(No Model.)

R. DENGEL.

EXTENSION STEP LADDER.

No. 524,195. Patented Aug. 7, 1894.

FIG. 1.

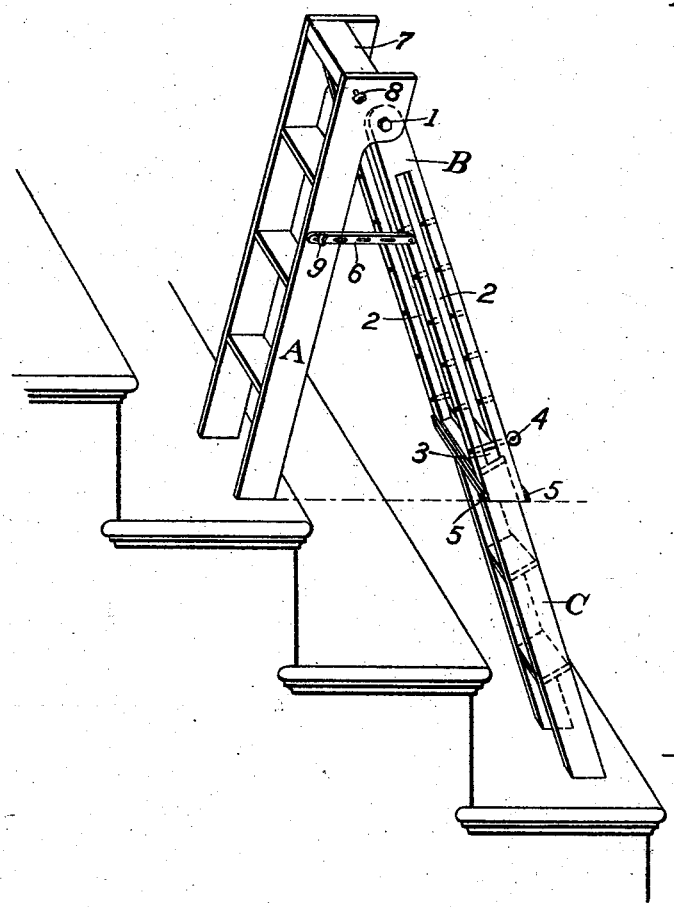
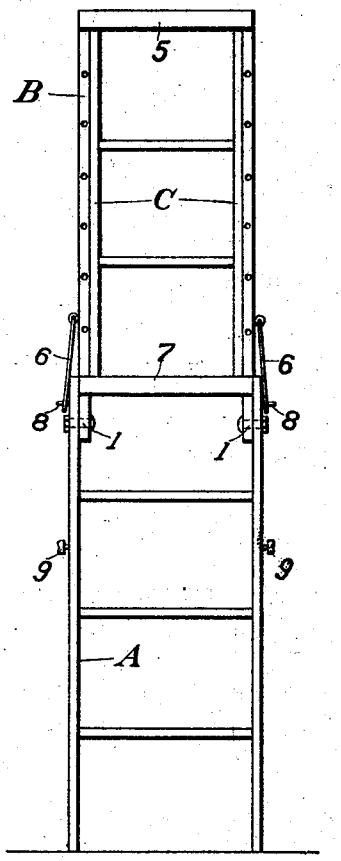


FIG. 2.



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UNITED STATES PATENT OFFICE.

RUDOLPH DENGEL, OF BROOKLYN, NEW YORK.

EXTENSION STEP-LADDER.

SPECIFICATION forming part of Letters Patent No. 524,195, dated August 7, 1894.

Application filed April 6, 1894. Serial No. 506,540. (No model.)

To all whom it may concern:

Be it known that I, RUDOLPH DENGEL, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Extension Step-Ladders; and I do 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 appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to extension step-ladders and it is designed especially for the use of electric wiremen and others in positions impracticable for the ordinary step-ladder; for example, on stairways or upon sloping galleries in theaters. It is further adapted to be turned into and used as a straight ladder.

The invention consists essentially of three main co-operating sections, two of which are pivoted together at the ends and the third moves up and down between the sides of the second section as more fully hereinafter described.

In the accompanying drawings like characters represent the same parts in the different views.

Figure 1 is an outline perspective showing the invention extended for use upon surfaces in different planes, and Fig. 2 presents the device when turned into a straight ladder.

