear legs must be slightly greater than the width of the chair seat, including the seat frame section **18** and seat cushion **24**. To this end, shims or spacers (not shown) may be placed between the upper ends of the rear chair legs **16** and the back frame section **17** prior to welding the legs to this section. The rear legs also incline laterally and rearwardly at a small angle, as shown.

One aspect of the present invention is concerned with improved stacking means **26** which are embodied in the chair **10** to permit several chairs of this type to be conveniently stacked one on top of the other when not in use. In the chair under consideration, the stacking means **26** comprise a pair of stacking brackets **28** mounted on the rear sides of the rear legs **16** equal distances below the upper ends of these legs. Each stacking bracket **28** has a seating face **30** which engages the rear surface of the respective rear leg and is keyed to its respective leg by an integral stud **32** which projects into a hole in the leg. The bracket is rigidly attached to the leg by a bolt **34**. The lower end of each stacking bracket is recessed, as shown, to provide the bracket with a downwardly presented stacking shoulder **36** and a retaining lip **38** at the rear of the shoulder.

Stacking means **26** further include a pair of upwardly presented stacking shoulders **40**. In the chair **10** under consideration, these latter stacking shoulders are furnished by the upper ends of the rear chair legs **16**. For this reason, according to the preferred practice of the invention, the upper ends of the rear legs comprise tips **42** which may be press fitted into or otherwise secured to the upper ends of the leg tubes and are contoured to complement the recesses in the stacking brackets **28**.

The stacking brackets **28** and the rear leg tips **42** may be made from various materials. Preferably, however, these parts are made from some wear-resistant, non-metallic material.

It is evident from the preceding description that the stacking means **26** on the chair **10** comprise, at each side of the chair, a set of stacking shoulders including a lower, downwardly presented shoulder **36** which is accessible from the rear of the respective rear leg member for engagement from below and an upper, upwardly presented shoulder **40** which is accessible from the front of the respective rear leg member for engagement from above. The upper and lower shoulders in each such shoulder set are disposed in a common plane normal to the chair back and seat. The upper stacking shoulders **40** are disposed the same vertical distance above the common plane of the lower ends of the chair legs **16** and **20** as are the

lower shoulders 36. The vertical spacing d_1 between the upper and lower shoulders is slightly greater than the overall thickness t of the chair seat. The upper stacking shoulders 40 are also located forwardly of the lower shoulders 36 a distance d_2.

Mounted on the front sides of the rear chair legs 16, equal distances above the plane of the lower ends of the chair legs, are spacers 44. These spacers may comprise rubber buttons, for example, having headed stems (not shown) fitted in holes in the legs.

When stacking several chairs of the type described above, any one of the chairs may be selected to be the bottom chair in the stack. Any of the remaining chairs is now placed, over this bottom chair, in the manner shown in FIGS. 1 and 2, so that the rear legs 16 of the second or upper chair straddle the seat 24 of the bottom chair and the lower stacking shoulders 36 on the second chair engage over and rest on the upper stacking shoulders 40 of the bottom chair. In this connection, it will be recalled that the spacing between the rear chair legs 16 is slightly greater than the width of the chair seat, whereby the rear legs of the second chair can straddle the seat of the bottom chair, as just explained. Also, since the lower and upper stacking shoulders 36 and 40 at each side of each chair are located in a common plane normal to the chair back and seat, the lower stacking shoulders on the second chair will be aligned with, and thereby can be engaged with, the upper stacking shoulders on the bottom chair, in the manner explained above.

It will further be recalled that the vertical spacing d_1 between the lower and upper stacking shoulders 36 and 40 on each chair is somewhat greater than the thickness t of the chair seat and that the upper stacking shoulders are spaced forwardly of the lower shoulders a distance d_2. These shoulder spacings are such that when the second chair occupies its stacked position of FIGS. 1 and 2 on the bottom chair, a small clearance will exist between the seats and backs of the two chairs, as shown. As a result, crushing and marring of the back and seat cushions 22 and 24 of the bottom chair by the second chair are avoided.

