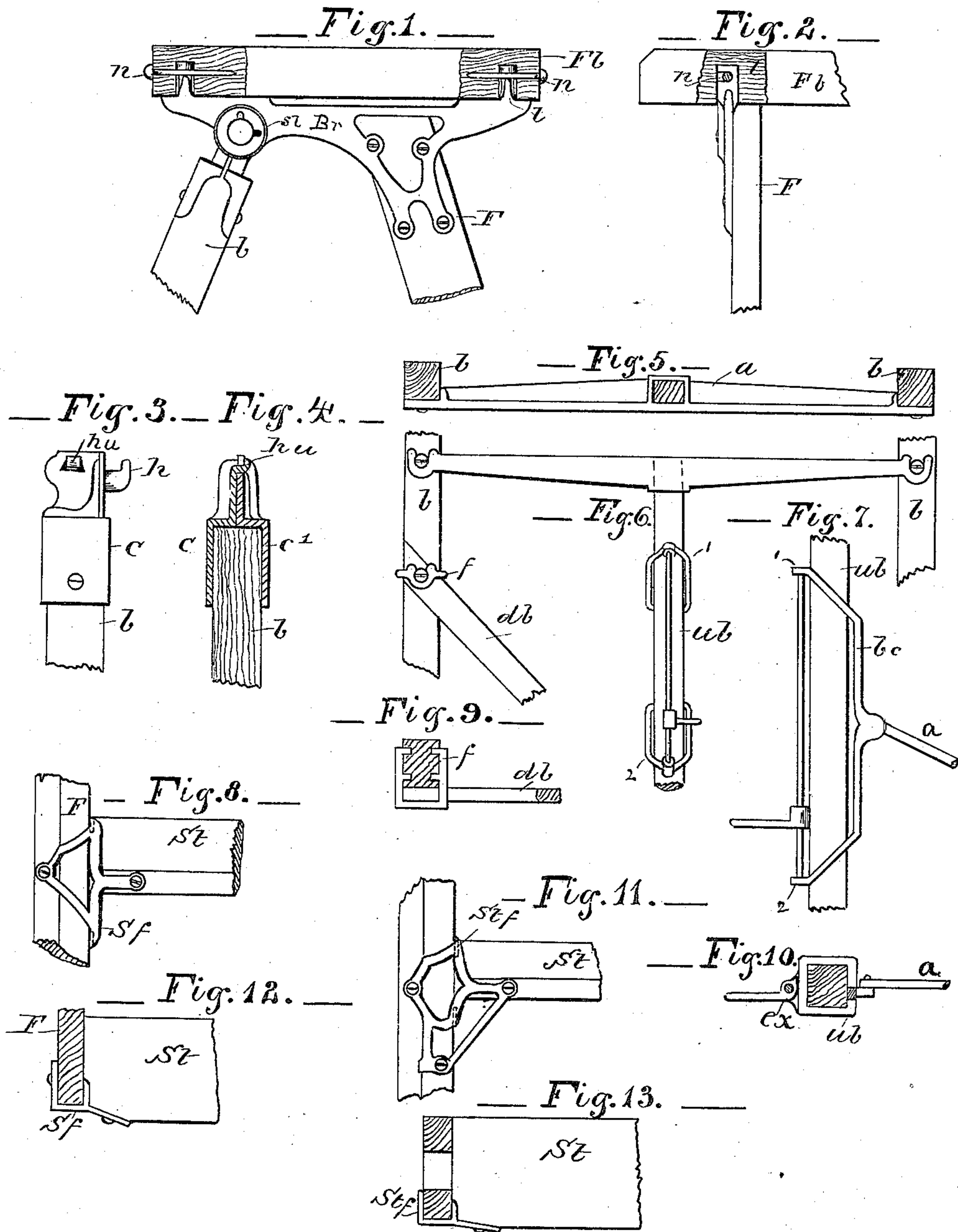


(No Model.)

C. G. UDELL.
STEP LADDER.

No. 309,322.

Patented Dec. 16, 1884.



WITNESSES.

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UNITED STATES PATENT OFFICE.

CALVIN G. UDELL, OF NORTH INDIANAPOLIS, INDIANA, ASSIGNOR TO
MATTHIAS R. UDELL, OF ST. LOUIS, MISSOURI.

STEP-LADDER.

SPECIFICATION forming part of Letters Patent No. 309,322, dated December 16, 1884.

Application filed June 20, 1883. Renewed June 2, 1884. (No model.)

To all whom it may concern:

Be it known that I, CALVIN G. UDELL, a resident of North Indianapolis, Indiana, have made certain new and useful Improvements in Step-Ladders, a description of which is set forth in the following specification, reference being made to the accompanying drawings, in theseveral figures of which like letters indicate like parts.

My invention relates to the securing and bracing of the several parts of a step-ladder, securing lightness, strength, and economy, as well as simplicity of construction at the same time.

In the drawings, Figure 1 is a side view of the top of the ladder with a part on each side near the ends broken away to show how the heads of the bracket-brace *Br* are inserted into the foot-board *Fb* from the under side, and how they are secured by nails *n*, driven through front and rear, *F* being the front and *b* the back part of the ladder. Fig. 2 is a rear view with a part broken away, showing the holes mortised or bored into the foot-board *Fb* and the head 1 of the bracket-brace inserted, and *n* is a cross-section of the wire nail driven in.

