

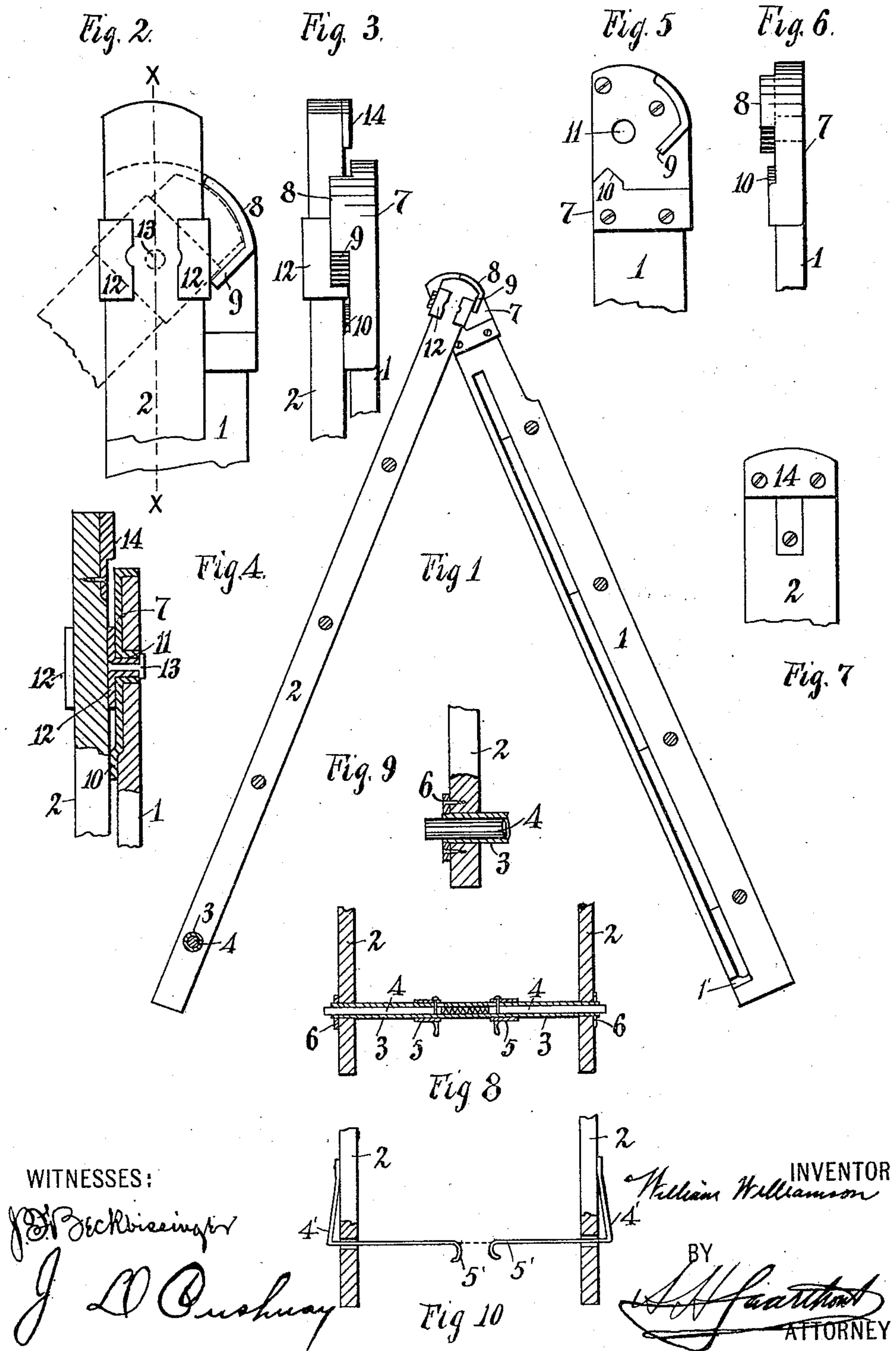
No. 640,611.

Patented Jan. 2, 1900.

W. WILLIAMSON.  
COMBINED STEP AND EXTENSION LADDER.

(Application filed June 12, 1899.)

(No Model.)





# UNITED STATES PATENT OFFICE.

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## COMBINED STEP AND EXTENSION LADDER.

SPECIFICATION forming part of Letters Patent No. 640,611, dated January 2, 1900.

Application filed June 12, 1899. Serial No. 720,206. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM WILLIAMSON, residing at Saginaw, in the county of Saginaw and State of Michigan, have invented certain new and useful Improvements in a Combined Step and Extension Ladder; 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 figures of reference marked thereon, which form a part of this specification.

