

Sept. 29, 1970

R. O. SCHMIDT

3,530,954

THREE-STEP CHAIR

Filed March 20, 1969

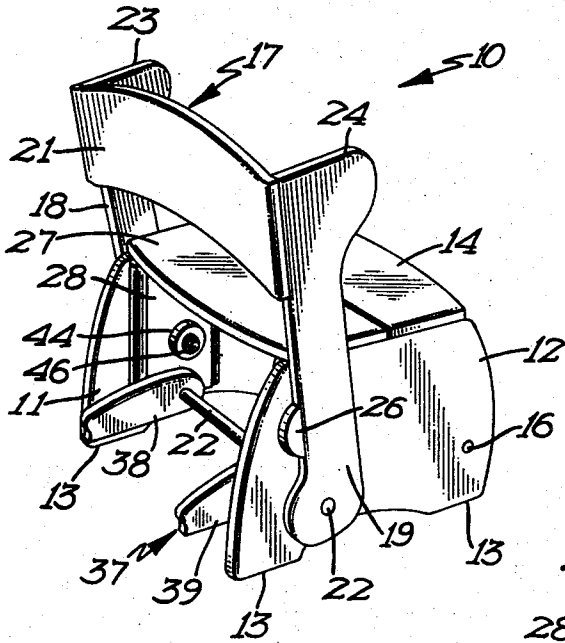


FIG 1

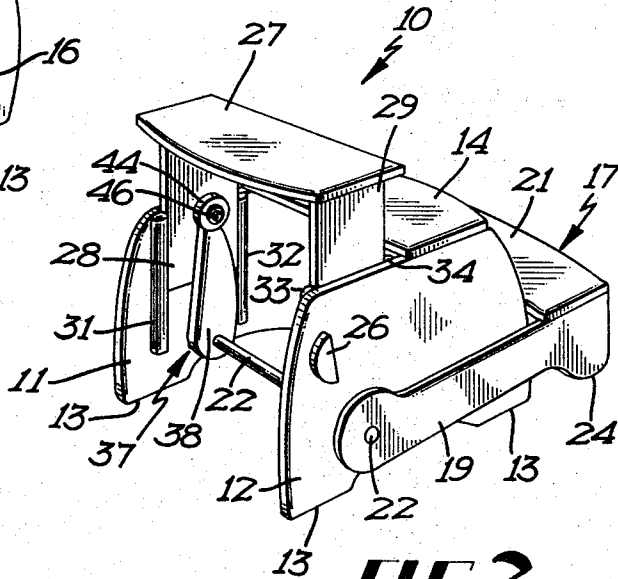


FIG 2

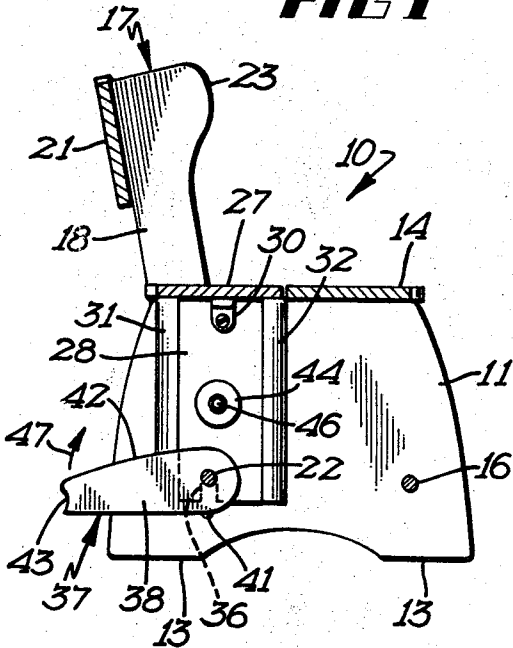


FIG 3

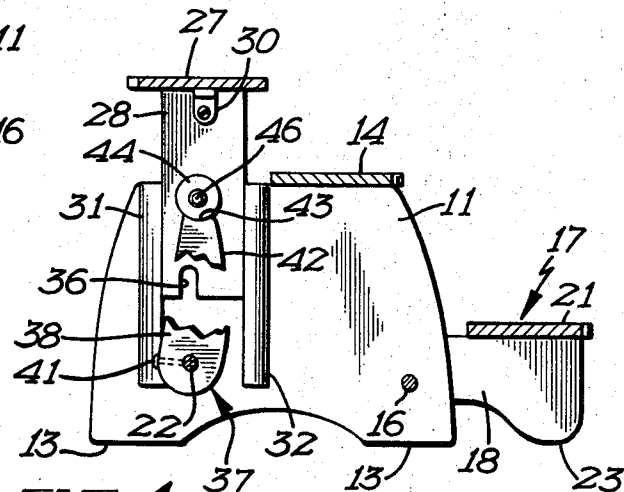


FIG 4

INVENTOR.

ROBERT O. SCHMIDT

BY

Burd, Braddock
& Bartz
ATTORNEYS

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3,530,954

THREE-STEP CHAIR

Robert O. Schmidt, 61 E. Rose Ave.,
St. Paul, Minn. 55117

Filed Mar. 20, 1969, Ser. No. 808,926

Int. Cl. A47c 13/00

U.S. Cl. 182—33

11 Claims

ABSTRACT OF THE DISCLOSURE

A step chair having a back rest and front seat panel secured to upright side members. A movable seat panel slideably mounted on the side members adjacent the back of the front seat panel is elevated in response to movement of the back rest. When the back rest is in a down-step position the movable seat panel is held in an up-step position. An elevating mechanism operable in response to pivotal movement of the back rests selectively moves and holds the movable seat panel to an up-step position and to a down-seat position.

BACKGROUND OF THE INVENTION

Combined seats and step stools have been developed wherein the back rests of the stools pivot to a down position over fixed seats to form two-step ladders. Examples of this type of seat and step stool are shown in U.S. Pats. No. 2,666,210 and No. 2,675,058. The maximum height of these stools is determined by the fixed position of the seat.

SUMMARY OF THE INVENTION

The invention broadly relates to a chair which can be converted to a three-step ladder. The chair has a base with a stationary seat panel. Movably mounted to the base is a back rest selectively movable to an upright back rest position to a down-step position. Located adjacent the stationary seat panel is a movable seat panel cooperating with upright guide members on the base. An elevating mechanism operatively attached to the movably mounted back rest raises the movable seat panel to a top-step position in response to movement of the back rest to its down-step position. The elevating mechanism locks the top step in its elevated position.

