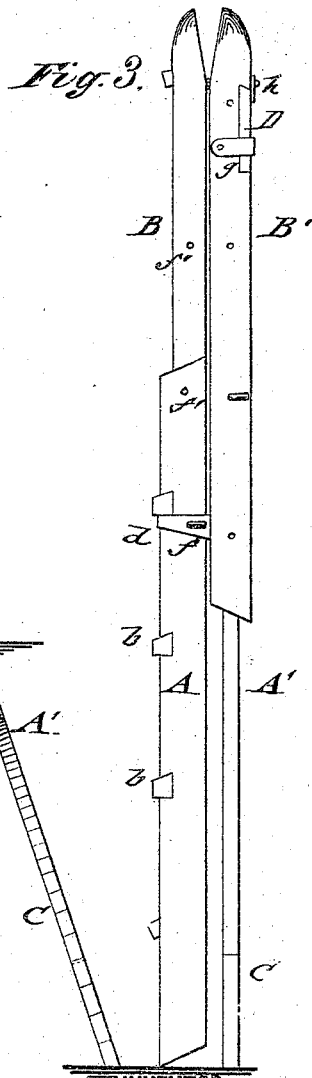
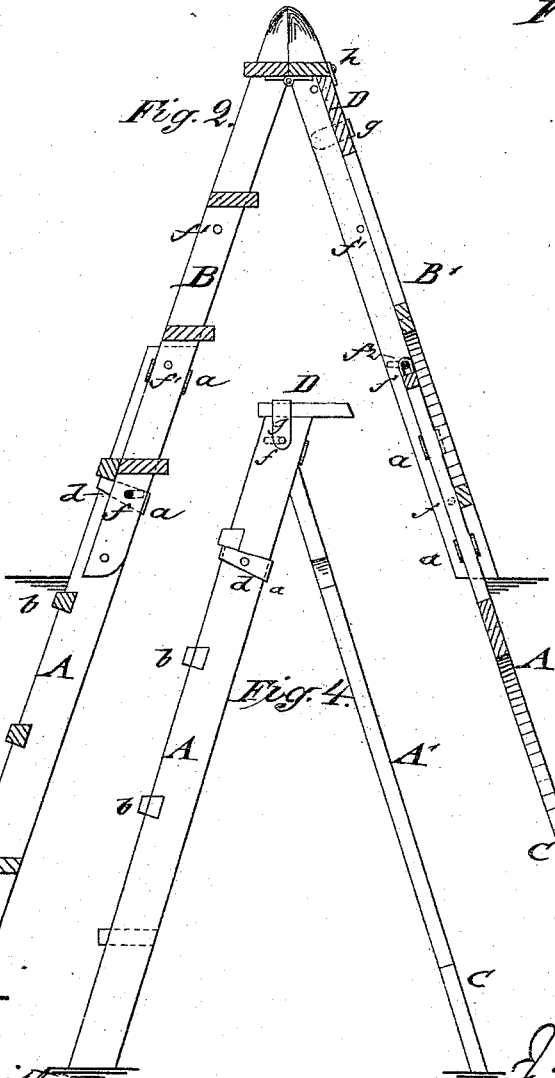
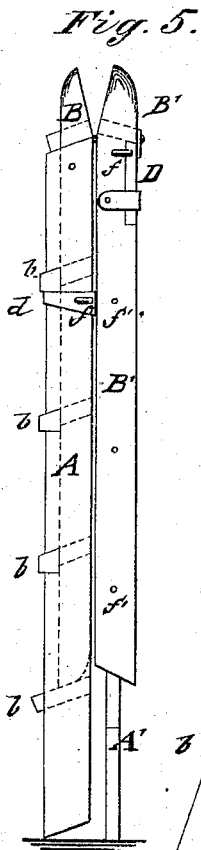
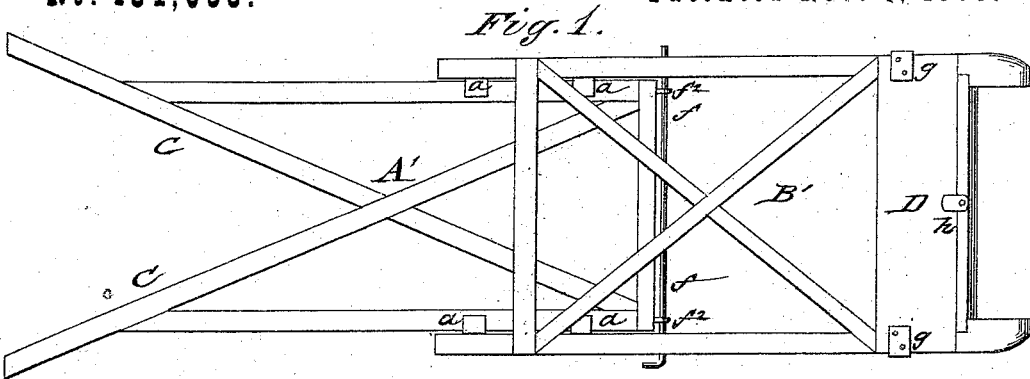


J. DILLON.
STEP-LADDER.

No. 184,066.

Patented Nov. 7, 1876.



WITNESSES:

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UNITED STATES PATENT OFFICE.

JOHN DILLON, OF NEW YORK, N. Y.

IMPROVEMENT IN STEP-LADDERS.

Specification forming part of Letters Patent No. 184,066, dated November 7, 1876; application filed September 22, 1876.

