

PATENT SPECIFICATION

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(54) IMPROVEMENTS IN FOLDING CHAIRS

(71) We, LAMONDINE S. A., of 55 Boulevard De Perolles, 1700 Fribourg, Switzerland a Societe Anonyme organised under the Federal Laws of Switzerland, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to folding chairs and particularly, but not exclusively, folding push chairs for children.

It has been proposed to provide a kind of folding chair comprising a pair of similar folding side frames interconnected by cross-members, the side frames each consisting of inter-pivoted bars which can move between an open position of use and a folded position wherein the bars lie side-by-side and the cross-members being hinged so that the folded side frames can be closed towards one another.

In such prior proposal, the cross-members are constituted by a complicated structure of bars and links hinged by their ends to the side frames as well as to a central member of U-brackets and connecting bars.

The present invention provides a simple but strong construction of a folding chair with folding side frames and hinged cross-members and, according to the invention, the cross-members each have at least one intermediate hinge and their ends are respectively integral with a respective side frame bar, the hinges forming at least one set of co-planar hinges arranged to come into coaxial alignment in the folded position of the side frames which can then close towards one another like the covers of a book.

By "integral" is meant that each cross-member end is made as one with its respective side frame bar by being either an extension from the bar or rigidly secured to the bar.

The cross-member hinges can be simple pivots, which can be incorporated without any projections in tubular cross-members,

and for compact closing, especially for wheeled push chairs, the hinges can be offset from the centres of the cross-members so that corresponding projections, such as wheels, on the side frames can overlap when the chair is folded.

In a preferred construction, the cross-members each have a central part hinged to the end parts so that there are two sets of co-planar hinges, in two normally vertical, parallel planes, and the hinges of each set respectively come into coaxial alignment in the folded position of the side frames.

The side frame bars, preferably of tubular metal, may comprise a front leg, a seat side bar, an arm-rest and a back pillar, all inter-pivoted to form a quadrilateral linkage, and a back leg pivoted to the back pillar and to the armrest.

The cross-members, also principally of tubular metal, may comprise a lower front rail, conveniently made as a foot-rest, a front seat rail, a lower back rail and an upper back rail which, for a push chair, is formed as a handle bar.

When the chair is in the open position of use, the axes of the cross-member hinges are out of alignment so that the side frames cannot close together and the structure is self-locking. To lock the side frames open, a locking member may be provided, in particular a spring-loaded sleeve slidable on a back pillar and biased into a position in which it engages an abutment, on a back leg or other adjacent bar, to prevent folding of the side frame.

For a push chair, wheels are provided, preferably as twin-wheels, on the front and back legs and a wheel-engaging brake may be provided.

The invention is illustrated, by way of example on the accompanying drawings, in which:—

Figs. 1 to 4 are diagrams of a wheeled push chair, to show the principle of the invention, respectively in side elevation and front view, in the open position, in side

elevation, with the side frames folded, and in plan in the fully closed position.

Fig. 5 is a perspective view of one embodiment of a child's folding push chair.

5 Figs. 6, 7 and 8 show the construction of the frames and cross-members of a similar embodiment, with some modifications in detail, respectively in side elevation open, front view open and front view fully folded and closed, and

10 Fig. 9 is a fragmentary view showing a preferred hinge construction for tubular cross-members.

15 A folding chair as illustrated comprises a pair of similar wheeled folding side frames interconnected by hinged cross-members carrying a seat of flexible sheet material.

20 Each side frame comprises interpivotated bars providing a front leg 1, a seat side bar 2, an arm-rest 3, a back pillar 4 and a back leg 5. The legs 1 and 5 have wheels 6.

25 The cross-members comprise a lower front rail 7, with foot-rest sections 8, a front seat rail 9, a lower back rail 10 and an upper back rail 11 forming a handle bar. The ends of the front seat rail 9 and handle bar rail 11 are integral extensions from the seat side bars 2 and back pillars 4 respectively and the ends of the foot-rest rail 7 and lower back rail 10 are securely united to the front legs 1 and back pillars 4 respectively so as to constitute integral parts thereof.

30 In the diagrammatic illustration of Figs. 1 to 4, the cross-members each have one central intermediate hinge at X, the hinges forming one co-planar set, to enable the folded side frames to close together simply like a thin book as indicated by Fig. 4.