An object of the invention is to provide a portable unit which can be used as a chair or a three-step ladder and can be converted from a chair to a ladder in minimum time without releasing or removing parts. Another object of the invention is to provide a step chair with a movable top step which is locked in the up-step position. A further object of the invention is to provide a three-step chair that is economical to manufacture, reliable and safe in use and adaptable for use by children and adults.

In the drawings:

FIG. 1 is a perspective view of the three-step chair with the back rest in the up position;

FIG. 2 is a perspective view of the three-step chair with the back rest in the down-step position and the movable seat panel in the up-step position;

FIG. 3 is a longitudinal sectional view of the three-step chair of FIG. 1; and

FIG. 4 is a longitudinal sectional view of the three-step chair of FIG. 2.

Referring to the drawings, there is shown in FIGS. 1 and 2 the three-step chair of the invention indicated generally at 10. Step chair 10 can be used as a conventional chair having an upright back rest as shown in FIG. 1. Alternatively, step chair 10 can be used as a three-step ladder with the back rest down, as shown in FIG. 2.

Step chair 10 comprises upright side members 11 and 12 each having front and rear flat legs 13 for supporting

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the chair on a surface. Attached to the top of side members 11 and 12 is a front seat panel 14. The seat panel 14 has a width approximately one-half the length of the top of the side members 11 and 12 and a slightly convex curved forward edge. Located below seat panel 14 is a transverse cross bar 16 attached to the side members 11 and 12 to stabilize and space the lower portions of the side members. The side members 11 and 12 and seat panel 14 comprise the stationary base of the chair.