It is evident that since the engaged stacking shoulders 36 and 40 of the stacked chairs are located at the rear of the chairs, the center of gravity of the second or upper chair is located forwardly of the shoulders so that the weight of the latter chair tends to rotate it in the clockwise direction in FIG. 1 about the engaged shoulders. The rear legs 16 of the second chair thereby seat against the spacers 44 on the rear legs of the bottom chair to orient the second chair in a fixed angular position with respect to the bottom chair wherein the seat of the second chair inclines upwardly toward its front edge relative to the seat of the bottom chair as shown in FIG. 1. The retaining lips 38 on the stacking brackets 28, of course, prevent accidental disengagement of the latter from the stacking shoulders 40 of the adjacent lower chair.

The foregoing stacking procedure is repeated for each succeeding chair to be stacked. It is evident that each successive chair in the stack is inclined slightly relative to the adjacent lower chair in the same manner as described above in connection with the first and second chairs. The chair stack thus curves in the same manner as does the chair stack described and illustrated in my aforementioned Patent No. 3,095,236, whereby the center of gravity of the stack remains within the area bounded by the four legs of the bottom chair, and the stack is stable.

It is evident that the use of a single pair of stacking brackets on the present chair and the placement of these brackets at the rear of the rear chair legs and at seat level is highly desirable from the standpoint of appearance and general chair design. The improved stacking means, including these brackets, are also obviously effective to produce a highly secure interlocking action between the engaged stacking shoulders in a stack of chairs which minimizes or eliminates any possibility of accidental disengagement of the engaged shoulders. A further advantage of the present chair design resides in the fact that the lower ends of the rear chair legs are located rearwardly of the upper edge of the chair back. As a result, when the chair is placed near a wall, the rear legs engage the baseboard before the chair back engages the wall, whereby marring of the wall by the chair back is avoided.

The modified stack chair 10*a* shown in FIG. 5 as well as the other modified stack chairs of the invention shown in FIGS. 6 and 7 employ the same basic chair structure as the chair 10 described above and differ from the latter chair only in the different types of stacking means employed. For this reason, each of the modified chairs is shown in part only and the illustrated portions of the basic chair structure are identified by the same numerals as they are in FIGS. 1–4. In these illustrations of the modified chairs, only the stacking means at one side of the chair are shown since the stacking means at the opposite side of the modified chairs are obviously identical, as in chair 10 just described.

Referring now to FIG. 5, in the alternative stacking means 26*a* embodied in the modified chair 10*a*, the rear stacking brackets 28*a* comprise generally Z-shaped bent metal bars which may be welded or otherwise rigidly joined to the rear chair legs 16. These brackets engage over the upper ends or tips 42 of the rear chair legs, as before. Chair 10*a*, therefore, like chair 10, has lower, downwardly presented stacking shoulders 36*a*, terminating in rear retaining lips 38*a*, which are furnished by the stacking brackets 28*a* and are accessible for engagement from the rear of the rear chair legs, and upper, upwardly presented stacking shoulders 40*a* which are furnished by the upper ends of the rear chair legs 16 and are accessible for engagement from the front of these legs.

The modified chair just described is stacked in the same manner, and the stacking means on the latter chair are arranged to accomplish the same relative positioning of the stacked chairs, as explained earlier in connection with the stack chair 10.

The stacking means 26*b* embodied in the modified stack chair 10*b* of FIG. 6 comprise stacking brackets 28*b* which are press fitted into or otherwise rigidly secured to the upper ends of the rear chair legs 16. These brackets include upwardly presented stacking shoulders 36*b* which extend forwardly of the rear chair legs, so as to be accessible for engagement from the front of these legs, and terminate in forward, upturned retaining lips 38*b*.

