

(No Model.)

2 Sheets—Sheet 1.

R. S. YOUNG.

COMBINED EXTENSION LADDER AND FIRE ESCAPE

No. 568,999.

Patented Oct. 6, 1896.

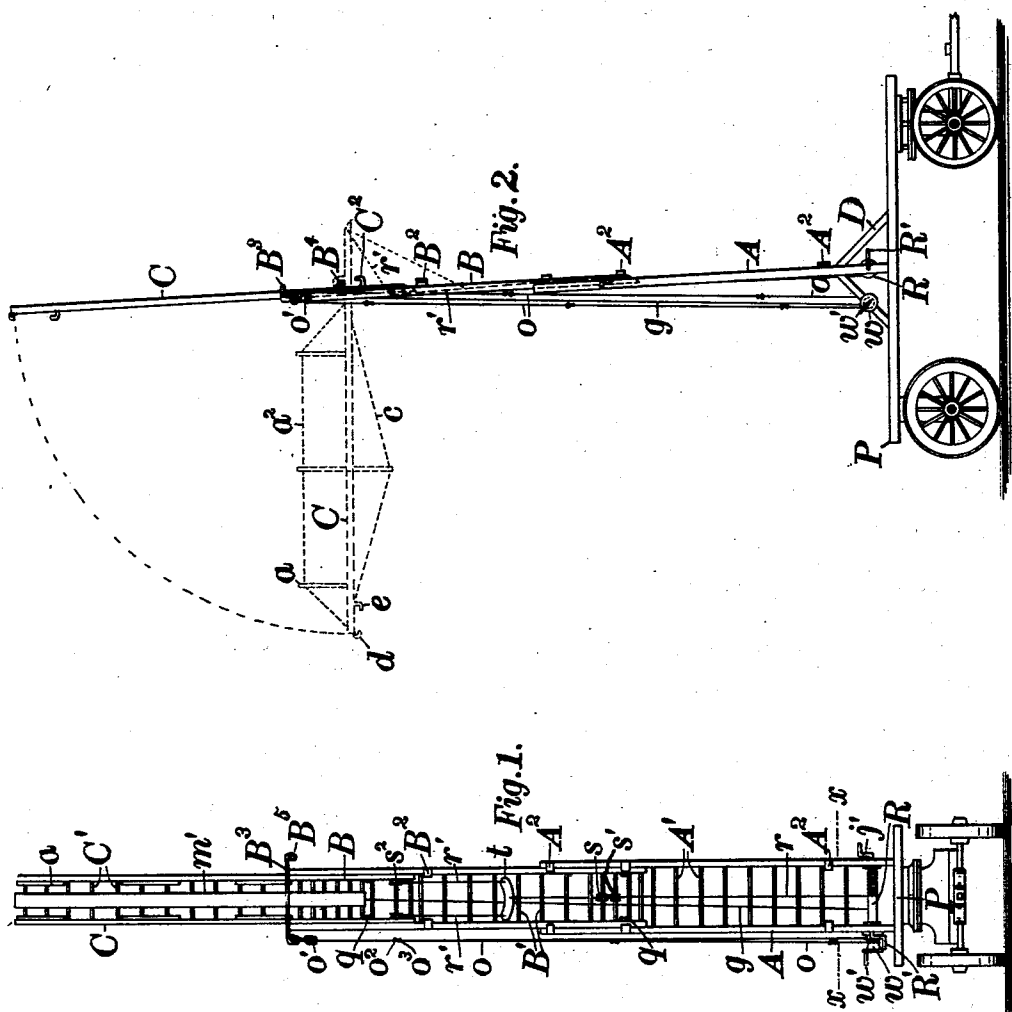


Fig. 3.

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Henry J. Miller, atty.

(No Model.)