A, B and C are the three main sections, of which A is provided with steps of the customary construction except the topmost step, 7, which is very much heavier and stronger than the others. The side boards of section A are widened from a point near the top upward and furnish bearings in the added width, somewhat below the top of said side boards, for the stout pivot roll, 1. With its upper ends between the widened parts of the side boards of sections A, and upon the roll, 1, as a pivot there swings the section, B, having longitudinal slots extending through the greater part of the length of the side boards of this section. In the direction of their width said side boards are pierced with holes through which the eye bolts or pins, 4, pass across the said slots for the purpose more fully explained in the following paragraphs. Section B possesses no steps and to preserve its rigidity two stiff cross pieces, 5, connect the slotted side boards at the extreme lower ends; said cross pieces serving the additional purpose of guides for the edges of the side boards of section, C. This third section, C, is less in width than and movable between the slotted sides of said section, B, and is provided with steps so placed, with relation to the side boards, that when the invention is turned to form a straight ladder all the steps of A and C will fall in practically parallel planes. Midway and lengthwise of the step connecting the extreme upper ends of the side boards of section C, and securely fastened thereto, is the thick cross bar, 3, exceeding in length the width of section C by enough to pass well through the slots in the side boards of B.

Considering the mode of operation, section C being entirely inclosed within B, the ladder is adapted for a level surface and the angle between A and B is governed and maintained by slotted straps, 6, one upon each side of the ladder, pivotally attached to B and fastened by simple cross nuts upon A as shown at 9 in Fig. 1. It being desired to place the ladder upon a stairway, section C is dropped until such length is attained as will allow for the difference in levels of the stairs, when the eye-bolts, 4, are passed through the holes in the slotted sides of B above the cross bar, 3, limiting the return of C within said section B. The cross pieces, 5, in connection with and aided by the bearing of the ends of the cross bar, 3, against the sides of the slots, 2, hold the two sections B and C in proper alignment. It being desired to turn the invention into a straight ladder, sections B and C are closed one within the other, or partly so, and both are swung upward upon the pivot roll, 1, until their edges meet the heavy step, 7, which is fashioned of such material and strength as to easily resist the pressure of said edges against it. My construction is such that the slotted strap, 6, again becomes available and locks the ladder in its straight form by means of other cross nuts upon A at 8.

All the parts of my step ladder are intentionally of the simplest description and designed to be made of such strength as to with-

stand successfully the rough usuage to which such articles are constantly subjected.

I am aware that step-ladders have been made adapted to be used upon stairways and inclines, and to be turned into straight ladders and with such constructions in view—

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

1. In an extension step ladder consisting of three main sections, the section, A, provided with steps and top-widened side boards, the section, B, pivoted to A near the top and having side boards slotted lengthwise for the admission and guidance of the cross-bar, 3, attached to the uppermost step of section, C, said section, C, movable up and down between the slotted sides of B, said motion being limited by pins, 4, transversely piercing the side boards of B, the whole so constructed and arranged as to be used upon levels or inclines and adapted to be turned into a straight ladder capable of variations in length substantially as described.

2. In an extension step-ladder the combination of the section, B, having slotted side boards pierced with holes for the insertion of the eye-bolts and provided with the stiff cross pieces, 5, as shown and described, with the section, C, moving between the slotted sides of B; said section C having securely fastened upon its topmost step a heavy cross bar, 3, the ends of which travel in the slotted sides of B and are governed by said eye-bolts or pins as hereinbefore described for the purposes set forth.

3. In an extension step ladder consisting of three main sections, the combination of the section, A, having side boards widened at and near the top and provided with steps, the topmost of said steps, 7, being thicker and stronger than the rest and less in width than the side boards at that point; the section, B, pivotally attached to A at 1, and possessing side boards with lengthwise slots, 2, transverse orifices for the insertion of pins, 4, the cross-pieces, 5, the slotted braces, 6, adapted to be fastened by the cross-nuts at 8 and 9 upon A; the third section, C, movable between the sides of B and provided with steps as described, the cross-bar, 3, upon the uppermost of said steps, extending into and movable along slots, 2, of section B, said motion limited by said pins, 4, the whole constructed and arranged to be used upon levels or inclines and as a straight ladder the length of which may be varied substantially as specified.

4. In an extension step-ladder consisting of three main sections in combination, the section A provided with steps the topmost step being of extraordinary thickness and strength, and having side boards widened near the top and pivotally attached to the section, B, of the construction shown, and the section, C, provided with steps and the heavy cross bar, 3, and adapted to move between and within the slotted sides of section B; the whole constructed and arranged to be used upon level surfaces, stairways or inclines and turned into a straight ladder substantially as shown and described.

In testimony whereof I affix my signature in presence of two witnesses.

RUDOLPH DENGEL.

Witnesses:

GEO. VAN BENSCHOTEN,

LOUIS DUDLEY MARTENS.