F. H. MOULTON.

EXTENSION LADDER HOOK.

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1,045,165.

Patented Nov. 26, 1912.

FIG. 1

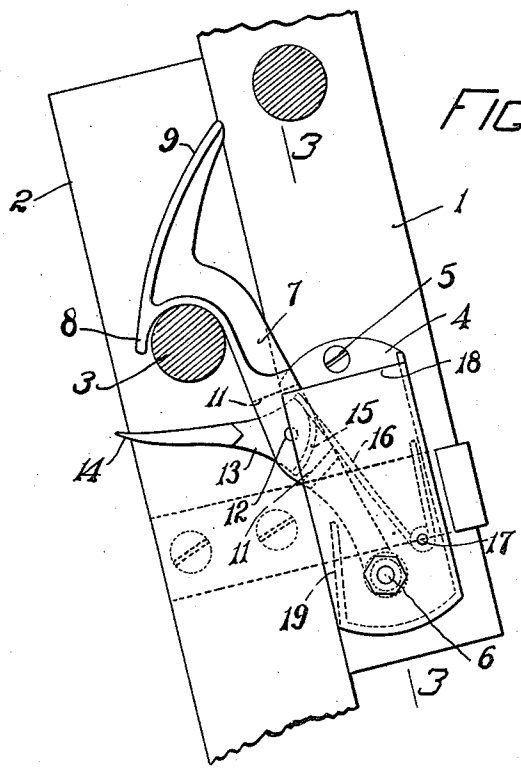


FIG. 2

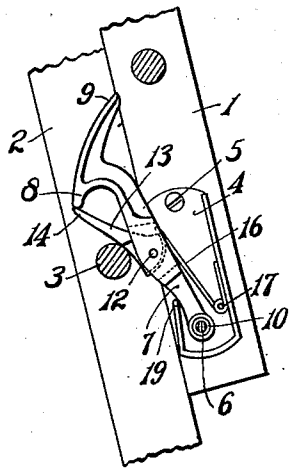
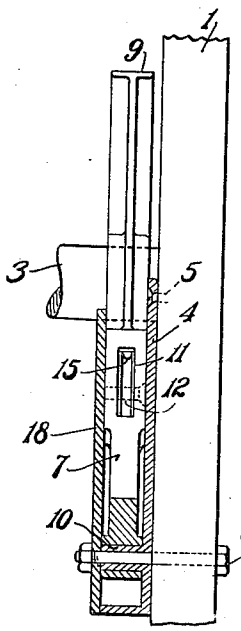


FIG. 3



WITNESSES

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EXTENSION-LADDER HOOK.

1,045,165. Specification of Letters Patent. Patented Nov. 26, 1912.

Application filed March 23, 1911. Serial No. 616,311.

To all whom it may concern:

Be it known that I, FRED H. MOULTON, a citizen of the United States, residing at Lexington, county of Middlesex, Commonwealth of Massachusetts, have invented certain new and useful Improvements in Extension-Ladder Hooks, of which the following is a specification.

This invention relates to hooks for extension ladders and similar devices. In the construction of hooks for this purpose it is greatly desired to have a construction which will afford an effectual and positive engagement in the downward bearing of the ladder when in gripping relation and a corresponding freedom from engagement during the retraction of the upper section of the ladder while it is being lowered, as well as a great strength to meet the strains to which it is subjected.

In discussing my present invention I shall refer to it particularly in connection with extension ladder usage, as this best illustrates the principles of the invention. In such an instance it is particularly desired that the catches ride freely over the rounds as the upper section of the ladder is run up, but, that they be adapted to positively catch on any round when the upper section of the ladder is sufficiently extended and that they be capable of accurate centering on that portion of any round with which they find engagement. It is furthermore desired that upon the release of the catch the upper section of the ladder may be run down freely without liability of the hooks again engaging. I accomplish this result by a certain construction and arrangement of hooks and in the combination of the same with a pivoted latch adapted to coöperate therewith in the downward movement.

The construction and operation of this device will be more fully described in the specification which follows. In the drawings which form a part of that specification I have shown as an illustrative embodiment a form of device which I have found well adapted to practical use in extension ladder construction.

Throughout specification and drawings like reference numerals are employed to indicate corresponding parts and in the drawings:—Figure 1 is a sectional view of a portion of an extension ladder showing one of the side hooks in engagement with a round, Fig. 2 is a similar view showing the hook in retracting position, and Fig. 3 is a section on the line 3—3, Fig. 1.

The usual extension ladder consists of two or more simple ladders slidably mounted together. In the drawings I have merely indicated the lower end of the upper section of the ladder and the upper end of the next lower ladder.

The side pieces 1 of the upper section of the ladder are slidably mounted on the side pieces 2 of the lower ladder, in any suitable way, as by the straps indicated in Fig. 1. On the inner faces of the sides 1 of the upper section of the ladder I locate my hook or catch. This consists of a plate 4 which is attached by screws 5 to the ladder sides 1 and a cover 18 which rests upon the surrounding flange of the plate 4 to protect the parts of the hook and return them in place. On the plate 4 I form an integral tubular stud or extension which has an opening for a bolt 6. There is a corresponding opening formed in the face of the plate at 8, so that the bolt 6 may be passed through the plate 18, through the tubular stud 10 upon which the shank 7 of the hook 8 is pivoted, and through the side 1 of the upper section of the ladder. This not only holds the plate 18 in place but affords a strong and sure pivot for the hook, so that even if the stud 18 should wear away or break off the ladder could not collapse and the hook would still be held by the bolt 6.

