(No Model.) 2 Sheets—Sheet 1.

C. L. KNOELLER.

FOLDING CHAIR AND STEP LADDER.

No. 433,795. Patented Aug. 5, 1890.

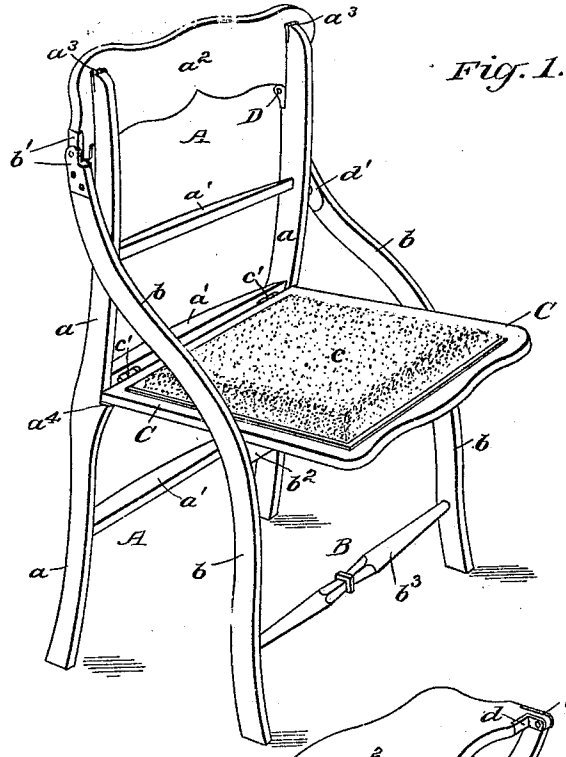


Fig. 1.

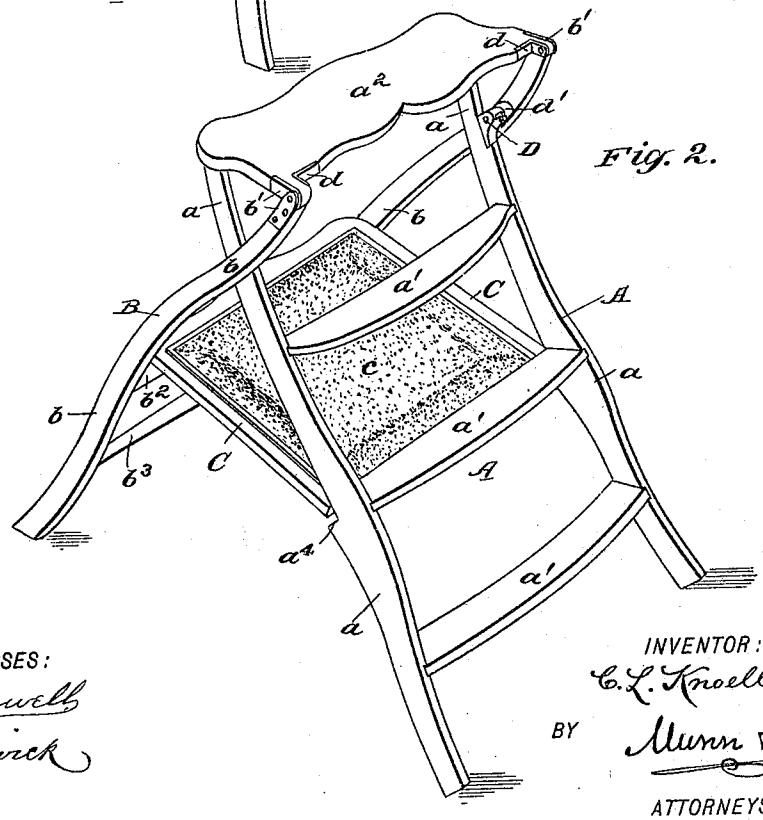


Fig. 2.

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ATTORNEYS

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

C. L. KNOELLER.

FOLDING CHAIR AND STEP LADDER.

