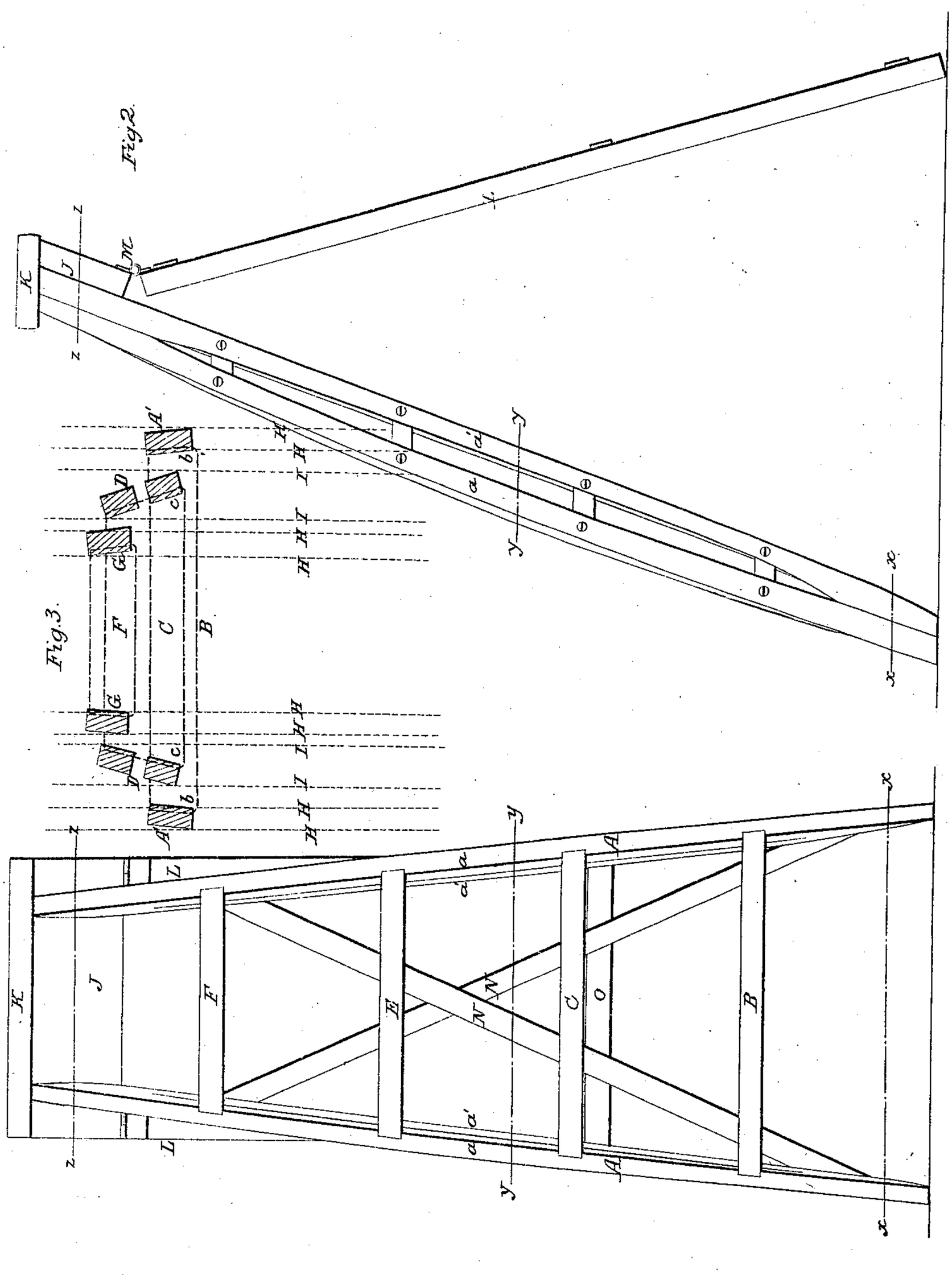
W. E. Bond.

Step Ladder.

No. 42,162. Patented Apr. 5, 1864.

Fig. 1.



Witnesses.

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UNITED STATES PATENT OFFICE.

WILLIAM EUGENE BOND, OF CLEVELAND, OHIO.

IMPROVED STEP-LADDER.

Specification forming part of Letters Patent No. **42,162**, dated April 5, 1864.