35 In the constructions shown by Figs. 5 to 9, each cross-member has a central part 7C, 9C etc. hinged to the end parts by respective hinges X and Y so that there are two sets of co-planar hinges which lie in two parallel, normally vertical, planes X—X, Y—Y indicated in Fig. 7.

40 When the side frames are folded, each set of hinges X and Y comes into line coaxially in its respective plane and, as shown by Fig. 8, the side frames, with the integral ends of the cross-members, can close together rather like hard covers of a thick book, the central parts of the cross-members staying in place like the spine of a book.

55 When the chair is open, as shown in Fig. 5 or Fig. 6, the cross-member hinges are out of alignment so that they cannot turn together and the structure is self-locking. This applies also when the chair is partly open.

60 To maintain the side frames fully open for use, a locking sleeve 12, with a concealed loading spring, is slidable on a back pillar 4 and is notched at its lower end to engage with a correspondingly notched

abutment of a bracket 13 on the adjacent back leg 5.

A hammock-type seat 14 (Fig. 5) of flexible sheet material is slung between the front seat rail 9 and the handle bar 11 and the sides of the sheet material are also wrapped around the back pillars 4. The lower back rail 10 extends clearly below the seat 14 so that a child is supported entirely by the seat and does not encounter the lower back rail 10.

The handle bar has flexible corrugated grips 15 for comfort in pushing the chair or carrying it folded, the bends of the handle bar being convenient for slinging the chair on the forearm of the user.

Pivoted lever wheel-engaging brakes 16 are provided for the back wheels.

A preferred hinge for the tubular cross-members is shown by Fig. 9 and comprises closing plugs 16 and 17 in opposed tube ends and respectively providing a forked hinge knuckle 18 and a tongue hinge knuckle 19 with a pivot pin 20.

The tube ends are each cut away, at the same side of the hinge axis, by half the hinging angle required, i.e. by 45° to give a 90° movement. The respective half-round oblique edges 21 and 22 so formed and the remaining half-round transverse edges 23 and 24 provide tube-end abutments at opposite limits of the hinging movement.

A twin push chair, to seat two children side-by-side, can be made from a pair of sideframes, as described and illustrated, and an additional folding frame at the centre secured to the central parts of the cross-members which are made long enough to give the seating width required. The central folding frame may have wheels but they are not essential and bars equivalent to a front leg and a back leg can terminate at the foot-rest and lower back rail respectively.

WHAT WE CLAIM IS:—

1. A folding chair comprising a pair of similar folding side frames interconnected by cross-members, the side frames each consisting of interpivotated bars which can move between an open position of use and a folded position wherein the bars lie side-by-side and the cross-members being hinged so that the folded side frames can be closed towards one another, characterised thereby that the cross-members each have at least one intermediate hinge and their ends are respectively integral with a respective side frame bar, the hinges forming at least one set of co-planar hinges arranged to come into coaxial alignment in the folded position of the side frames which can then close towards one another like the covers of a book.



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Fig. 5 is a perspective view of one embodiment of a child's folding push chair,

5 Figs. 6, 7 and 8 show the construction of the frames and cross-members of a similar embodiment, with some modifications in detail, respectively in side elevation open, front view open and front view fully folded and closed, and

10 Fig. 9 is a fragmentary view showing a preferred hinge construction for tubular cross-members.

15 A folding chair as illustrated comprises a pair of similar wheeled folding side frames interconnected by hinged cross-members carrying a seat of flexible sheet material.

Each side frame comprises interpivotated bars providing a front leg 1, a seat side bar 2, an arm-rest 3, a back pillar 4 and a back leg 5. The legs 1 and 5 have wheels 6.

20 The cross-members comprise a lower front rail 7, with foot-rest sections 8, a front seat rail 9, a lower back rail 10 and an upper back rail 11 forming a handle bar. The ends of the front seat rail 9 and handle bar rail 11 are integral extensions from the seat side bars 2 and back pillars 4 respectively and the ends of the foot-rest rail 7 and lower back rail 10 are securely united to the front legs 1 and back pillars 4 respectively so as to constitute integral parts thereof.