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Fig. 3.

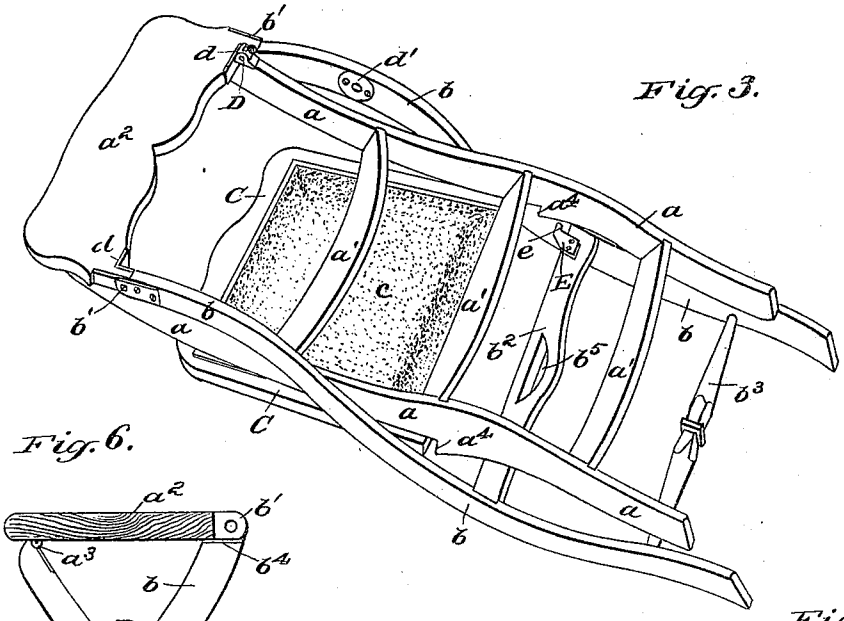


Fig. 6.

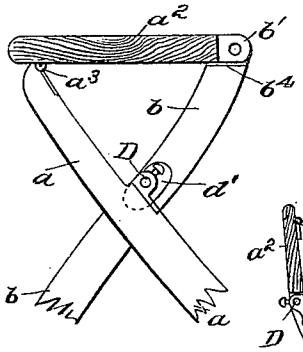


Fig. 5.

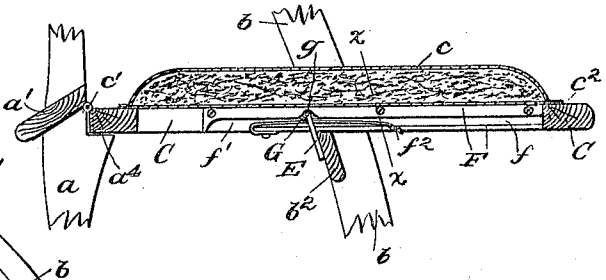


Fig. 7.

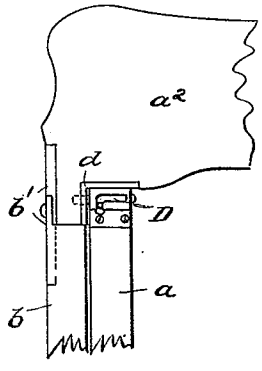


Fig. 4.

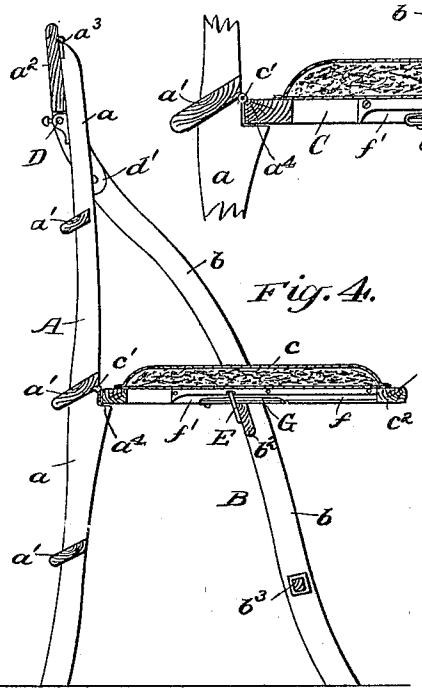
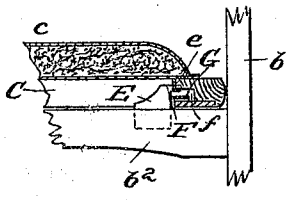


Fig. 8.