2 Sheets—Sheet 2.

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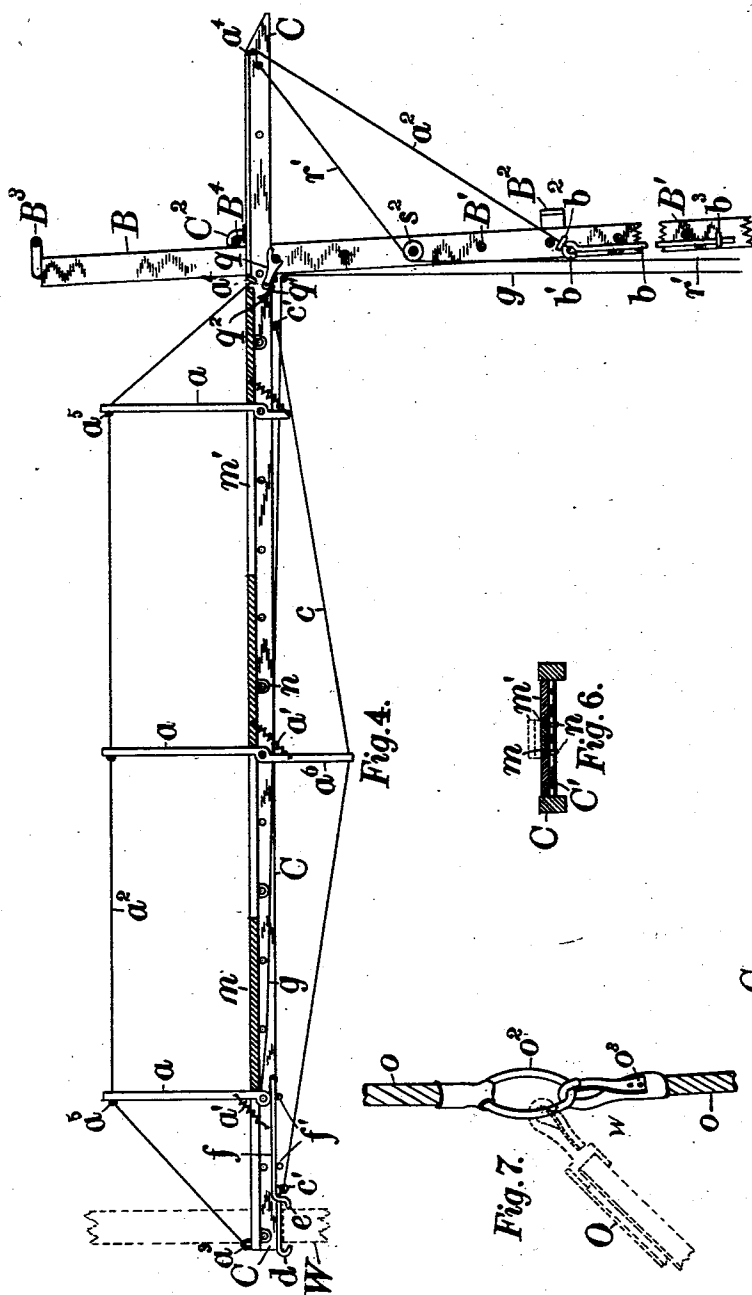


Fig. 4.



Fig. 6.

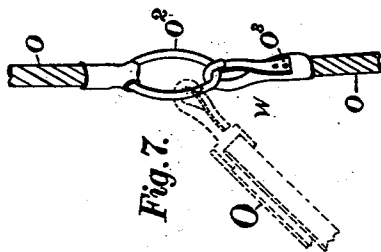


Fig. 7.

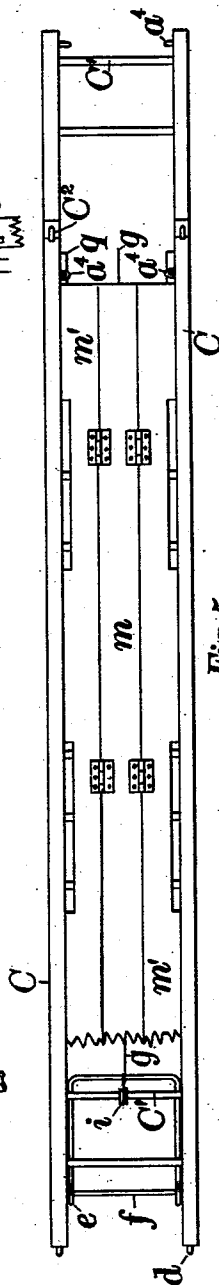


Fig. 5.

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UNITED STATES PATENT OFFICE.

