No. 708,413. Patented Sept. 2, 1902.

W. H. SIBLEY.

EXTENSION LADDER.

(Application filed Nov. 25, 1901.)

(No Model.)

Fig. 1.

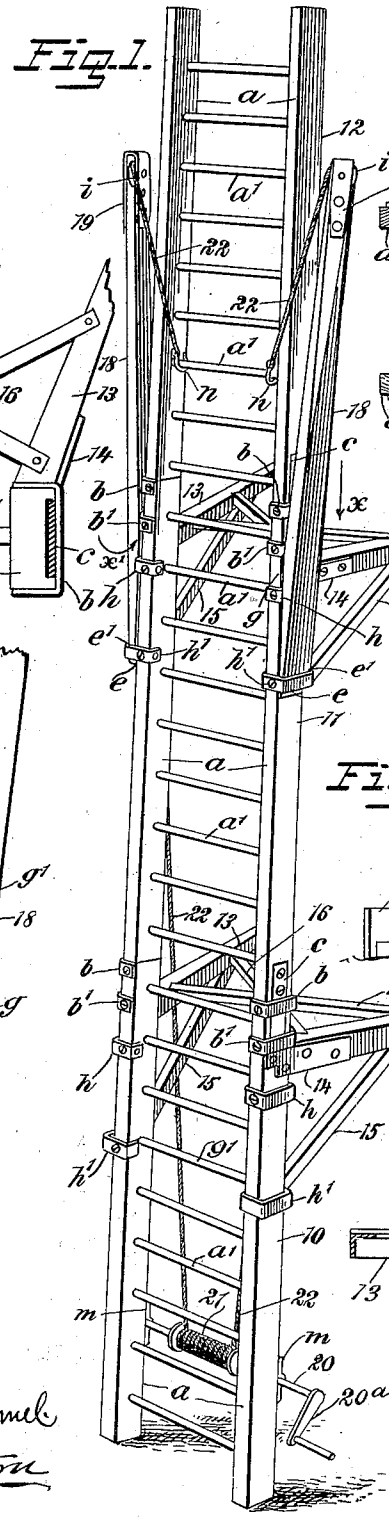


Fig. 2.

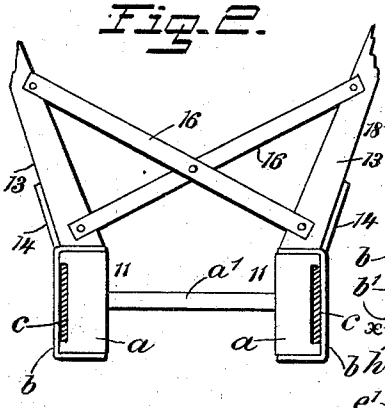


Fig. 4.

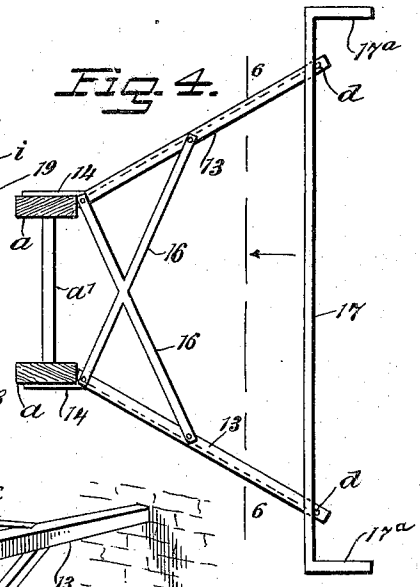


Fig. 3.

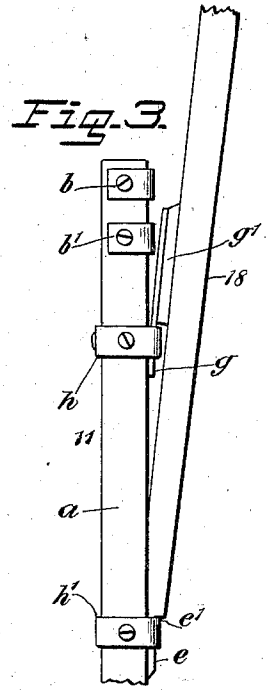


Fig. 5.

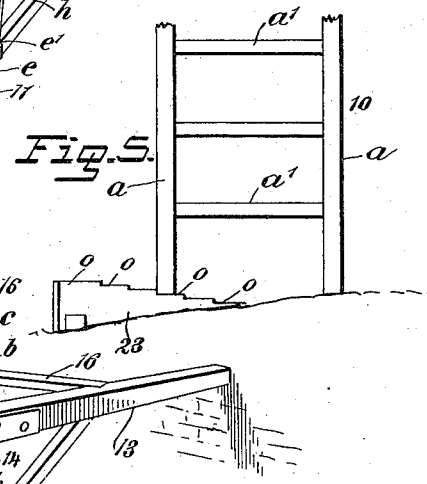
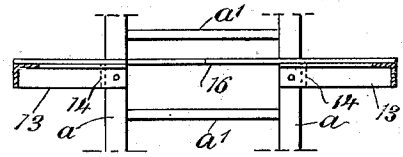


Fig. 6.