This headed bracket-brace and the means of securing it to the foot-board is one part of my invention.

The next and second part of my invention is shown in Figs. 3 and 4, the former being a front view and the latter a vertical section of the brace *b* and the two halves of the hinged clamp *cc'*, which are screwed on either side the brace *b*, and hinged together at the top and locked securely thereby, as shown at *hu*. Hooks *h*, formed on each half of the clamp, flat on their inner sides where they are brought together, are passed through an opening, which has a slot on one side, *sl*, in the bracket-brace *Br*, and thus hinge the clamp and its attached brace *b* on each side to the bracket-brace *Br*. These hooks *h* are not claimed herein.

The third part of my invention is shown in Figs. 5 and 6, and consists of a cross-brace, *a*, screwed to the rear brace, *b*, on each side through a half-eye on each end to allow its removal, when necessary, by merely loosening the screws, and having an eye in the center to receive the end of the central brace-bar, *ub*.

The fourth element of my invention is the locking cam-lever and rod *ex*, which works in bearings on the upper and lower clamps, 1 and 2, of the brace-clamp *bc*, and these openings in the clamps 1 and 2 are made large enough to admit the central brace-bar, *ub*, loosely, and the clamps may readily be locked by means of the cam, so as to secure them at any desired point on the brace-bar. A brace, *a*, is attached to the inside of the brace-clamp *bc*, and extends forward to and is hinged to one of the ladder-steps; but this brace and brace-clamp are not claimed in this application, being shown in Letters Patent heretofore issued to me, No. 254,518. In Fig. 6 is shown a rear view of the brace-clamp and cam-lever, and in Fig. 7 a side view of the same, and Fig. 10 is a top view showing the brace bar and rod in cross-section.

The fifth element in my invention is the open-toothed clamp *f*, a rear elevation of which is shown in Fig. 6, wherein the diagonal brace *db* is illustrated, secured by this clamp to the rear brace, *b*. In Fig. 9 is shown a top view with the brace *b* in cross-section. This clamp *f* has teeth on each side and a half-eye in front, and is made with the sides or jaws wider than the closed front portion, and these, being made of malleable iron, are closed together when the clamp is put on, forcing the teeth firmly into the sides of the brace *b*.

The sixth element of my invention is the step-flange *Sf*, which is preferably made of malleable iron, and is shown a front view in Fig. 8, and the manner of securing it to the ladder-step *St*, and the front standard, *F*, and in Fig. 12 is a top view of the same, the part *F* being in horizontal section. This clamp has two small lugs which fit on the inside of the piece *F*, the upper one being shown in Fig. 12. These are used at each corner of each step, four to each step, except on the front corners of the lower step, where the seventh element of my invention, the step-brace flange *Sf*, is used. This is shown in Figs. 11 and 13, the former being a front and the latter a top view of the same. It differs from the step-flanges *Sf* in having an additional diagonal brace extending from the arm on the edge of the step to an arm extended from the main part of the flange down the part *F*, where it is

again fastened for greater security, and this device enables me to dispense with the diagonal and independent braces heretofore used by me, and shown in my earlier patents for supporting the lower step and securing it more firmly to the sides of the pieces F. All these different devices are designed to be used in one and the same step-ladder, and when so used they make a more substantial, neater, and cheaper ladder than any heretofore known or used. And the step-ladder with these devices is an improvement on those described and claimed in the several Letters Patent heretofore issued to me for improvements in step-ladders.

What I claim, and desire to secure by Letters Patent, is the following:

1. In combination with the front step-frame, F, and rear braces, *b*, and foot-board F*b* of a step-ladder, the bracket-brace Br, provided with headed pins for entering the foot-board in its under side, with slotted eye-holes to receive nails for securing such brace to the foot-board, substantially as described.

2. The leg-clamp composed of two parts, *c c'*, and hinged together at the top by the hinge *hu*, substantially as described.

3. The cross-brace *a*, in combination with the brace-bar *ub* and the legs *b*, and secured to the latter, substantially as described.

4. The open-toothed clamp *f*, in combination with the diagonal brace *db* and leg *b*, substantially as described.

5. The open-toothed clamp *f*, substantially as described.

6. The cam-lever *ex*, rigidly attached to a vertical rod, which is parallel with the brace-bar *ub*, and journaled at each end in the brace-clamp *bc*, all combined substantially as described.

7. The step-flange *Sf*, in combination with the step *St* and step-frame F, substantially as described.

8. The step-brace flange *Stf*, in combination with the step *St* and step-frame F, substantially as described.

9. In a step-ladder, the combination of the step-frame F, leg-frame *b*, foot-board F*b*, brace *a*, brace-bar *ub*, bracket-brace Br, and hinged leg-clamp *c c'*, provided with lug *h*, for connection to the bracket-brace, substantially as described.

In witness whereof I have hereunto set my hand this 15th day of June, 1883.

CALVIN G. UDELL.

Witnesses:

C. P. JACOBS,
F. M. CROUSE.