A back rest indicated generally at 17 is pivotally mounted on the side members 11 and 12 for movement from an upright back rest position, as shown in FIG. 1, to a down-step position, as shown in FIG. 2. Back rest 17 comprises a pair of arms 18 and 19 located adjacent the outsides of the side members 11 and 12. The back of the outer ends of the arms are secured to a transverse back panel 21. The lower ends of arms 18 and 19 are secured to a transverse pivot rod 22 projected through aligned holes in the back of side members 11 and 12. Flat washers (not shown) carried by rod 22 are located between the lower ends of the arms 18 and 19 and the outside of the side members 11 and 12 to space the arms from the side members. The upper end of arms 18 and 19 have forwardly directed rounded ears 23 and 24 which serve as supports for the back rest 17 when it is in the down position, as shown in FIG. 2. Ears 23 and 24 have a length of about twice the transverse width of arms 18 and 19.

When the back rest 17 is in the up position, as shown in FIGS. 1 and 3, the back edges of the arms 18 and 19 engage stops 26 secured to the side members 11 and 12. The arms 18 and 19 when in the up position project upwardly and rearwardly locating the back rest rearwardly over center of the pivot rod 22 thereby preventing the free fall movement of the back rest 17 to the horizontal position.

Located adjacent the rear side of front seat panel 14 is a movable seat panel 27. Panel 27 is movable between a down-seat position, as shown in FIG. 1, wherein opposite end portions of the panel rest on the top of side members 11 and 12 to an up-step position. FIG. 2 shows the movable seat panel 27 in the up top-step position. The opposite ends of the movable seat panel 27 are secured to upright flat slide members 28 and 29 located closely adjacent the inside faces of the side members 11 and 12. Angle brackets 30 secure the seat panel 27 to the upright members 28 and 29.

As shown in FIG. 2, the upright slide member 28 is located between upright guide strips or rails 31 and 32 secured to the inside of side member 11. In a similar manner, upright guide strips or rails 33 and 34 are secured to the inside of side member 12 to provide guideways for the upright slide member 29. The front and rear upright edges of the slide members 28 and 29 are in loose sliding relation with the adjacent surfaces of the upright guide strips 31, 32 and 33, 34. To provide the upright slide members 28 and 29 with large bearing surfaces with the guide strips 31, 32 and 33, 34, the bottom of the upright members 28 and 29 are provided with upright recesses 36 for accommodating the pivot rod 22. The slide members 28 and 29 have relatively large flat faces located close to the inside of side members 11 and 12 providing the seat panel 27 with lateral stability.

The elevating mechanism for the movable seat panel 27 indicated generally at 37 comprises a pair of cam arms 38 and 39 attached to the pivot rod 22 with fasteners 41, as bolts, so that the cam arms 38 and 39 rotate with the pivot rod 22. The arms 38 and 39 are located adjacent the inside faces of the upright members 28 and 29. Each cam arm has an upper convex curved face 42 which terminates in a top notch 43. The face 42 is aligned with a roller 44 rotatably mounted on an axle 46 secured to

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and projected outwardly from the upright side member 28. Axle 46 can be a bolt fixed to the side member. Roller 44 can be rotatably mounted on the fixed bolt. A similar roller (not shown) mounted on side member 29 cooperates with cam arm 39.