RALPH S. YOUNG, OF KEARNEY, NEW JERSEY.

COMBINED EXTENSION-LADDER AND FIRE-ESCAPE.

SPECIFICATION forming part of Letters Patent No. 568,999, dated October 6, 1896.

Application filed May 28, 1896. Serial No. 593,391. (No model.)

To all whom it may concern:

Be it known that I, RALPH S. YOUNG, a citizen of the United States, residing at Kearney, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in a Combined Extension-Ladder and Fire-Escape, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to an improvement in that class of extension-ladders wherein the several sections are fitted together so as to slide longitudinally upon one another and are retained in their extended position by means of suitable detents interposed between the adjacent sections; and its object is, primarily, to provide a suitable bridge from the top of such ladder to the building to which access is required, so as to permit of the erection of the ladder at a distance from the wall of the building and enable it to avoid obstructions adjacent thereto.

The invention consists in the features of construction hereinafter described, and specifically set forth in the claims annexed.

In the accompanying drawings, Figure 1 is a front elevation of a truck provided with my improved extension-ladder; Fig. 2, a side elevation of the same with the bridge-section shown in dotted lines in its transverse relation to the adjacent section, and Fig. 3 a sectional plan of the same on line x in Fig. 1. Fig. 4 is a sectional elevation, upon a larger scale, of the bridge-section and upper end of the adjacent section with the nearer side bars removed and the rungs and platform in section adjacent thereto; Fig. 5, a plan of the same with the upright section omitted, and Fig. 6 a transverse sectional view of the bridge-section. Fig. 7 is a view, upon a still larger scale, of the adjacent ends of two sections of the line w , with a life-belt attached.

The ladder is shown herein constructed in three sections composed, as usual, of side bars A B C, joined together by the rungs A' B' C', respectively, the lower section A being supported upon the platform P of a suitable truck and sustained in its upright position by means of suitable braces D. The side bars B of the intermediate section are

fitted within those of the lower section and confined in parallel relation thereto by the rungs A' on one side and overhanging hooks A² upon the lower section; and the upper or bridge section is similarly confined between the side bars B of the intermediate section, when in its normal lowered position, by means of the hooks B², intermediate to the ends of the bars B, and the offset cross-bar B³, joining their extreme upper ends.

A reel R with a crank R' for turning the same is provided at the base of the lower section of the ladder, from which is led the hoisting-line r over a pulley s upon one of the upper rounds A' and under a pulley s' at the lower end of the intermediate section to a yoke-piece t , from which are led the two side lines r' over pulleys s^2 at the top of the intermediate section to the lower rung C' of the bridge-section.

The several sections each resting normally upon the platform P, the actuation of the reel R and lines r and r' , connected therewith, operates to draw the intermediate and bridge sections upward to a suitable height, where they are retained by spring-detents, as q in Figs. 4 and 5, and the slackening of the hoisting-lines then permits the upper bridge-section to swing upon its sustaining-rung B' into the transverse position indicated in dotted lines in Fig. 4, where its motion is arrested by the engagement of the hooks C² thereon, with a cross-bar B⁴ fixed to the bars B, the upper rungs B' being omitted from the intermediate section to permit such movement of the bridge-section.

One form of spring-pawl suitable for retaining the several sections in their elevated position is shown at the right in Fig. 4, wherein it is embodied in the lever q , forked at one end to fit the rung B', and pivoted at the opposite end to the side bar C and carrying a lateral leaf-spring q' , engaging a pin q^2 upon the bar C. A suitable stop is provided in practice for limiting the throw of this lever or pawl. It is obvious, however, that other forms of detent may be employed for the above purpose. It will be observed that the hooks C² not only serve to check the swinging movement of the bridge-section, but to retain the detent q firmly seated upon the rung B' of the intermediate section, so as to

lock such section securely from displacement during its operation.