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UNITED STATES PATENT OFFICE.

CHARLES L. KNOELLER, OF NEW YORK, N. Y.

FOLDING CHAIR AND STEP-LADDER.

SPECIFICATION forming part of Letters Patent No. 433,795, dated August 5, 1890.

Application filed April 24, 1890. Serial No. 349,261. (No model.)

To all whom it may concern:

Be it known that I, CHARLES L. KNOELLER, of the city, county, and State of New York, have invented a new and Improved Folding Chair and Step-Ladder, of which the following is a full, clear, and exact description.

My invention relates to a combined folding chair and step-ladder, and has for its object to provide a simple, comparatively inexpensive, readily-adjustable, and nicely-designed piece of furniture of this character, which is very substantial when set up either as a chair or a step-ladder and may be quickly folded up into small space for transportation or storage. While the piece of furniture is more especially designed for use as a hall or library chair, it may be used to advantage in other rooms or places where a step-ladder is required.

The invention will first be described, and then will be particularly pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a perspective view of the article of furniture adjusted as a chair. Fig. 2 shows it adjusted as a step-ladder. Fig. 3 is a perspective view of it in folded condition. Fig. 4 is a vertical sectional side elevation of the chair. Fig. 5 is an enlarged detail side sectional view of the seat portion of the chair. Fig. 6 is a side view of the upper part of the step-ladder with its top in cross-section. Fig. 7 is a detail rear view of the locked joint between the chair back and uprights; and Fig. 8 is a detail front sectional view at the chair-seat and taken on the line $x\ x$ in Fig. 5.

This improved piece of furniture is made with a frame A, which forms the back of the chair and the steps of the ladder, a frame B, which is hinged to the hinged top of the frame A and is a front brace to the chair and a rear brace to the step-ladder, and a frame C, which is preferably upholstered and is hinged to the frame A and forms the seat of the chair and a brace to the step-ladder.

The frame A is made with two opposite side bars or posts $a\ a$, between which are fastened cross-bars $a'\ a'$, placed at proper angles and at suitable distances apart to form intermediate and lower steps of the ladder when the parts are adjusted as shown in Fig. 2 of the drawings. The top piece or plate a^2 of the frame A is connected near its upper edge by hinges $a^3\ a^3$ with the upper ends of the frame side bars $a\ a$, so as to swing upward from or at the rear face thereof, and at its lower edge the top a^2 is connected by side-plate hinges $b'\ b'$ with the upper ends of the two opposite side bars $b\ b$ of the frame B.

Two slide-bolts D D, held to the upper parts of the side bars $a\ a$ of the frame A, are adapted to lock into lugs pendent from the top piece a^2 or, preferably, into metal plates $d\ d$, facing said lugs and screwed to the top piece. The casings of these bolts have L-shaped slots, which provide for locking the bolts projected, as most clearly shown in Fig. 7 of the drawings. The bolts are also adapted to lock into apertures of metal catch-plates $d'\ d'$, fixed to the inner faces of the upper parts of the side bars $b\ b$ of the frame B. While these barrel-bolts D, having bayonet-locks, are preferred, any other suitable detents or catches may be used to engage the lugs or plates $d\ d$ to lock the top piece a^2 of the frame A in vertical position, to serve as a portion of the chair-back, and to lock into the plates $d'\ d'$ to hold said part a^2 horizontally to form the top of the step-ladder.