As shown in FIGS. 1 and 3, when the back rest 17 is in the up position the cam arms 38 and 39 extend rearwardly and are spaced from the rollers 44. On forward movement of the back rest 17 to the forward horizontal step position, as shown in FIGS. 2 and 4, the cam arms rotate with the pivot rod 22 in the direction of the arrow 47. Rod 22 serves as a power transmitting means between back rest 17 and elevating mechanism 37. As the back rest is pivoted in a forward direction the convex curved faces 42 of the cam arms 38 and 39 engage the rollers 44 and move the seat panel 27 in an upward direction. When the back rest 17 is in the horizontal step position the rollers 44 have moved into the notches 43 at the ends of the cam arms 38 and 39 thus locking the seat panel 27 in its raised position. The cam arms 38 and 39 being slightly over center in a forward direction prevent the back rest 17 from raising when a load is placed on the movable seat panel 27. Accordingly, the movable seat panel 27 is locked in the up position by the cam arms 38 and 39 until the back rest 17 is pivoted back to its up position.

The three-step chair is converted from the three-step ladder as shown in FIGS. 2 and 3, back to the chair position by merely raising the back rest 17 to the up position. This moves the cam arms 38 and 39 rearwardly away from the rollers 44 whereby the seat panel 27 is free to slide down into engagement with the top of the side members 11 and 12. The stops 26 on the side members 11 and 12 hold the back rest 17 in the up-back-rest position.

The size of the three-step chair can be a child's stool with fixed seat panel 14 having an elevation from the floor of about 8 inches. The movable seat panel 27 elevates about 4 inches. The chair can be a kitchen stool wherein the fixed seat has an elevation from the floor of about 18 inches. The movable seat panel and back rest are proportional in size and location to the fixed seat panel. Other types of elevating linkages and mechanisms can be used to raise the movable seat panel in response to forward movement of the back rest. The guide rails can be provided with antifriction strips or rollers to prevent binding of the slide members attached to the movable seat panel. Changes in material and the shape of the various parts can be made without departing from the spirit of the invention. The chair can be made of wood, plastic, metal and like rigid materials.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A step chair comprising: base means having a generally horizontal seat, movable means located adjacent the seat, guide means mounting the movable means on the base means for selective movement to an up position and a down position, a back rest movably mounted on the base means for movement to an up back-rest position and to a down-step position, and elevating means coacting with the back rest and movable means to selectively move the movable means to the up position and down position in

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response to movement of the back rest between the upright position and down-step position.

2. The step chair of claim 1 wherein: the base means has upright side members, said seat being attached to the top of the side members.

3. The step chair of claim 1 wherein: the movable means has a horizontal seat panel and downwardly directed slide members cooperating with the guide means.

4. The step chair of claim 3 wherein: the guide means comprise spaced upright rails engaging opposite portions of the downwardly directed slide members.

5. The step chair of claim 1 wherein: the base means has spaced upright side members and a generally horizontal seat panel attached the top of the side members, said movable means having a generally horizontal movable seat panel and slide members secured to and extended downwardly from opposite portions of the movable seat panel, said slide members located adjacent the side members and cooperating with the guide means to direct the movement of the movable means.

6. The step chair of claim 5 wherein: the movable seat panel when in the down position is supported on the top of the side members.

7. The step chair of claim 1 wherein: the back rest has arms located on opposite sides of the base means and a back rest panel member attached to the arms, said arms being secured to power transmitting means connected to the elevating mechanism.

8. The step chair of claim 1 wherein: the elevating means has first means connected to and movable with the back rest and second means connected to and movable with the movable means, said first means being related to the second means so that movement of the first means results in movement of the second means.

9. The step chair of claim 8 wherein: the first means includes a cam arm and the second means is a roller engageable with the cam arm.

10. The step chair of claim 8 wherein: the first means and second means having interlocking portions operable to hold the movable means in the up position.

11. The step chair of claim 1 wherein: a transverse rod rotatably mounted on the base means is nonrotatably connected to the back rest, said elevating means comprising a pair of cam arms secured to the rod and rollers attached to the movable means in alignment with the cam arms whereby movement of the cam arms to upright positions raises the movable means, said cam arms have recesses in the outer ends thereof for accommodating the rollers to lock the movable means in the up position.

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REINALDO P. MACHADO, Primary Examiner

U.S. Cl. X.R.

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