The bridge-section is provided with rods a , pivoted upon the inner side of each of the bars C and retained normally parallel therewith by means of springs a' , and a life-line a^2 , having one end attached to the staple a^3 at the extreme outer end of the bar C, is led through the head of each of such pivoted rods and through suitable guides a^4 at the opposite end of said bar and through a staple b^2 below the same upon the bar B to the eye b' in the depending counterbalance-rod b , passing through a suitable guide b^3 below upon the bar B. Each of such life-lines at opposite sides of the bridge-section is provided at suitable intervals in the portion adjacent to the outer end with collars or protuberances a^5 for engagement with the heads of the rods a . When the bridge-section is in its normal relation to the intermediate section and the ladder is closed, the counterbalance-rods b gravitate downward and take up the slack of the line a^2 , the springs a' drawing the line sufficiently to permit the rods a to lie flat upon the rungs C' ; but the lateral projection of the bridge-section causes the tension of the lines a^2 to draw the eyes b' of the rods b into engagement with the staples b^2 and to then overcome the tension of the springs a' in raising the rods a . In such position of the rods a and b the line a^2 is stretched to its fullest extent and serves to brace the bridge-section as thus extended. The section $C C'$ is further strengthened by means of lines c , connected at the ends to staples c' upon each of the bars C and made taut by the depression of the lower end of the extension a^6 of the central supporting-rod a for the life-line a^2 , the lines c and extensions a^6 together forming trusses upon the under sides of the bars C in such position of the extensions a^6 .

It is obvious that the ladder may be constructed with as many sections as required to attain the desired extent of elevation for the bridge-section, and that such section may be raised through any portion of such height and the lower sections retained in the corresponding positions by means of their spring-detents, the bridge-section being extended laterally and made to rest upon the roof of the building to be entered or upon the sill W of one of its windows, as indicated in dotted lines in Fig. 4. In order to provide stability for the structure in such position, the outer ends of the bars C are provided upon their lower sides with downwardly-projecting hooks d , fixed rigidly thereto, and a sliding frame f , with depending hooks e , opposed to the hooks d , is applied to the lower side of the section beneath the rungs C' and sustained by the cross-bars f' , a cord g being attached at one end to one of the cross-pieces of the frame f and led over a pulley i upon one of the rungs C' in advance of the same, over a cross-bar h upon the intermediate section,

down to a reel j , with actuating-crank j' at the base of the ladder. It will be obvious that by operating the reel j when the end of the bridge is projected through the window, as indicated, the bridge may be clamped firmly upon the window-frame, so as to not only prevent the withdrawal of the bridge-section, but to obviate any vibration of the ladder when in operation.

The bridge-section is provided with a folding platform, of which the central portion m is fixed to the rungs C' by means of staples n , and the side portions m' are hinged to the opposite sides thereof to adapt them for being folded upon the portion m when not in use, as indicated in Figs. 1 and 6, the rungs upon opposite sides of such folded platform being obviously adapted for use in the ordinary manner at such time.

To provide a safe means of transferring those rescued from high buildings to the ground without the necessity of climbing down the ladder after traversing the bridge, the bar B^3 is formed with outwardly-projecting ends terminating in eyes B^3 , from one or both of which depends a pulley-block o' , carrying a sectional line o , passing over a drum w , with operating-crank w' , mounted loosely upon the spindle of the reel j . Each of the several sections of the line o is provided at one end with a snap-hook o^3 and at the opposite end with a ring o^2 for connecting the same with the adjacent sections, and persons supplied with suitable life-belts O , Fig. 7, having suitable hooks as they emerge from the building may be secured to the rings o^2 and lowered to the ground by means of the line o . By forming such line in sections readily detachable from one another its length may be regulated to correspond with the height at which the bridge is elevated and the superfluous sections removed. It is obvious that a person may be attached to the line o at the junction of each of two sections and that the line may be operated continuously, so as to lower several persons at once and to simultaneously raise firemen to the bridge.

While the improvement as above described is designed specially for use as a fire-escape ladder, it is evidently adapted for certain commercial purposes, as for house-painting and other uses where it is desired to span a system of telegraph-wires or other obstructions close to the building to be operated upon.

It will be obvious that the precise details of construction described above are not essential to the present invention, the characteristic feature of which is the single line means for actuating the same whereby it may first be operated to extend the several sections the desired degree and to then cause the upper or bridge section to assume its transverse position. While I have shown only a single intermediate section $B B'$, it is obvious that the number of such sections employed will depend upon the degree of extension of the ladder desired.