The frame B is made with the above-named opposite side bars $b\ b$ and two cross bars or rails $b^2\ b^3$, the one b^2 giving support to the chair-seat, and the other bar b^3 forming a lower brace and stay for the two side bars of the frame.

The seat-frame C is shown upholstered at c, and is connected by hinges $c'\ c'$ with the middle step-bar a' of the frame A. When the piece of furniture is adjusted as a chair, the rear rail or part of the seat-frame rests upon shoulders a^4, formed on the side bars $a\ a$ of the frame A, to relieve the hinges c' of strains to which they might otherwise be subjected.

Metal plates E E, fixed to opposite end parts of the cross-bar b^2 of the frame B, are provided with outwardly-projecting pins $e\ e$, which enter slots $f\ f$, formed at the inner edges or faces of the two opposite side bars

of the seat-frame C. These slots *f* are preferably formed in metal plates or frames F, which may each consist of one piece of cast metal or may be made of two plates separated to provide the slot *f* between them, the latter construction being shown in the drawings. The slots *f* of the frames or plates F are closed at their forward ends by the front cross-bar c^2 of the seat-frame C, but are open at their rear ends *f'* to allow escape of the pins *e* from them when folding up the piece of furniture, as hereinafter explained.

In the slot *f* of each side of the seat-frame or of the metal plate or frame F, held thereto, is placed a spring, preferably a quite long arched or bowed plate-spring G, which is fastened at one end to the seat-frame or the lower metal wall of the slot *f* thereof and passes freely at its other end through a slot f^2 in the lower wall of the slot *f*. The spring is thus adapted to hold the pin *e* of the plate E on the adjacent bar b^2 of the frame B into a recess or notch *g*, made in the upper edge or wall of the slot *f*, to prevent forward or backward slipping of the frame B beneath the chair-seat, while allowing the pin *e* to slip or move over said spring as the piece of furniture is adjusted to serve as a chair or step-ladder or while it is being folded flat for storage or shipment.

When the piece of furniture is adjusted as a chair and as shown in Figs. 1, 4, 5, 7, and 8 of the drawings, the bolts D engage the lugs or the plates *d* thereon at the lower edge of the top cross-piece a^2 to hold it upright, and the pins *e* on the opposite plates E of the cross-bar b^2 of the frame B are retained by the springs G in the notches *g* at opposite sides of the seat-frame, and this frame rests upon the shoulders a^4 of the bars *a* of the frame A.

To form a step-ladder, it is only necessary for the operator to first grasp the cross-bar b^2 of the frame B and draw it forward as the pins *e* escape from the notches *g* in the seat-frame and until said pins strike and stop at the front bar c^2 of the seat-frame or the forward ends of the slots *f*, whereupon the bolts D will be disengaged from the lugs or plates *d* of the top piece a^2 of the frame A, and this top piece will then be folded down on the two pairs of hinges a^3 *b'* to the position shown in Figs. 2 and 6 of the drawings to form the top of the step-ladder of what formerly was the upper cross bar or piece a^2 of the chair. It will be noticed that in this position the upper face of the step-ladder top a^2 is what forms the rear face of said top or cross piece when the piece of furniture is adjusted as a chair; hence the top of the ladder may be trodden upon and scratched or marred without defacing that side of the cross-piece a^2 which forms its front face when adjusted for a chair.

The folding down of the top cross-piece a^2, as above described, causes the pairs of side bars *a b* of the frames A B to cross each other at lower points than they do at the chair adjustment and brings the bolts D D on the side bars *a a* of the frame A directly opposite the apertures in the plates *d'* on the side bars *b b* of the frame B, into which the bolts will then be shot and locked to complete the step-ladder adjustment shown in Fig. 2 of the drawings. When thus adjusted, the ladder-top a^2 rests upon shoulders b^4 at the tops of the side bars *b b* of the frame B, and relieves the adjacent hinges *b'* of excessive strains. (See Fig. 6 of the drawings.)