Upon the upper end of the shank 7, and above the hook 8, is formed a cam shaped ear 9 which is adapted to strike against the

rounds 3 of the lower ladder to throw back the hook 8 during the raising of the upper section of the ladder 1.

The hook 8 is normally thrown forward in the position shown in Fig. 1 by a spring 16 coiled at its middle about a pin 17 set on the plate 4 and having its rear end confined by the flange of the plate 4.

The shank 7 of the hook is slotted about midway of its length, and within the slot is pivoted the reduced end 13 of a latch 14. This latch is of sufficient length so that when it is thrown upward it will cover the tip of the point 8. On the opposite side of the pivot 12 of the latch the end of the latch is rounded, as at 15, in the form of a double cam. This cam is grooved to guide the end of the spring 16 which bears upon it. The spring 16, therefore, normally holds the latch 14 at substantially right angles to the shank 7.

The flange 19 of the base plate 4 which extends part way up the inner edge of the plate is so proportioned and locked as to afford a stop for the pivoted shank 7. The arrangement of this flanged stop is such that the hook 8 is allowed to be advanced so that it will stand normally slightly beyond the flange center of the rounds 3. This is for the reason that the rounds 3 in the ordinary commercial ladder will not be absolutely uniformly made, due to slight inaccuracies in turning and in positioning, or, to occasional subsequent warping.

It is very desirable that the hook 7 should be capable of centering itself on each end of any one of the rounds, so that the hook will secure a full and complete bearing upon the round. For this reason I provide for a normal forward positioning of the hook 8 in the direction opposite to its line of retreat under the action of the cam ear 9. It will be seen by reference to Figs. 1 and 2 that the end of the spring 16 not only actuates the latch 14 but also the shank 7 of the hook.

The operation of my device is as follows: Suppose that the hook be in engagement, as shown in Fig. 1, and it be desired to still further raise the upper section of the ladder 1. If the upper section of the ladder 1 be pushed up the hook 8 will be raised from the round 3 and the latch 14 will be brought against this round. As the latch is freely pivoted, however, it will yield, forcing back if necessary the lever 7 to secure a complete disengagement with the round 3. After the round 3 is passed, if there should be another round above it with which engagement is desired, a continued raising would bring the ear 9 against said next round. On account of the cam shape of the ear 9 the hook would be forced back until the point 8 of the hook cleared the top of the round, when the spring 16 would throw it forward to complete the hooking movement and full engagement would be made by letting the upper section of the ladder settle in place. If after the latch 14 had passed the round 3 it were desired to retract the upper section of the ladder 1, the downward motion would be started until the parts reached the position shown in Fig. 2, in which the under side of the latch 4 is in engagement with the round 3. In this position the latch covers the point of the hook 8 and the upper section of the ladder 1 may be drawn past the round 3 without any possibility of making an engagement of the hook 8 with the round.

As each round is encountered in the downward movement the latch 14 is first met and thrown against the point 8, so that the entire lever 7 will be forced back against the spring 16 to permit the hook to pass the round. In this way I am able to provide for the free handling of the upper section of the ladder with a certainty of hooking engagement when the ladder is run up and a certainty of clearance of the hooks when the ladder is being run down. As pointed out, if the stud 10 should become worn away, or, if through any flaw or excess strain it should be broken, the engagement of the ladders would still be maintained without danger of precipitating the user of the ladder to the ground.

Various modifications in the construction and arrangement of the parts of my device may obviously be made without departing from the spirit of my invention if within the limits of the appended claims.

What I, therefore, claim and desire to secure by Letters Patent is:—

1. A ladder lock comprising a casing, an integral round-engaging hook and shank pivoted at one end of said shank in said casing, and having an upwardly disposed cam portion adapted to contact directly with a ladder round in one direction to push the hook back from its round engaging position, the shank on said hook having a longitudinal slot between its ends, a hook covering latch pivoted in said slot and adapted to overlap the point of said hook, a double cam bearing on the end of said latch symmetrically disposed with regard to said pivot and exposed on the rear side of said shank in said slot, a spring supported in said casing behind said shank and operatively connecting with said cam bearing and said latch, and effective to yieldingly maintain said latch at right angles to said hook shank and to yieldingly support said hook in round engaging position.

2. In an extension ladder a pair of relatively movable ladder sections, an integral round-engaging hook and shank pivotally mounted on one section and having an upwardly disposed cam portion adapted to contact directly with a ladder round in one

direction to push the hook back from its round engaging position, a hook covering latch pivoted to said shank and carried thereby and effective to cover the point of said hook to receive the direct thrust of a ladder round from the other direction to push the hook from round engaging position, and a spring yieldingly supporting said hook in round engaging position and yieldingly maintaining said pivoted latch at substantially right angles to said shank.

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

FRED H. MOULTON.

Witnesses:
M. SUMNER COGGAN,
ELLIS SPEAR, Jr.