My invention relates to combined step and extension ladders, and is an improvement on Letters Patent No. 542,308, issued July 9, 1895, and comprises certain novel features of construction, arrangement, and combination whereby certain important advantages are attained and the device made more durable and better adapted for use.

Figure 1 is a section of inside of ladder in elevation. Fig. 2 is a detail of the upper end of the ladder. Fig. 3 is a side view of Fig. 2; Fig. 4, a section on line  $x x$  of Fig. 2. Figs. 5 and 6 are details of plate 7; Fig. 7, a detail of plate 14; Fig. 8, a section through lower end of inner section of the ladder; Fig. 9, a detail of part of same; Fig. 10, same view, showing parts differently constructed.

The general outline of the frame of my ladder is the same as in the Letters Patent above mentioned, 1 being the outer section and 2 the inner section; but the hinge joining the two sections for the purpose of spreading them and forming a step-ladder is different. This hinge consists of two parts, the plate 7 and the strap or guide 12, 7 being secured to the outer section and 12 to the inner. The strap 12 has a laterally-extending lug 13, adapted to fit into the hole 11 in the plate 7 and pivot the strap and its section 2 of the ladder to the plate 7 and its section 1. The plate 7 has along its front edge and projecting inward the lug 8, which may be curved, as shown, or of any other shape to correspond with the end of the section 2. The lug 8 has a continuation 9 extending diagonally across the plate 7 for the proper distance. These lugs may, however, be separate. Their use is to limit the movement of the strap 12 on the plate 7, or,

in other words, to form a stop for the spread of the ladder when used as a step-ladder, the upper lug 8 preventing the section 2 from shoving upward and the lug 9 limiting the spreading of the parts. 10 is another lug on lower part of plate 7 and at right angles to lug 9 and engages the lower edge of strap 12 when the ladder is spread, the three lugs 8, 9, and 10 forming thus a seat for the strap or guide 12 when the ladder is spread. The strap 12 is so formed as to be a guide through which the sides of section 2 pass when the ladder is extended. 14 is a plate secured to the outside of the upper end of the side pieces of section 2, and the lower edge of this plate engages the upper edge of strap 12 when the section is down, thus preventing its withdrawal from the strap or guide.

In Figs. 8 and 10 I have illustrated my improved means for holding section 2 in its adjusted position and for adjusting it. 3 is a tube extending from side to side of section 2 and is provided with washer 6 on each end outside of the section, which washer may be secured to the side of the section. In the tube 3 are the spring-actuated rods 4 4, adapted to pass beyond the ends of the tube and enter slots in the section 1. 5 5 are sleeves on the tube 3 near the middle thereof and secured to the rods 4 4 by screws passing through slots in the tube 3 for that purpose. Depending from these sleeves are the thumb-pieces, which may be grasped by the hand and by pressing them together compress a spring lying in the tube between the end of the rods 4 4, and thereby withdraw the ends of the rods 4 4 from the slots in section 1 and permit section 2 to be moved. In the lower end of section 1 is a slot 1', through which the ends of the rods 4 4 pass when the sections are spread apart. In Fig. 10 I show another means of adjustment comprising the spring-rods 4', secured to the outside walls of section 2 and extending through the walls at right angles, terminating in the thumb-pieces 5' near together, whereby by pressing the thumb-pieces together with the hand the angle formed by bending the spring-rods inward will be withdrawn from the slots in the wall of section 1 and permit section 2 to be adjusted.

It will be seen from the above that other



forms of adjustment may be devised without materially departing from the means illustrated.

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

1. In combination with a step and extension ladder a hinge for the same comprising the plate 7 adapted to be secured to the outer section of the ladder, and having on its inner surface lugs adapted to limit the movement of the inner section, and the guides 12 having a laterally-extending lug entering a hole in the plate 7 whereby the guide is pivoted thereto, the guides holding the section 2, as and for the purpose set forth.

2. In a step and extension ladder, the combination of the outer and inner ladder-sections, means for hinging said sections together at their upper ends, and for permitting the inner section to be raised, comprising a plate secured to the outer section, a guide for the inner section pivoted upon the plate, a lug upon the plate limiting the rotary movement

of the guide, a stop upon said plate limiting the upward movement of the inner section, and means for preventing the downward movement of said latter section.

3. In a step and extension ladder, the combination of the outer and inner ladder-sections, means for hinging said sections together at the upper ends and for permitting the inner section to be raised, comprising a plate fixedly secured upon the inner face of the outer section, a rigid strap pivoted upon the plate said strap partly encircling the side of the inner section and constituting a guide for the latter, lugs upon the plate limiting the rotary movement of the strap and the upward movement of the inner section, and means upon the inner section for preventing its withdrawal from the strap.

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

WILLIAM WILLIAMSON.

Witnesses:

A. H. SWARTHOUT,  
C. E. JACKSON.