Having thus set forth the nature of the invention, what I claim herein, and desire to secure by Letters Patent, is—

1. The extension-ladder comprising a lower section having a guide-pulley near the upper end and a reel at its foot, one or more intermediate sliding sections of which the lower is adapted to slide upon the first-named section and provided each with guide-pulleys near the opposite ends, an upper or bridge section fitted to slide upon the adjacent intermediate section, automatically-operating detents for retaining said sliding sections in their extended positions, guides for always retaining said intermediate section or sections in parallel relation with the lower section and guides for retaining said upper or bridge section parallel with the adjacent section until fully extended upon the same, and a line attached at one end to the lower end of the bridge-section, passing over the guide-pulleys as described and running to the reel at the foot of the lower section, whereby the rotation of the reel in one direction to draw in the line operates to extend the ladder and the turning of the reel in the opposite direction for slackening said line causes the upper or bridge section to swing transversely upon its detents, as and for the purpose set forth.

2. The extension-ladder comprising the lower section A A' with guides A² and provided with reel R and grooved pulley s, the intermediate section B B' with guides B² and grooved pulleys s' and s² and with cross-bar B⁴, the upper or bridge section C C' with laterally and upwardly projecting hooks C² adapted to engage the cross-bar B⁴, the line r r' passing around the pulleys s, s' and s² and connecting the lower end of the bridge-section with the reel R, and detents interposed between the adjacent sections for retaining the same in their elevated positions, as and for the purpose set forth.

3. The extension-ladder comprising the lower section A A' with guides A², the intermediate section B B' with guides B² and cross-bar B³ with depending pulley-block o' and the upper or bridge section C C', means for elevating the intermediate and bridge sections and retaining them in their elevated positions and for laterally extending said bridge-section, a hoisting-drum w at the base of the lower section, and an endless sectional line o extended between said pulley-block and hoisting-drum, each section of said line having a ring o² at one end and a hook o³ at the other end, whereby the length of said line may be varied by the removal or insertion of sections to adapt it to correspond with the degree of extension of the ladder, as and for the purpose set forth.

4. In an extension-ladder constructed with a sliding and swinging upper section and means for elevating and laterally extending

the same, the combination, with said upper section, of a folding platform composed of longitudinally-hinged portions of which one is fixed to the rungs of said section, as and for the purpose set forth.

5. In an extension-ladder comprising a lower section A A', an intermediate section B B', an upper or bridge section C C', and means for elevating the intermediate and bridge-sections and for laterally extending the said bridge-section, the combination, with the bridge-section, of rods a pivoted to the side bars C in the upper or outer portion thereof and springs for retaining said rods normally in parallel relation to the side bars, and lines a² connected at one extremity to the outer ends of said side bars, attached to the free ends of said rods, passing thence through suitable guides to the opposite ends of said bars C and secured at the opposite ends to the intermediate section beneath said bridge-section, as and for the purpose set forth.

6. In an extension-ladder comprising a lower section A A', an intermediate section B B', an upper or bridge section C C', and means for elevating the intermediate and bridge sections and for laterally extending the latter, the combination, with the bridge-section, of rods a pivoted to the side bars C in the upper or outer portion thereof and springs for retaining said rods normally in parallel relation to the side bars, and lines a² connected at one extremity to the outer ends of said side bars, attached to the free ends of said pivoted rods, passing thence through suitable guides to the opposite ends of said bars C and through a combined guide and stop b² upon the intermediate section beneath the bridge-section and attached at the other extremity to a depending counterbalance-rod b, as and for the purpose set forth.

7. In an extension-ladder comprising a lower section A A', an intermediate section B B', an upper or bridge section C C', and means for elevating the intermediate and bridge sections and for laterally extending the latter, the combination, with the bridge-section, of the lines c having their extremities attached to opposite ends of the side bars of the section C C' upon the under side, the rods a having extensions a⁶ pivoted to said bars intermediate the extremities of the lines c, and means for automatically turning said pivoted rods into parallel and transverse relation to said bars C for varying the tension of the lines c, as and for the purpose set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

RALPH S. YOUNG.

Witnesses:

HENRY J. MILLER,
JOHN J. FARLEY.