No. 675,744. Patented June 4, 1901.

M. J. LEWIS.

EXTENSION, STEP, AND SCAFFOLD LADDER.

(No Model.) (Application filed May 31, 1900.) 2 Sheets—Sheet 1.

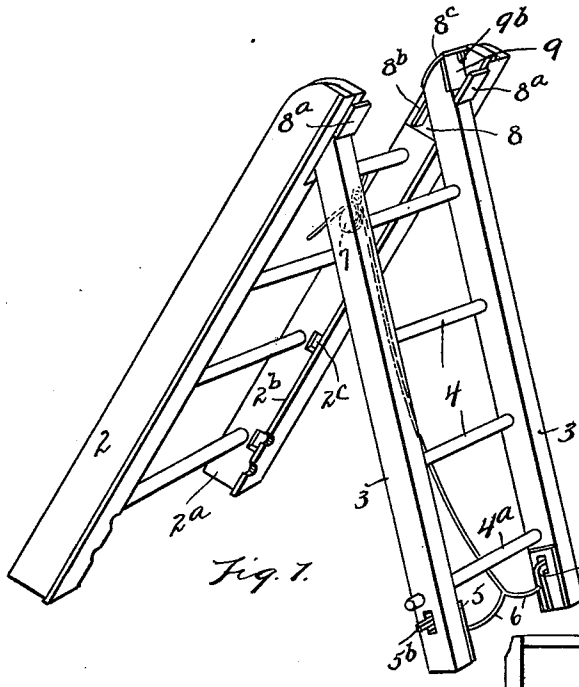


Fig. 1.

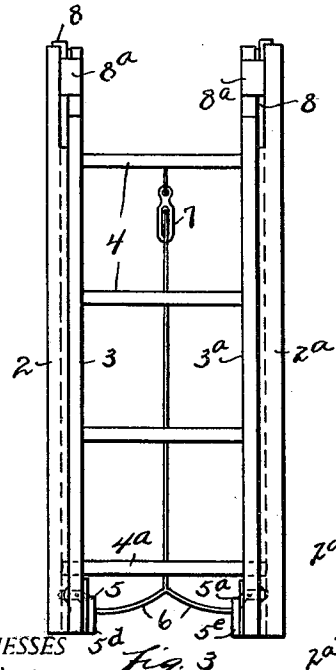


Fig. 3

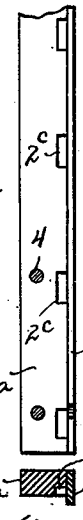


Fig. 4.

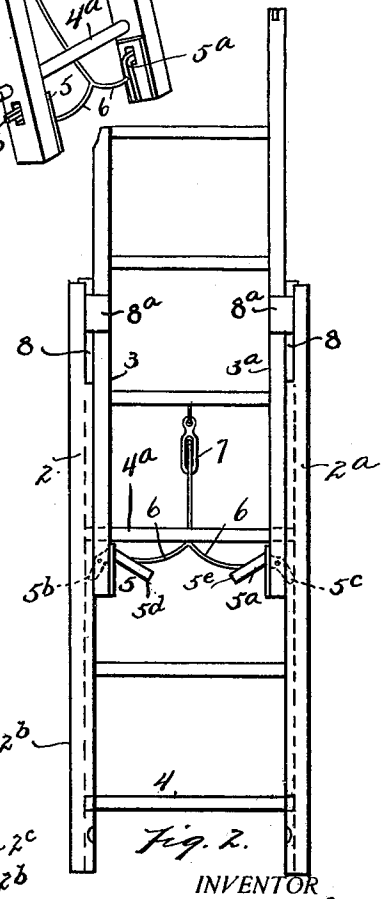


Fig. 2.

WITNESSES

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(No Model.) (Application filed May 31, 1900.) 2 Sheets—Sheet 2.

