

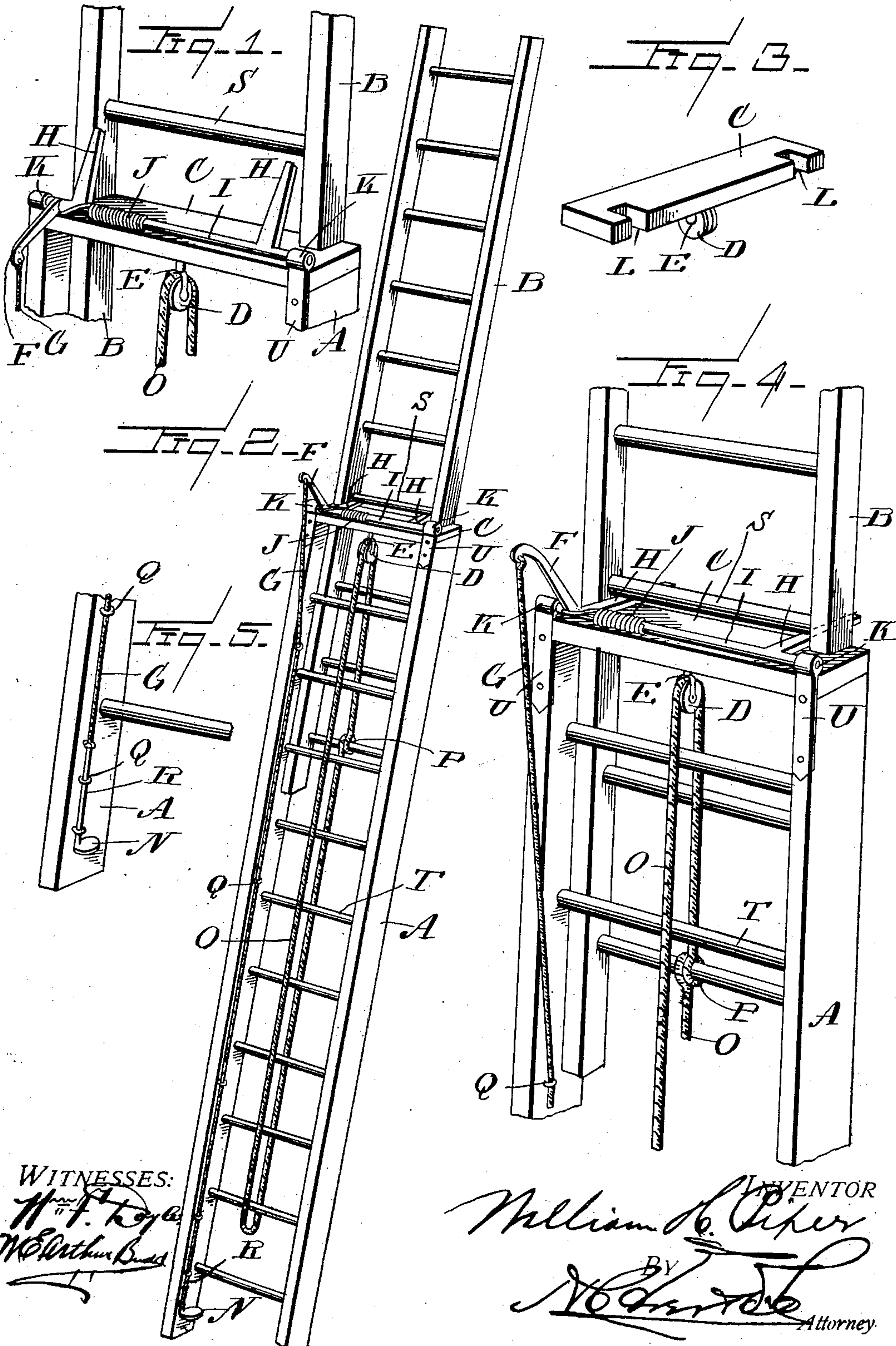
No. 762,346.

PATENTED JUNE 14, 1904.

W. H. PIPER.
EXTENSION LADDER.

APPLICATION FILED JUNE 13, 1901.

NO MODEL.



WITNESSES:

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EXTENSION-LADDER.

SPECIFICATION forming part of Letters Patent No. 762,346, dated June 14, 1904.