To fold the piece of furniture quite flat, the top piece or cross-bar a^2 is first locked into the position it has as part of the chair-back and shown in Figs. 1 and 4 of the drawings, and then the frame B will be pushed or drawn toward the frame A until the pins *e e* on the frame B slip out of the open rear ends *f'* of the slots *f* of the chair-seat C, whereupon the frames A B will be folded together and the seat-frame C will be folded backward against the frame A, as shown in Fig. 3 of the drawings, thus permitting convenient carriage or storage of the piece of furniture.

An opening b^5, made in the upper cross-bar b^2 of the frame B, allows the folded article or structure to be hung upon a pin or peg driven into a wall, and also provides a hand-grasp for conveniently carrying the folded piece of furniture.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a combined chair and step-ladder, the combination, with connected step and brace frames sustaining a chair-seat, of an upright cross-piece hinged to the step-frame and adapted to swing upward to horizontal position and then present its rear face at the top, said cross-piece hinged also to the side bars of the brace-frame, and detents locking the cross-piece in either upright or horizontal position, substantially as described.

2. In a combined chair and step-ladder, the combination of connected step and brace frames, a seat hinged to the step-frame and sustained from the brace-frame, said step-frame having a hinged upright cross-piece adapted for adjustment to horizontal position and the brace-frame being hinged to the hinged cross-piece of the step-frame, and detents locking the cross-piece in either upright or horizontal position, substantially as described.

3. In a combined chair and step-ladder, the combination of connected step and brace frames, the step-frame having a hinged upright cross-piece adjustable to horizontal position, detents locking said cross-piece in either upright or horizontal position, and a seat hinged to the step-frame and provided with side slots and detents thereat, said brace-frame hinged to the hinged top cross-piece of the step-frame and provided with pins entering and latching or stopping at the seat-frame slots, substantially as described.

4. In a combined chair and step-ladder, the combination of connected step and brace frames, the step-frame having a hinged upright cross-piece adjustable to horizontal position, and a chair-seat hinged to the step-frame and provided with side slots which are closed at the front and open at the rear, said slots having notch-detents and said brace-frame being hinged to the hinged top cross-piece of the step-frame and provided with pins entering and latching and stopping at the seat-frame slots, substantially as described.

5. In a folding chair and step-ladder, the combination, with a frame A, having cross-pieces forming steps, and a top cross-piece a^2, hinged to its side bars a a, of a brace-frame B, having side bars b b, hinged to the cross-piece a^2 and having cross-bars, detents locking the cross-piece a^2 in either upright or horizontal position, a seat C, hinged to the frame A and adapted for support by a cross-bar of the brace-frame, and detents retaining the brace-frame and seat in proper relative positions, substantially as herein set forth.

6. In a folding chair and step-ladder, the combination, with a frame A, having cross-pieces forming steps, and a top cross-piece a^2, hinged to its side bars a a, of a brace-frame B, having side bars b b, hinged to the cross-piece a^2 and provided with cross-bars, slide-bolts on the side bars a a, adapted to lock the cross-piece a^2 in either upright or horizontal position by engaging the parts a^2 and b, respectively, a seat C, hinged to the frame A, and adapted for support by a cross-bar of the frame B, and detents retaining the frame B in proper relation to the chair-seat, substantially as herein set forth.

7. In a folding chair and step-ladder, the combination, with a frame A, having cross-pieces forming steps, and a top cross-piece a^2, hinged at its side bars a a, of a brace-frame B, having side bars b b, hinged to the cross-piece a^2 and provided with cross-bars, detents locking the cross-piece a^2 in either upright or horizontal position, a seat C, hinged to the frame A and provided with side slots f, closed at their forward ends and open at f' at their rear ends and notched at g, and springs G in the slots f, said frame B having pins e, entering the seat-slots f and adapted to engage the notches g, substantially as described.

CHARLES L. KNOELLER.

Witnesses:
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E. C. TOWNSEND.