The rear sides of the rear chair legs 16 have longitudinal slots 42*b*, the upper edge walls 40*b* of which are located equal distances below the upper stacking shoulders 36*b* and furnish downwardly presented stacking shoulders on the rear chair legs which are accessible for engagement from the rear of these legs. The upper stacking shoulder 36*b* and slot 42*b* at each side of the chair are located in a common plane normal to the chair back and seat.

When stacking several chairs of the type just described, each succeeding chair in the stack is placed over the preceding chair, with the rear legs of the upper chair straddling the seat of the preceding lower chair, as before, and with the upper stacking shoulders 36*b* on the stacking brackets 28*b* of the lower chair extending through the slots 42*b* in the upper chair, as shown, to supportably engage the lower stacking shoulders 40*b* on the upper chair. The retaining lips 38*b* on the stacking brackets of the lower chair prevent accidental disengagement of the upper chair from the latter brackets.

The stacking means 26*b* on the chair 10*b*, like the stacking means on the chairs 10 and 10*a* are designed so that each succeeding chair in the stack is positioned at a slight angle relative to the preceding chair, in the manner explained earlier, whereby the stability of the stack is maintained. Also, each chair is retained out of contact with the back and seat cushions of the preceding chair, as before.

Stacking means **26c** embodied in the modified stack chair **10c** of FIG. 7 comprise stacking brackets **28c** which are rigidly secured to the rear sides of the rear chair legs **16**, equal distances below the upper ends of the legs, in much the same manner as the stacking brackets on the chair **10**. Stacking brackets **28c** have downwardly presented stacking shoulders **36c** terminating in rear, downturned retaining lips **38c**. In this case, the upper ends of the rear chair legs **16** are left open and have hollow, cylindrical tips or bushings **42c** inserted therein. The upper annular edges **40c** of these bushings form upwardly presented stacking shoulders on the legs.

When stacking chairs of this latter type, each chair is placed over the preceding chair in the same manner as before, and the retaining lips **38c** on the stacking brackets **28c** of the upper chair are inserted into the hollow tips **42c** in the upper ends of the rear legs of the preceding chair, as shown, thereby to engage the lower stacking shoulders **36c** on the upper chair with the upper stacking shoulders **40c** on the preceding chair. Stacking means **26c** are arranged to effect the same positioning of the stacked chairs as explained earlier.

At this point, it is apparent that in each disclosed stack chair of the invention, the upper ends of the rear chair legs are located in a common transverse plane of the chair, and each chair has a pair of upper stacking shoulders and a pair of lower stacking shoulders, one of which shoulder pairs is located substantially entirely in said common plane. The other pair of stacking shoulders on each chair project beyond the common plane of the rear legs, toward that side of the legs from which the latter shoulders are accessible for engagement, and define with the rear legs recesses R which open vertically away from the stacking shoulders of said one shoulder pair. When the chairs are stacked telescopically one on top of the other, the pair of stacking shoulders on each chair which are located in the common plane of the rear legs are disposed in vertical supporting engagement with the pair of projecting stacking shoulders on an adjacent chair and engage in the recesses defined by the latter shoulders, thereby to interlock the engaged shoulders against relative movement in the fore and aft direction of the chairs. Thus, each upper chair in the stack is supported on the adjacent lower chair in such manner that the weight of the upper chair tends to rotate the latter chair downwardly about the engaged stacking shoulders on the latter chair and the adjacent lower chair to a position wherein the rear legs of the upper chair rest rearwardly against the rear legs of the adjacent lower chair and the seat of the latter chair has no supporting contact with the upper chair. The location of one of the pairs of stacking shoulders in the common plane of the rear chair legs is desirable for the reasons that the number of projections on the chair which might interfere with normal use of the chair, or catch in the clothing of a person sitting on or standing behind the chair, and the cost of the chair are minimized.

Clearly, then, the invention disclosed herein is fully capable of attaining the objects and advantages preliminary set forth.

While certain presently preferred forms of the invention have been disclosed, the invention is susceptible of various other modifications within the spirit and scope of the following claims.