Application filed June 13, 1901. Serial No. 64,443. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. PIPER, a citizen of the United States, residing at Dexter, in the county of Penobscot and State of Maine, have invented certain new and useful Improvements in Extension-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 of reference marked thereon, which form a part of this specification.

Like letters of reference indicate corresponding parts in the different figures of the drawings.

The special object of my invention is to provide an extension-ladder which can be operated from the ground or at any point upon the lower or fixed ladder either to extend or lower the upper or movable section with more ease and certainty than any hitherto invented.

In the drawings herewith, Figure 1 shows the top of the lower or fixed ladder surmounted by the cross-bar, carrying the suspended pulley and hoisting-rope, the tripping device and cord descending by side of the fixed ladder, and the bottom of the upper or movable ladder, in combination with the lower ladder and the hoisting and sustaining device. Fig. 2 shows the whole ladder in perspective, illustrating the manner in which the hoisting-cable is disposed with both its ends attached to the lower rung of the upper or movable ladder, so that the slack is taken up out of the way of those using the ladder in whatever position the upper or top ladder is placed, and also shows the tripping or rocking shaft at top of the lower or fixed ladder with its forward-extending arm at side of ladder and the tripping-cord attached thereto and extending down the side of the lower ladder through rings or eyes attached thereto to the foot-trip at the bottom. Fig. 3 is a view in perspective of the cross-bar top of the lower section of the ladder, and Fig. 4 shows in perspective the channeled cross-bar or top of lower ladder with the forward arm of the tripping de-

vice thrown upward. It also shows the position of the side bars of the upper ladder with reference to the channels in back of the cross-bar. Fig. 5 shows the bottom of side bar of the lower ladder with the arrangement of the tripping wire or cord and the foot-plate for working said cord and tripping device at top of lower ladder without use of the hands.

In the illustrations, A is the lower or fixed ladder, and B is the upper or movable ladder, slidably clamped thereto at its back. B is made narrower than A, so as to fit within the side bars of A and rest against the rungs of A.

C is the channeled cross-bar resting upon the top of the sides of A at each end, and thereby securing a firm support for the hoisting-pulley D, pivoted in the frame E, secured to the under side of C by a bolt. Two channels L L, Fig. 3, are cut in the backward edge of C wide enough to receive the side bars of B and deep enough to permit said side bars to rest against the rungs of A. The cross-head C is made the same width as the side bars of A, which width permits the free passage of the rungs of B by C.

Attached by bolts through the side bars of A are the metal straps U U, which pass one upon each side above the top of C and have upon their upper extremities the journal-bearings K K. In these bearings rest the ends of the rocking shaft I. This shaft carries backward-extending projections either separate or continuous, adapted to lie flat upon the top of C and in that normal position to engage with and support the weight of B by extending far enough back from C to come in contact with the rungs of B and prevent their downward passage. To said shaft at one extremity is fixed a forward-extending arm, which leans out above and in front of C in a manner which permits a wire or a flexible cord to be attached to it for the purpose of operating the arm to rock said shaft I. A spring J is attached to said cross-bar C and arranged to operate said shaft I and by its tension to keep said backward-extending arms or supports H H in normal position flat upon the top of C when same are

not raised therefrom by force. By placing said rocking shaft I near the front of the cross-bar C, I gain the advantage of greater strength for the journaled bearings K K by
 5 attaching them through the metal straps U U to the side bars of the lower ladder direct. This serves to sustain any weight that may be placed upon the upper ladder and the supporting-arms H H much more securely than
 10 a cross-shaft resting in seats attached to the top of the cross-bar alone would. It also gives the supporting-arms H H the advantage of lying flat and resting upon nearly the full width of the cross-top C as a support,
 15 which alone secures great strength of support, such as is needed in ladders for fire department and builders' purposes. This position of the rocking shaft I also gives room for the free downward motion of the forward-extending
 20 trip-arm F in its use for the purpose of releasing the upper ladder B from contact with the supporting-arms H H by rocking the shaft I and tilting the arms H H up, so as to pass in front of the rungs of the upper ladder B and allow the latter to be raised or lowered
 25 at will by means of the hoisting-rope O O O.

