

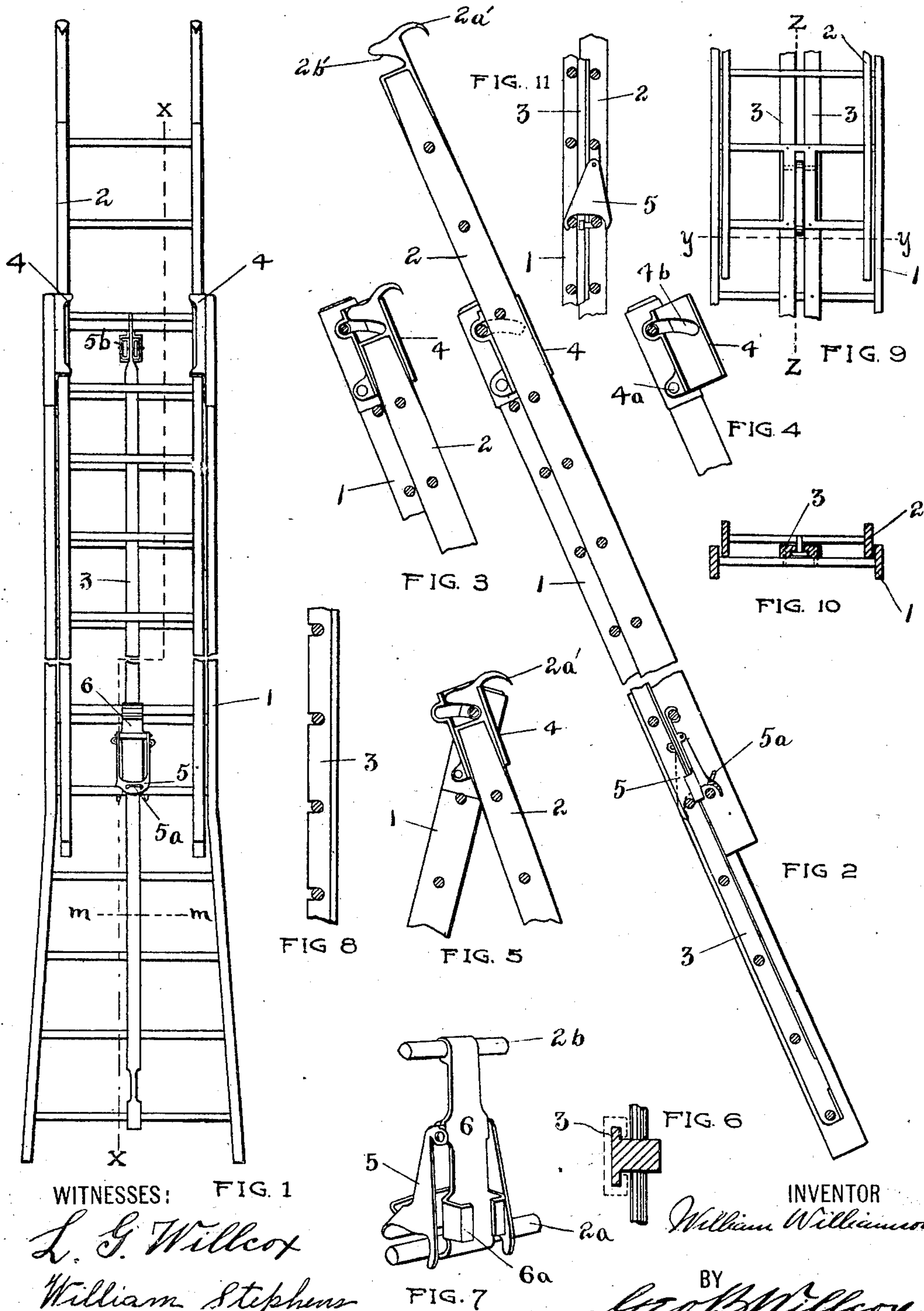
No. 674,950.

Patented May 28, 1901.

W. WILLIAMSON.
COMBINED EXTENSION AND STEP LADDER.

(Application filed Oct. 25, 1900.)

(No Model.)



WITNESSES: FIG. 1

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FIG. 7

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WILLIAM WILLIAMSON, OF SAGINAW, MICHIGAN.

COMBINED EXTENSION AND STEP LADDER.

SPECIFICATION forming part of Letters Patent No. 674,950, dated May 28, 1901.

Application filed October 25, 1900. Serial No. 34,302. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM WILLIAMSON, a citizen of the United States, residing at Saginaw, in the county of Saginaw and State of Michigan, have invented certain new and useful Improvements in a Combined Extension and Step Ladder; and I do hereby 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.

My invention relates to ladders, and more particularly to combined or convertible extension, scaling, and step ladders.

The improvements consist in certain means and devices whereby the objects of my invention are attained. These objects are, first, to provide a combined step-ladder and extension-ladder that shall be simple in construction, combining lightness and strength with ease of adjustment; second, to provide a central guide for the extension member to strengthen the ladder and prevent binding; third, to provide a combined socket and joint of simple construction that will both support the ladder when used as an extension member and lock it in standing position when it is used as a step-ladder, and, fourth, to provide an automatically-locking catch for securing the extension member to the bottom member at any desired height.

My invention is illustrated in the accompanying drawings, throughout the several views of which similar characters of reference designate corresponding parts and devices.