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EXTENSION-LADDER.

SPECIFICATION forming part of Letters Patent No. 708,413, dated September 2, 1902.

Application filed November 25, 1901. Serial No. 83,551. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM HENRY SIBLEY, a subject of the King of Great Britain, and a resident of Wittenberg, in the county of Colchester, Province of Nova Scotia, and Dominion of Canada, have invented a new and Improved Extension-Ladder, of which the following is a full, clear, and exact description.

This invention relates to a class of ladders comprised of a plurality of connectible sections, thus providing a long ladder to be utilized as a fire-escape or for other purposes.

The object of my invention is to provide an extension-ladder with novel features of construction, that afford a simple, strong, and conveniently-arranged device which embodies a means for elevating or lowering portions of the ladder or other material when partially or completely erected.

The invention consists in the novel construction and combination of parts, as is hereinafter described, and defined in the appended claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a perspective view of the improved ladder erected for use. Fig. 2 is an enlarged plan view of the upper end of a section of the ladder seen in direction of the arrow x in Fig. 1. Fig. 3 is an enlarged front view of the upper portion of a ladder-section seen in direction of the arrow x' in Fig. 1. Fig. 4 is a transverse sectional view of a ladder-section and a plan view of a lateral brace thereon having details of the invention. Fig. 5 is a front view of the lower portion of the ladder and of a side-hill support for one leg of the ladder, and Fig. 6 is a transverse sectional view of the brace shown in Fig. 4 substantially on the line 6 6 in said figure.

In the drawings, which show the construction and arrangement of details of the invention, 10 11 12 represent sections of the ladder, which may be increased in number, if this is desired, each section comprising strong side bars a and spaced transverse rungs a', these parts being of metal or wood, as may be preferred.

Upon the side bars a of each ladder-section, near the end which is uppermost in service, two clip-bands b b' are secured upon each side bar, these bands, which project from the outer side of each bar at equal distances apart, being in the form of flat loops disposed oppositely in pairs. Upon the outer sides and lower ends of the side bars on a ladder-section next in sequence two similar tongue-bars c are secured so as to permit a portion of each bar to project a suitable distance below the ends of the side bars upon which they are secured, and said tongue-bars are adapted to have a close-fitted slidable engagement within the flat looped projecting portions of the clip-bands b b'.

It will be seen that when sections of the ladder are to be joined together for the formation of a long ladder the introduction of the tongue-bars c on one section within the clip-bands $b b'$ on an alined section will serve to reliably connect the ladder-sections and permit the adjacent ends of the respective side bars to impinge upon each other, as clearly shown in Fig. 1.

Upon the lower ladder-section 10 and the intermediate ladder-section 11 a laterally-projected brace is secured near an upper end of each of the same, each brace comprising two arms 13 and other connected parts, which will be described. The arms 13 are preferably of metal and may be formed of tapered bars, as indicated in Figs. 1 and 2, or preferably be constructed of angle-iron, the sets being equal in length. Each pair of arms 13 is affixed upon a respective ladder-section by means of two similar bracket-plates 14, secured upon the exterior of the arms and side bars of the ladder. The bracket-plates which hold in place each pair of arms 13 are oppositely bent into obtuse-angular form, so that when secured in place upon the side bars and the arms the latter are held outwardly inclined or, in other words, diverged at their free ends a suitable degree. Two strut-braces 15 are provided for the support of each pair of arms 13, said braces extending diagonally

between the side bars of a ladder-section and the arms whereon the ends of the braces are affixed. Two horizontal crossed braces 16 extend between each pair of arms 13 and are secured at their ends to the arms, the braces serving to stiffen the arms and prevent them from spreading while the ladder is in use.

As the preferred use of the extending ladder is to provide a means of escape from a burning building, it is of advantage to employ a bridge-piece 17 in connection with each pair of brace-arms 13, and, as represented in Fig. 4, said bridge-piece consists of a metal plate of suitable dimensions having a leg 17^a formed on each end. The length of the bridge-piece 17 exceeds the extent of spread given to the arms 13, and a transverse perforation is formed near each end of the plate to receive the free ends of said arms, and thus permit the bridge-piece to be mounted on the arms. The bridge-piece 17 is held in place on the arms 13 by pins d, inserted into vertical perforations formed in the arms near their ends.