To all whom it may concern:

Be it known that I, WILLIAM EUGENE BOND, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented new and useful Improvements in Step-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 part of this specification, in which—

Figure 1 is a front view, and Fig. 2 is a side view.

Like letters refer to like parts in the several views.

The nature of my invention relates to such a construction of the side bars and step-boards as to give strength to sustain a weight, and to guard against a lateral swaying, while at the same time lightness of structure is secured. The side bars A A consist of two pieces each, (shown at *a a'*,) secured together at the ends by screws or bolts, and separated in the middle about five or six inches; or they may be made of one piece of board each by removing the middle portion to within a foot, or thereabout, of the ends, in which case it would be proper to pass a screw or bolt through, near each end, to prevent them from splitting. In either form of construction each section *a a'* should be about two inches wide, or even less, and about an inch in thickness, and the space between the sections *a a'*, in the middle, from five to six inches, as above stated, according to the size of the ladder. The ends of the lower step, B, are cut at nearly right angles, as shown at *b b* in detached view in Fig. 3, and is let into the inner faces of the bars A at a suitable distance from the lower end for the first step, and secured by screws to each section *a a'*, or otherwise. The step-board B will therefore occupy the position in relation to the sides A as shown in cross-section at A' A', the point of which cross-section is shown by the red lines *x x* in Figs. 1 and 2, the cross-section being shown in Fig. 3. The step C is about two inches shorter on the front edge than the step B, and has its ends cut at a sharper angle than the step B, (measuring from the front edge,) as seen at *c c* in Fig. 3. The side bars *a a'* are consequently twisted inward upon their inner edges, in order to cause them to conform to the ends of the step-board C—that is, the sections *a' a'* of the side bars A are brought nearer together, relatively, than the sections *a a*, which gives the side bars A, as a whole, a spiral or winding form from the lower end to the middle in reversed order, so that the red lines *y y* in Figs. 1 and 1 would show in cross-section the position represented at D D in Fig. 3. The step-board E has its ends cut at the same angle as that of C, but is about two inches shorter, and, being secured firmly to both the side bars at a proper distance for the step, preserves this twisted and spiral form of the side bars to this point; but by reason of each succeeding step-board being shorter than that below it the side bars are caused to approach each other toward the top. The step F has its ends cut at the angle of the step B, and being secured firmly to the side pieces A A, as is the other step-boards, reverses the spirality of the sides A A by turning the inner edges again outward, which brings the two side bars A A back to the position shown in cross-section at G, Fig. 3, the same point being represented by the red lines *z z* in Figs. 1 and 2. Thus, by cutting the ends of the step-boards at constantly-varying angles and compressing the side bars A A to correspond therewith and securing them firmly together, the two side bars are caused to have a twisted or spiral form from the bottom to the middle in opposite directions and in reverse order from the middle to the top. The effect of this double spirality is equivalent to an increased thickness in the middle of the bars A A, equal to the difference in the distance between the dotted lines H H and I I in Fig. 3, thus giving great resistance against a lateral pressure, without any increase of weight in the material used in the structure. Any number of step-boards may be used, in order to give the ladder any desired height, and in the variation of the number of step-boards the angle of the ends must be varied accordingly, and the variation in the length of the front edge of the step-boards will give the desired inclination of the upper ends of the side pieces or bars toward each other, thus making the whole structure narrower at the top than at the bottom. The two bars A A are secured together at the top by a board, J, which is screwed or nailed to the back edge of both, as

shown in the figures, and the upper step or platform, K, is secured to this and to the upper end of the side pieces A, and is about twice the width of the step-boards below. The platform K is in length about equal to the step-board E. The back brace consists of two rods, L, which are hinged to the lower edge of the board J, as shown at M. The lower ends of these rods are held in place by diagonal braces N and a stay-piece, O, near the middle. The back brace can be placed at any desired angle when the ladder is in use. Its proper position is shown in Fig. 2. It can be folded against the bars *a' a'* when not in use.

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

The herein-described construction of the side bars A A with step-boards B C E F in combination therewith, and having their ends cut at continually-varying angles, and by their union with each other, causing a spiral or twisted form of the side bars in opposite directions, in the manner and for the purpose specified.

WILLIAM EUGENE BOND.

Witnesses:

J. BRAINERD,

W. H. BURRIDGE.