To all whom it may concern:

Be it known that I, JOHN DILLON, of the city, county, and State of New York, have invented a new and Improved Double-Extension Step-Ladder, of which the following is a specification:

In the accompanying drawing, Figure 1 represents a plan view of my double-extension step-ladder; Fig. 2, a vertical transverse section of the same, shown extended in position for use. Fig. 3 is a side view, folded up. Fig. 4 shows a side view of one of the step-ladders of which the extension-ladder is composed in detached state; and Fig. 5, a side view of the folded and telescoped extension-ladder.

Similar letters of reference indicate corresponding parts.

The object of this invention is to provide an extension step-ladder that may be folded up into narrow space, extended to its full length without getting shaky or wobbling, and which may be changed into two separate step-ladders of different height, with great facility, whenever desired.

It forms thereby a compact and convenient step-ladder for house and business purposes, as it may be readily adjusted to different heights required and used, by detaching two ladders for different purposes at the same time.

The step and brace sections of the lower ladder are jointed, when detached, by a lateral hinge-rod and top step, the step-section being made of side pieces with a lowermost full step and short upper steps dovetailed into the sides. The upper part of the side supports of the lower step-section is strengthened by metallic encircling-bands, through the holes of which the connecting-rod of the upper ladder passes. The brace-section is extended at the bottom to greater width than the step-section, and connected by a lateral screw-rod to the brace part of the upper ladder.

Referring to the drawing, A A' represent the lower, and B B' the upper, step-ladder, which form, jointly, my improved extension step-ladder. The lower and upper ladders slide, by means of metallic guide-bands *a*, along each other, namely, the upper step-section inside of the lower step-section, and the lower brace-section inside of the upper brace-

section, so as to form, when folded and slid together, a double step-ladder of very compact shape, that may be readily and conveniently stored with the same facility, taking up even less space than a common single step-ladder. The lower ladder A A' is made higher and stronger than the upper, preferably with five steps, while the upper ladder is made of four, so that by combining them an extension-ladder of from six to eight steps is obtained. The lower ladder, being made stronger, furnishes a greater degree of resistance at the base part of the extension-ladder, instead of making the upper part the heavier part, as is mostly the case in extension-ladders in which the lower part slides outwardly from the upper main part.

The main advantage of my extension-ladder consists in the fact that the upper ladder telescopes into and slides out from the lower, which is accomplished by shortening the steps *b* of the lower ladder, with the exception of the lowermost one, and increasing their cross-section so as to give them the same strength. These shorter steps *b* are dovetailed into the side pieces of the ladder, and leave a space back of the same for the sliding in and out of the upper ladder, as shown in Fig. 2. The steps of the upper ladder are made, for the same reason, with full width, but so as to project at the rear or back, instead of at the front, of the side pieces, as is commonly the case.

For the purpose of giving the side supports of the lower ladder sufficient strength to prevent their splitting in longitudinal direction, the lower step is made of full width, and the side pieces are further stiffened by metallic encircling-bands *d* near the upper parts, so as to give thereby the side pieces the same strength as if all the steps were of the common width. The lower wider step serves also as a stop for the upper ladder when sliding the same down into the lower. The brace part of the lower ladder slides inside of the brace part of the upper ladder, and is made with diagonal pieces *C*, which are extended beyond the side pieces to such length that the brace part is wider at the lower end than the step part, and gives thereby a steady support to the entire ladder, without side shaking or wobbling.

The upper ladder B B' is adjusted to any height, by being moved outwardly and locked by a lateral screw-rod, *f*, that passes through holes of bands *d* and holes *f*¹ of the side pieces of the upper ladder. The brace parts A' B' are connected in similar manner to corresponding height by a rod, *f*, passing through holes *f*¹ of the outer brace part and top staples *f*² of the lower brace part A'. The connecting-rods *f* are rigidly secured, by having eyes at one end and binding screw-nuts at the opposite end, or in any other approved manner. When the upper ladder B B' is pulled out entirely, it forms directly a step-ladder of four steps for common use, the inside top ends bearing against each other, and preventing its spreading open beyond a certain width. The step-section A and brace parts A' of the lower ladder are then connected at the top by one of the rods *f*, which fastens at the same time to a top step, D, provided with perforated side lugs *g*. This top step D is secured, when the ladders are telescoped into each other, to recesses of the side pieces of the upper brace part, by a hinged stop, *h*, as shown in Figs. 1 and 3. The connecting-rods are also passed through any suitable holes of the step or brace parts, to be available as soon as required for extending the ladder. The solid side pieces of the step and brace sections add to the strength of the extension step-ladder, which recommends itself, by the convenience

of its being extended to greater height and by being separated into two independent step-ladders of average size, for store and business purposes and for use in the trades.

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

1. The combination of the lower step-section A, having guide-bands and shortened upper steps, with the sliding upper section B, whose steps project at the back instead of the front, substantially as described.
2. The side pieces of the lower step-section A, being strengthened against longitudinal splitting by the wider lowermost step *b*, and by metallic stiffening-bands *d* at the upper part, substantially as described.
3. The combination of the lower sliding brace part A', having staples *f*², with the upper brace part B', having side holes *f*¹, and with a connecting screw-rod, *f*, substantially as described.
4. The combination of the detachable top step of lower ladder with recesses of side pieces and pivot-stop *h* of upper ladder, to secure the top step when the separate step-ladders are used as extension-ladder, substantially as specified.

JOHN DILLON.

Witnesses:

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