25 In the diagrammatic illustration of Figs. 1 to 4, the cross-members each have one central intermediate hinge at X, the hinges forming one co-planar set, to enable the folded side frames to close together simply like a thin book as indicated by Fig. 4.

30 In the constructions shown by Figs. 5 to 9, each cross-member has a central part 7C, 9C etc. hinged to the end parts by respective hinges X and Y so that there are two sets of co-planar hinges which lie in two parallel, normally vertical, planes X—X, Y—Y indicated in Fig. 7.

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abutment of a bracket 13 on the adjacent back leg 5.

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75 The handle bar has flexible corrugated grips 15 for comfort in pushing the chair or carrying it folded, the bends of the handle bar being convenient for slinging the chair on the forearm of the user.

Pivoted lever wheel-engaging brakes 16 are provided for the back wheels.

80 A preferred hinge for the tubular cross-members is shown by Fig. 9 and comprises closing plugs 16 and 17 in opposed tube ends and respectively providing a forked hinge knuckle 18 and a tongue hinge knuckle 19 with a pivot pin 20.

85 The tube ends are each cut away, at the same side of the hinge axis, by half the hinging angle required, i.e. by 45° to give a 90° movement. The respective half-round oblique edges 21 and 22 so formed and the remaining half-round transverse edges 23 and 24 provide tube-end abutments at opposite limits of the hinging movement.

90 A twin push chair, to seat two children side-by-side, can be made from a pair of sideframes, as described and illustrated, and an additional folding frame at the centre secured to the central parts of the cross-members which are made long enough to give the seating width required. The central folding frame may have wheels but they are not essential and bars equivalent to a front leg and a back leg can terminate at the foot-rest and lower back rail respectively.

WHAT WE CLAIM IS:—

110 1. A folding chair comprising a pair of similar folding side frames interconnected by cross-members, the side frames each consisting of interpivotated bars which can move between an open position of use and a folded position wherein the bars lie side-by-side and the cross-members being hinged so that the folded side frames can be closed towards one another, characterised thereby that the cross-members each have at least one intermediate hinge and their ends are respectively integral with a respective side frame bar, the hinges forming at least one set of co-planar hinges arranged to come into coaxial alignment in the folded position of the side frames which can then close towards one another like the covers of a book.



2. A folding chair according to claim 1, characterised thereby that the cross-member hinges are offset from the centres of the cross-members.

3. A folding chair according to claim 2, characterised thereby that the cross-members each have a central part hinged to the end parts so that there are two sets of co-planar hinges, in two parallel, normally vertical, parallel planes, and the hinges of each set respectively come into coaxial alignment in the folded position of the side frames.

4. A folding chair according to any foregoing claim, characterised thereby that the bars of each side frame comprise a front leg, a seat side bar, an arm-rest and a back pillar, all inter-pivoted to form a quadrilateral linkage, and a back leg pivoted to the back pillar and to the arm rest.

5. A folding chair according to any foregoing claim, characterised thereby that the cross-members comprise a lower front rail, a front seat rail, a lower back rail and an upper back rail.

6. A folding chair according to claims 4 and 5, characterised thereby that the ends of the front seat rail are extensions from the seat side bars of the side frames and the ends of the upper back rail are extensions from the back pillars of the side frames.

7. A folding chair according to claim 5 or 6, characterised thereby that a seat of flexible sheet material is slung between the

front seat rail and the upper back rail and the lower back rail is located clearly below the seat material in the open position of use of the chair.

8. A folding chair according to claim 5, 6 or 7, characterised thereby that the lower front rail is formed as a foot-rest and the upper back rail as a handle bar.

9. A folding chair according to any foregoing claim, characterised thereby that a side frame is provided with a locking member movably mounted on one bar and biased into a position in which it engages an abutment on an adjacent bar to prevent folding of the side frame from the open to the folded position.

10. A folding chair according to claim 9, characterised thereby that the locking member is a spring-loaded sleeve slidable on a back pillar bar and engageable with an abutment on a back leg bar.

11. A folding chair according to any foregoing claim, characterised thereby that front and back leg bars of the side frames are provided with wheels.

12. A folding push chair substantially as described with reference to and as shown by Fig. 5 or Figs 6 to 8 of the accompanying drawings.

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