To the forward-extending arm F of the rocker-shaft I is attached the wire or cord
 30 G, which passes down along the inside of the side bar of the lower ladder A through the rings Q, attached thereto as guides for said cord, and ends at the bottom of the lower ladder in a step-piece, slidable in said rings R,
 35 adapted in shape to be pressed downward by the foot of the operator and leave his hands free to manipulate the hoisting-rope O O O. This arrangement enables a single person standing at the foot of the ladder A to raise
 40 or lower the upper ladder B and operate the supporting device upon the top of the cross-bar C to engage or release the rungs of the upper ladder with great ease.

The forward-extending arm F of the supporting device may be placed at either end of the cross-shaft I and the cord or wire G be brought down upon either side bar of the lower ladder without change of the principle or invention involved; but preferably they are
 50 placed at the left-hand side, as shown in the drawings.

A spring J is attached to the cross-top C and attached to the rocker-shaft I or the arms H H, so as to operate by its tension to keep
 55 the arms H H flat upon the top of the cross-bar C when not raised therefrom by superior force.

It is obvious that contact of the rungs of the upper ladder S with the arms H H in
 60 raising the upper ladder alone serves to tilt the arms upward out of contact, so that the tripping device as operated by means of the cord G, and the foot-piece N, and the arm F needs no attention from the person raising it.
 65 When upper ladder B is raised and rests

upon said supports H H and it is desired to lower it, B is drawn up a little by means of the hoisting-rope O, thereby lifting the rung S, Fig. 1, off from the supports H H by means of the foot upon the foot-plate N, Figs. 70 2 and 5, the cord G is drawn down, depressing the arm F, rocking the shaft I, and tilting the supports H H out of contact with the rungs of the upper ladder, as shown in Fig. 3. The cord G and the hoisting-rope O can also be
 75 worked in raising and lowering the upper ladder from any point upon the lower ladder as desired.

The hoisting-rope O is attached to the lower rung of the upper ladder at both its ends. 80 The rope passes in front of the rungs of the upper ladder over the hoisting-pulley D, suspended in the frame E to the cross-bar C, and thence down in front of the rungs of the lower ladder and under them, and thence upward to
 85 the lower rung of the ladder B and there attached to it again, (see P, Fig. 2.) This arrangement keeps the hoisting-rope O always in position for ready and convenient use and at same time prevents its getting in the way of
 90 persons upon the ladder A.

I am aware that ladders have been heretofore constructed having an upper member arranged to slide upon or within the side bars of a lower member and held thereto by clamps 95 or bars sliding with said parts upon the side bars of said members. I am also aware that hoisting-ropes attached to the lower rung of the upper member by their lifting ends, and thence passing over a hoisting-truck suspended from the upper rung of the lower member or attached to the inner side of a side bar or fixed in a slot in the side bars of the lower member, have been used for the purpose of adjusting said upper member and
 100 such have sometimes had the other extremity attached to said lower rung of the upper member, so as to be hoisted therewith; also, that devices consisting of rods or bars pivoted in bearings attached to the side bars of the lower member and carrying supporting lugs, dogs, or bars adapted to drop over the rungs of the lower member and under the rungs of the upper member upon a bar or rest behind them to support said upper member in position and adapted to tilt said supporting-bars upward and forward out of contact with said rungs of upper member to release same; also that ladders have been constructed with similar spring-controlled supporting-bars pivoted in bearings attached to the top of a slotted cross-bar upon the lower section and carrying a handle centrally located between said supporting-bars for the purpose of tilting the same by hand out of the way of the rungs of the upper member, and I claim none of these devices as my invention.

What I do claim as new, and desire to secure as my own invention, is—

A ladder comprising a lower section having 130

a top board formed in its one edge with a pair of channels, an upper section having its side rails received in said channel and the portion thereof lying therebeneath engaging the rungs
5 of the lower section, a rope secured to one of the rungs of the last-named section and passing over a pulley secured to the under face of the said top of the first-named section, a pair of bearings secured to the side rails of the
10 first-named section adjacent its top, a spring-pressed shaft journaled in said bearings, a pair of arms formed integral with said shaft and projecting inwardly therefrom, said arms

being adapted to be supported by the top of the first-named ladder-section, and projecting 15 beneath and engaging one of the rungs of the last-named section, a forwardly-projecting lever carried by said shaft, and a cord attached to said lever, substantially as described.

In testimony whereof I affix my signature in 20 presence of two witnesses.

WILLIAM H. PIPER.

Witnesses:

WILLIAM J. HASELTINE,
CHARLES H. WYMAN.