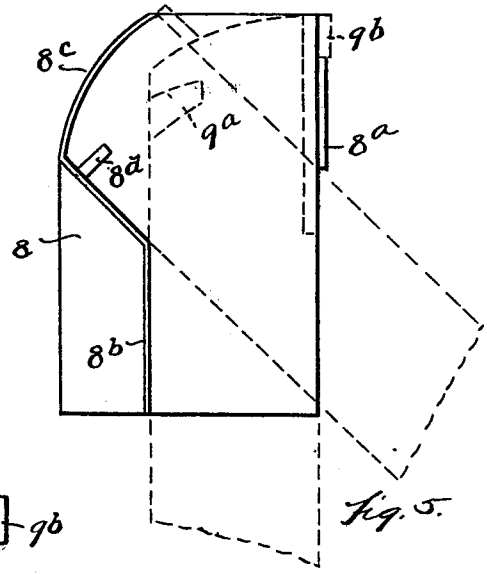


Fig. 5.

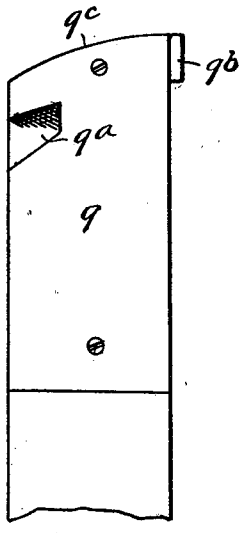


Fig. 6.

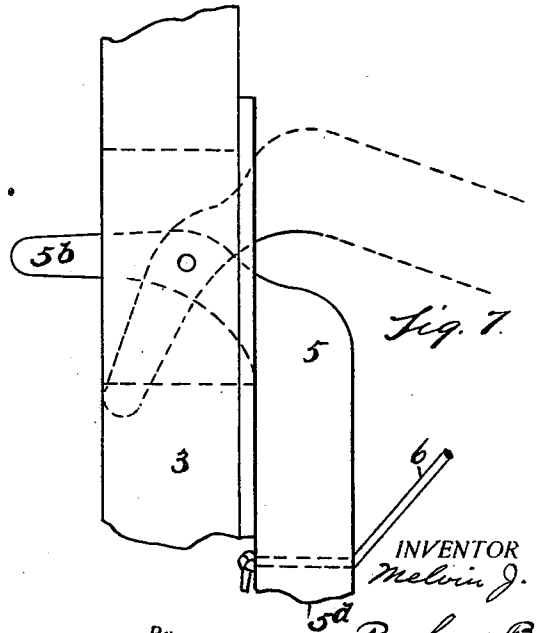


Fig. 7.

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UNITED STATES PATENT OFFICE.

MELVIN J. LEWIS, OF YPSILANTI, MICHIGAN.

EXTENSION, STEP, AND SCAFFOLD LADDER.

SPECIFICATION forming part of Letters Patent No. 675,744, dated June 4, 1901.

Application filed May 31, 1900. Serial No. 18,481. (No model.)

To all whom it may concern:

Be it known that I, MELVIN J. LEWIS, a citizen of the United States, residing at Ypsilanti, county of Washtenaw, State of Michigan, have invented a certain new and useful Improvement in Extension, Step, and Scaffold Ladders; and I declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to ladders, and has for its object an improved form of ladder which may be used as an extension-ladder, step-ladder, or scaffold-ladder.

In the drawings, Figure 1 shows the ladder spread as a step-ladder or a scaffold ladder. Fig. 2 is a front elevation showing the ladder as an extension-ladder. Fig. 3 is a front elevation showing the ladder closed in compact form. Fig. 4 is an inside view of the side rail of the larger one of the two parts of the ladder. There is also in Fig. 4 a small cross-sectional view at one of the mortises. Fig. 5 is an enlarged detail showing the coupling-irons at the tops of the two parts of the ladder. Fig. 6 is an enlarged detail of the coupling-iron at the upper end of the inner or smaller one of the two ladders. Fig. 7 is a detail of the holding-dog.

The ladder is made in two parts which are at times separable, but which in certain positions of the ladder are so interlocked as to be securely held together until the position is changed, and when spread in the position shown in Fig. 1 the ladder may be used safely for either a scaffold-ladder or a step-ladder. When the bottoms are brought together, the two parts are still engaged together and can slide longitudinally the one to the other, so that the two parts now become an extension-ladder and cannot be disengaged unless one slides entirely out endwise from its engagement with the other. In this condition the extension-ladder is held by dogs which are pinned to the inner ladder and engage in mortises in the outer ladder and which securely hold the extension-ladder in its extended condition. The two dogs are, however, easily and simultaneously disengaged from the mortises, and the two parts can then be slid together into the condition shown in Fig. 3.