I claim:

1. A stack chair comprising:
a rigid chair structure including a seat, a back rest, front legs, and rear legs,
said rear legs being disposed laterally outboard of and rigidly joined at their upper ends to opposite sides, respectively, of said back rest at the base thereof,
said rear legs having upper tips located at the approximate level of said seat and defining upper, upwardly presented stacking shoulders disposed laterally outbard of and substantially flush with the front side of the base of said back rest,
said rear legs having front and rear sides,
a pair of stacking brackets secured to the rear sides of said rear legs, respectively, a distance below said upper tips thereof,
said stacking brackets extending rearwardly from the rear sides of said rear legs and downwardly toward the lower ends of said rear legs to define with the rear sides of said rear legs downwardly opening recesses terminating at their upper ends in downwardly presented lower stacking shoulders,
said upper stacking shoulders generally complementing said recesses,
projecting spacers mounted on one of said sides of said rear legs below said stacking brackets, and
the vertical spacing between said upper and lower stacking shoulders being greater than the thickness of said seat, whereby said chair is adapted to be stacked with other like chairs one on top of the other to form a chair stack wherein the rear legs on each chair straddle the seat of the adjacent lower chair directly in front of the rear legs of the latter chair, the stacking brackets on each chair straddle the back rest of the adjacent lower chair and rest on the upper tips of the rear legs of the latter in the recesses of the adjacent upper chair to interlock the adjacent chairs against relative fore and after movement, and the spacers on the rear legs of each chair engage the rear legs of an adjacent chair, thereby to locate each chair in a stacked position relative to the adjacent lower chair wherein the seat of each chair is vertically spaced from and inclines upwardly relative to the seat of the adjacent lower chair in a forward direction of the chair seats.

2. A stack chair according to claim 1 wherein:
said upper tips of said rear legs comprise a relatively soft material, such as plastic.

3. A stack chair according to claim 1 wherein:
said rear legs are tubular in transverse cross section, and
said upper tips of said rear legs comprise buttons of relatively soft material, such as plastic, inserted into and projecting axially upward beyond the upper ends of said rear legs.

4. A stack chair comprising:
a rigid chair structure including a seat, a back rest, front legs, and real legs,
said rear legs being disposed laterally outboard and rigidly joined at their upper ends to opposite sides, respectively, of said back rest at the base thereof,
said rear legs being tubular in transverse cross section and having front and rear sides,
the upper ends of said rear legs being located at the approximate level of said seat laterally outboard of and substantially flush with the front side of the base of said back rest,
a pair of stacking brackets secured to the rear sides of said rear legs, respectively, a distance below the upper ends of said rear legs,
said stacking brackets extending rearwardly from the rear sides of said rear legs and downwardly toward the lower ends of said rear legs to define on sad brackets depending lips spaced from the rear sides of said rear legs and downwardly opening recesses between said lips and rear legs, said recesses terminating at their upper ends in downwardly presented lower stacking shoulders,
projecting spacers mounted on one of said sides of said rear legs below said stacking brackets,
the upper annular edges of said rear legs defining upper, upwardly presented stacking shoulders, and
the vertical spacing between said upper and lower stacking shoulders being greater than the overall thickness of said seat, whereby said chair is adapted

to be stacked with other like chairs one on top of the other to form a chair stack wherein the rear legs of each chair straddle the seat of the adjacent lower chair directly in front of the rear legs of the latter chair, the stacking brackets on each chair straddle the back rest of the adjacent lower chair and rest on the upper stacking shoulders of the adjacent lower chair with the lips on the brackets extending into the open upper ends of the rear legs on the adjacent lower chair to interlock the adjacent chairs against relative fore and aft movement, and the spacers on the rear legs of each chair engage the rear legs of an adjacent chair, thereby to locate each chair in a stacked position relative to the adjacent lower chair wherein the seat of each chair is vertically spaced from and inclines upwardly relative to the seat of the adjacent lower chair in the forward directions of the chair seats.

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