Figure 1 is a front elevation showing my improved ladder used as an extension-ladder. Fig. 2 is a vertical section on the line $x x$ of Fig. 1. Fig. 3 is a detail of the combined socket and joint, showing the upper and lower ladder-sections telescoped. Fig. 4 is a detail of the socket secured to the upper end of the lower ladder-section. Fig. 5 is a detail showing the position of the socket when the ladder is locked in position as a step-ladder or scaffold-support. Fig. 6 is a transverse section through the central guide on the line $m m$ of Fig. 1. Fig. 7 is a rear perspective view of the catch for automatically locking the upper and lower members together when the upper member is used as an extension. Fig.

8 shows a method of securing the central guide to the rounds. Fig. 9 is a slightly-modified arrangement showing two central guides with a central catch between. Fig. 10 is a section on the line $y y$ of Fig. 9. Fig. 11 is a section on the line $z z$ of Fig. 9.

As is clearly shown in the drawings, the ladder consists in a lower ladder 1 and an upper ladder 2, narrower than the lower ladder, so that it may slide between the sides of the lower ladder. A central guide 3 extends the length of the lower ladder and is secured thereto by passing the rounds through holes in the guide, as shown in Fig. 2, or by slotting the guide to fit the rounds, as in Fig. 8.

At the upper end of the lower ladder two guides 4 are secured, through which the sides of the extension member 2 slide. The construction and operation of these guides or channels will be more fully described later. To secure the extension member at any desired elevation, I provide the locking device shown in detail in Fig. 7. It consists in a vertical swinging tongue or catch 5, carried by the upper or extension ladder, and preferably secured thereto by being pivoted to a band or strap 6, fixed to the two bottom rounds. The lower end of catch 5 is of suitable form to embrace a round of the extension-ladder and a round of the lower ladder at the same time, as is shown in Fig. 2. When the extension member is being elevated, the catch 5 rides loosely over the rounds of the lower member without engaging them. When once engaged in the two rounds, it cannot be released except by slightly raising the extension member and pulling the latch outwardly by means of its handle 5^a. This may be accomplished by pulling a cord attached to the handle and passing around a pulley 5^b at the upper end of the lower member. For the sake of clearness this cord is not shown in the drawings.

In practice I prefer to mount the catch as shown in Fig. 7, where 2^a and 2^b are the first and second rounds of the extension member, to which the strap 6 is fixed. This strap carries a pair of slides 6^a, preferably formed integral with it, adapted to embrace the central guide 3, which is provided with a T-head for the purpose, as in Fig. 6.

The ladder is capable of being used as a

step-ladder or scaffold-support by sliding the extension member down upon the lower member and then separating their bases. The two members are locked in position automatically and cannot be displaced until their bases have been brought together. This is accomplished by means of the guides 4, the construction of which is shown in Figs. 1 and 4. The guide consists of a channel in which the side of the upper ladder may slide longitudinally. The channel is secured by a pivot 4^a near its lower end to the side of the lower ladder, and its motion is limited by a circular slot 4^b, formed in the guide and embracing the top round of the ladder. When the upper ladder is extended, as in Fig. 2, the side 2 locks the channel in position; but when the upper ladder is telescoped upon the lower ladder, as in Fig. 3, the member 2 may be swung out to form a step-ladder, as in Fig. 5.

To prevent the member 2 from becoming disengaged by sliding through the channel, I provide hooks 2^{a'} upon the upper end of the member 2. These hooks are also available as scaling-hooks when the upper member is used as a scaling-ladder. A projection 2^{b'}, having its under side curved to the same radius as the slot 4^b, is formed opposite the hook 2^{a'} to engage the round when the ladder is used as a step-ladder.

The central guide 3, which may be a single T-bar, as shown in Fig. 6, or two parallel L-bars, as shown in Fig. 10, serves not only to strengthen the ladder, but it avoids binding between the upper and lower members due to warping or other distortion.

It will be noticed that the extension-ladder 2 is supported at three points, two at the top of the lower member and one central point at the bottom of the extension member, where it is clamped to the lower member and supported by the catch 5.

By the means above described I have produced a thoroughly practical ladder that can be quickly adapted for use as a scaling-ladder, an extension-ladder, a step-ladder, and a

scaffold-support, as well as other uses that ladders are put to.

What I claim is—

1. In a combined extension and step ladder comprising a lower ladder-section and an extension-section, the combination of a pair of guides of substantially U-section pivoted to the upper ends of the lower ladder-section and arranged to slidably engage the sides of the extension-section, said guides having curved slots embracing a round of the lower ladder-section, whereby the movement of the guides is limited; and curved projections upon the upper ends of the extension-section arranged to register with the curved slots of the guides when the extension-section is in its lowered position, whereby the sections may be locked together when their lower ends are separated, substantially as described.

2. In a combined extension and step ladder, the combination with a lower ladder-section and an extension-section longitudinally movable thereon and a pair of channel-guides carried by the sides of the lower section at its upper end and slidably engaging the extension-section; of a central guide-bar extending the length of the lower ladder-section and secured to the rounds thereof by passing the rounds through the guide-bar; of a strap secured to the two lower rounds of the extension member and a pair of slides formed integral with the strap and adapted to engage and slide along the central guide-bar; of a catch pivotally mounted on the strap and arranged to override the rounds of the lower section when the extension-section is pushed up, and to simultaneously engage a round of each section when the extension-section is lowered.

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

WILLIAM WILLIAMSON.

Witnesses:

GEO. B. WILLCOX,
WILLIAM STEPHENS.