The outer ladder has two side rails 2 and 2^a. Each side is provided with an overhang-strip 2^b, the overhanging edge of which extends toward the middle line of the ladder, and each outer rail is provided with a number of mortises 2^c, the purpose of which is to hold the ends of the dogs hereinafter mentioned. The two side rails 2 and 2^a are parallel. The inner or smaller section of the ladder is also composed of two side rails 3 and 3^a, held together and spaced by the rungs 4, and at the bottom of each inner rail is pinned a dog 5 5^a, which has the form or shape of a bent lever, the pin of which passes through holes near the elbow of the lever. The inner ends 5^b and 5^c are arranged to engage in the mortises 2^c. The free ends 5^d and 5^e may be considered as weights that normally tend to drop and throw the engaging ends into the mortises. To each of these weight ends is secured a cord 6, that passes up over a sheave 7, which hangs from the upper rung of the larger section of the ladder. The dogs are actuated to disengage them by pulling this cord. They automatically engage in the mortises.

The lower rung 4^a of the inner ladder extends to the outside of each side rail, and the overlapping strip 2^b is provided near its bottom end with notches, through which these projecting ends may pass and the ladder be spread to the form shown in Fig. 1.

In all other positions of the ladder than the one shown in Fig. 3 and the one shown in Fig. 1 the ends of the rung 4^a hold the inner ladder from escaping beyond the side pieces 2^b, while they permit the two parts to be extended longitudinally.

The junction-irons at the top are shown in Figs. 5 and 6. The iron on the outer or larger section is a plate 8^c, that extends toward the middle line of the ladder. The projection 8^a lies approximately flush with the front face of the side rail of the ladder. The projection 8^b lies about in the line of the rungs and is spaced from the projection 8^a the width of the side rail of the inner ladder. Its upper edge is below the lower edge of the projection 8^a to allow for the desired spread of the lower ends of the two parts of the ladder.

The projection 8^b is continued diagonally upward and backward to the back of the plate 8 and there joins the projection 8^c, which continues in an arched form upward and forward to a point directly over the upper edge of the projection 8^b. A lug 8^d extends from the plate 8, forming a branch from the diagonal part of the extension 8^b, and this lug 8^d is somewhat below the meeting-line of the diagonal part and the arched part of the extension. The coupling-iron on the inner section of the ladder is a plate 9, provided with a recess 9^a near its upper part and opening into it from the back. It is provided also with a lug or hook 9^b at its front upper edge, and its upper edge is curved to correspond with the arched projection 8^c. The two coupling-irons thus described interlock, so that the upper edge 9^c rests against the curved face 8^c, with the recess 9^a engaging over the lug 8^d. The front face of the inner ladder engages against the under side of the projection 8^a. The rear face engages against the oblique extension between 8^b and 8^c, and the parts are securely locked together. They cannot be drawn apart until the bottom ends have been closed together sufficiently to disengage the recess 9^a and the lug 8^d. When this disengagement has been effected and the lug 9^b has come into engagement over the extension 8^a, the two parts cannot be disengaged by drawing the inner ladder downward. The inner ladder can be pushed upward and the entire ladder extended, and the inner ladder can be drawn out from the outer ladder by pushing it upward or in the direction of extension; but the two parts cannot be disengaged in the other direction. Whenever the ladder is in an upright position and the one part is extended above the other, the holding-dogs 5 and 5^a constantly tend, because of their weighted ends, to engage in the notches and to lock the parts. The dogs must be forcibly disengaged by lifting the weighted ends of the levers either with the cord or in some other way.

What I claim is—

1. A folding and extension ladder, comprising a coupling-iron on the one part provided with parallel guide projections, an arched abutment projection, and a diagonal bearing projection joining the arched projection and one of the guide projections, substantially as described.

2. A folding and extension ladder comprising a coupling-iron on the one part provided with parallel guide projections, an abutment projection lying in a slanting direction with reference to the ladder, a diagonal bearing projection joining the slanting projection and one of the guide projections, and a lug upon one part adapted to extend into a cavity on the other part when the two parts are spread, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

MELVIN J. LEWIS.

Witnesses:
ZINA RUCK,
DARWIN C. GRIFFEN.