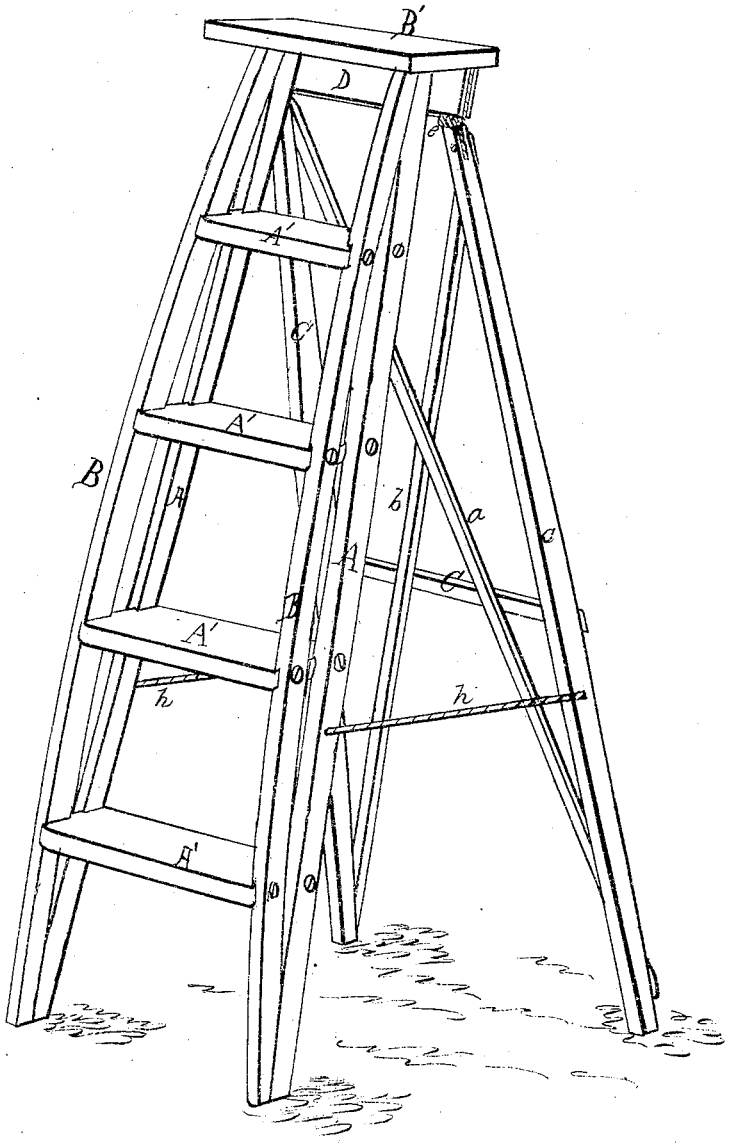
2 Sheets-
Sheet 1.

W. E. Bond.

Step-Ladder.

No. 50,894. Patented Nov. 14, 1865.

Fig. 1.



W. H. Burnings
A. N. McClelland

W. E. Bond.

2 Sheets.
Sheet. 2.

W. E. Bond.

Step-Ladder.

No. 50,894. Patented Nov. 14. 1865.

Fig. 2.

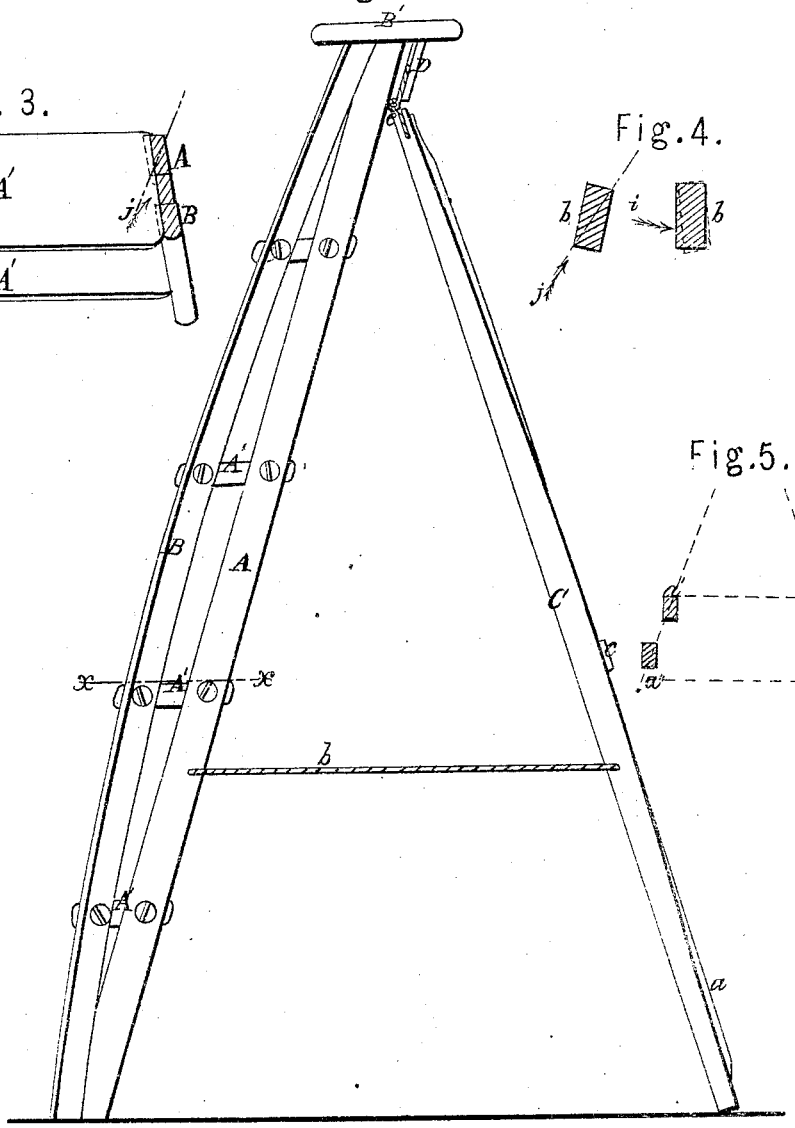


Fig. 3.

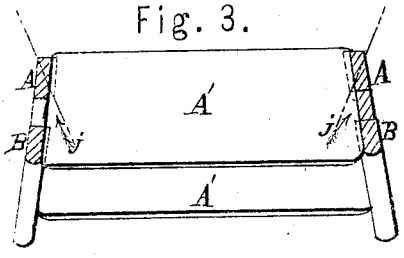
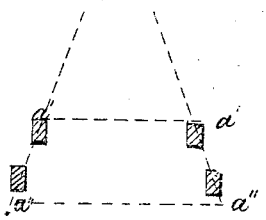


Fig. 4.

Fig. 5.



Witnesses:
W. E. Bond

Inventor:
W. A. Bunnings
A. W. McClelland

UNITED STATES PATENT OFFICE.

W. E. BOND, OF CLEVELAND, OHIO.

IMPROVED FRUIT OR STEP LADDER.

Specification forming part of Letters Patent No. **50,894**, dated November 14, 1865.

To all whom it may concern:

Be it known that I, W. E. BOND, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Ladders; and I do hereby declare that the following is a full and complete description of the construction and operation of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a perspective view of the ladder. Fig. 2 is a side elevation. Fig. 3 is a sectional view in the direction of the line *x x* in Fig. 2. Figs. 4 and 5 will be referred to in the description.

Like letters of reference refer to like parts in the several views.

My improvement relates to constructing a ladder the sides of which are formed of a chord and arch that, in connection with the steps, form a truss, and also to turning the chord inward toward the front of the steps, which, together with the steps, being narrower across the rear side, causes the strain to be principally in the direction of the width of the chord and arch, as hereinafter described.

In the drawings, A represents the chord, and B the arch, secured together at the upper and lower end, forming the sides of the ladder, each of which, in connection with the steps A′, forms a truss. C is a brace for supporting the ladder, that is hinged, as seen at *e*, to a piece, D. This piece is fastened to the chord or truss in the ordinary manner, on the top of which is secured the upper step, B′.

a b c are cross pieces or braces on the brace C, to strengthen it.

The chord and arch are cut out on the inner sides to receive the ends of the steps, as shown in Figs. 1 and 3, and also indicated by the dotted lines in Fig. 3. The steps are narrower across the rear side, where they are connected to the chord, than they are in front, and the chord on each side is turned inward toward the middle of the steps, from end to end or from the top to the bottom, being inclined or turned most in that direction at the middle, where the greatest strain is upon the ladder, and gradually less toward the ends, where it is connected to the arch. The steps being narrower across the rear side, as seen in Fig. 3, and the chords inclined inward, the strain or lateral thrust upon the steps, when used, will be partly on the chords from the front to the rear, as indicated by the arrows *j*, in the direction that they are widest, and consequently strongest; whereas, if the chord were straight from end to end on the side of the ladder in the plane of the arch, as at *b* in Fig. 4, which is a cross-section, or if the chord were inclined outward, as noted by the dotted lines, from the rear to the front, in either case the pressure or strain would be directly upon the side of the chord, where it will not bear near as much strain as in the other direction; but by turning the chord round toward the center of the step, more or less, into the position shown at *b′* in Fig. 4, together with the steps being narrower across the rear side, the strain and thrust will be upon the chord in the direction indicated by the arrows *j* in Figs. 3 and 4 upon the end, or diagonally across the chord, as noted by the red lines, in the direction that the chord is thickest through, relieving the chord from the strain and pressure on the side, where it is not so strong, and preventing any thrust laterally, while the arch, with the chord, sustains the vertical pressure. Thus by this combination of the arch and chord and the peculiar position of the chord, which, in connection with the steps, a truss is formed on each side so firm and strong that any vertical pressure or lateral thrust will be sustained without the liability of breaking or any part being strained or sprung out of place. The tension of the arch also is a firm and strong support for the vertical pressure on the steps.

The same principle of construction and operation is involved in making a ladder, as represented in Fig. 5, in which the chords *a′* need not be inclined or turned, but placed inward from the arches *a″* toward the middle or center of the steps in a straight position, as represented. The back of the step being so much narrower than the front and the chords nearer together than the arches, whether the chords are inclined or not, the thrust and strain will be upon the chords in the same manner as before. The chords being presented edgewise, the whole strength of the timber is obtained.

h h are ropes or cords extending between the chords A and brace C on the sides of the ladder.

What I claim as my improvement, and desire to secure by Letters Patent, is—

1. The chords A and arches B, in combination with the steps A′, constructed and arranged in the manner and for the purpose set forth.

2. In combination with the above, the making the steps narrower in the rear than in front, in combination with the chords, substantially as and for the purpose set forth.

W. E. BOND.

Witnesses:
W. H. BURRIDGE,
J. HOLMES.