It will be seen that in case of a fire in a building the improved ladder may be located in front of a tier of windows therein and each lateral brace serve as a footway from the window to the ladder, the bridge-piece secured on the arms of each brace arching across the window it is opposite in an obvious manner, so as to properly support the ladder away from the window for free travel thereon.

Two derrick-arms 18 are provided as complementary parts of a hoisting-tackle to be employed for elevating and lowering the sections of the ladder and for other uses, as will be explained, said arms being held removably in position at the upper end of either ladder-section, as occasion may require. A tenon e is formed or secured on the lower end of each derrick-arm 18 in alinement at the normal inner face thereof, with a sloped formation on the arm, and on the side of the arm which is outermost in service or opposite the sloped face a shoulder e' is formed at the upper end of the tenon e. Upon the inner side of each derrick-arm 18 a tongue g is formed or secured, which is blocked out from the surface of the arm by a liner g', so that the depending end portion of the tongue will have proper clearance from the arm, as shown for one arm in Fig. 3.

At a suitable distance below each bracket-plate 14 on a respective side bar a of the ladder-section 10 or 11 two keeper-bands h h' are secured, these keeper-bands, which are spaced apart a proper distance, extending outwardly in the form of flat loops wherein the tenon e and tongue g on each derrick-arm 18 may be freely inserted, which engagement of parts will detachably hold the derrick-arms oppositely and outwardly inclined in a substantially upright position on the respective side bars a of the ladder-section 10 or 11, as may be found necessary, the shoulders e' seating on the keeper-bands h' when this engagement of parts is effected. Upon the upper end of each derrick-arm 18 a pulley i is held to rotate by pivoted engagement with a bracket-frame 19, secured upon said end portion of the arm, as indicated in Fig. 1.

A windlass-shaft 20, having the usual drum 21 thereon, is rotatably secured upon the lower portion of the lower ladder-section 10, at one side thereof, by journal-boxes m, so that the drum will be located between the side bars A of the ladder and a crank-handle 20^a on one extended end of the shaft, being disposed at one side of the ladder for convenient manipulation.

Two flexible connections 22 have one end secured upon the drum 21 and a portion wrapped on the drum, the main part of each flexible connection being upwardly extended, so as to engage with a respective loose pulley i and trend downwardly therefrom, the free end of each flexible connection having a hook n for engagement with any object to be hoisted or lowered, as occasion may require.

In some situations the ground upon which the ladder is to stand may have such an inclination as to prevent the foot of the ladder from engagement therewith, so that both side bars a will have contact with the pavement or ground when the latter is perpendicular. To obviate this difficulty, I have provided a rest-block 23, (shown in Fig. 5,) this block being tapered to give it wedge form, and may have formed on its upper edge a series of low steps o to afford level seats for the leg of the ladder that is to engage with the rest-block.

It will be evident that the provision of the rest-block as an adjunctive feature of the ladder will greatly aid the quick and reliable erection of the ladder at a burning building, so that the ladder may be put into service without loss of time.

In case the ladder is to be used where its full length is required to reach the upper stories of a high building and it cannot be erected while the sections of the ladder are connected together it will be seen that the ladder-sections may be quickly placed one upon the other to form a complete ladder, as follows: The lower ladder-section 10 may with ease be positioned at a vertical wall of a building at which the ladder is to be erected, the braced arms 13 resting against the wall or against the bridge-piece 17, if this is connected with the arms, as before explained. The derrick-arms 18 are now engaged with the side bars a of the ladder-section 10, and the hooks n are connected with a lower rung on the ladder-section 11, that is to be placed upon the ladder-section 10. The windlass-shaft 20 is now turned by manipulation of the crank-handle 20^a, so as to wrap the flexible connection 22 upon the drum 21, which will raise the ladder-section 11, and as said section may be readily guided while the braced arms 13 or bridge-piece 17 slide against the wall of the building one man at the windlass and one

on the lower ladder-section 10 may raise the ladder-section 11, so that the tongue-bars *c* may be entered within the clip-bands *b* and then be fully inserted into the spaced clip-bands *b b'* on each side bar *a*, if the flexible connections 22 are sufficiently slackened.

It is evident that any number of ladder-sections may be provided and each be furnished with the keeper-bands *h h'* to receive the tenons and tongues *e g* on each derrick-arm 18, so that the ladder-sections may be placed one upon the other at a high building and locked together by the tongues and clip-bands, as hereinbefore described.

It will be evident that the flexible connections 22 and hooks *n* thereon may be utilized to facilitate the lowering of ladder-sections when the ladder is to be removed and also be available while the ladder is in position for raising hose or the like at a burning building or lowering insensible persons or valuable goods that are to be saved.

It is obvious that the improved extension-ladder may be utilized for building purposes and for other purposes where a safe high or low ladder is needed as a means for ascending to high points and descending therefrom.

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

1. In an extension-ladder, a plurality of ladder-sections detachably connectible in sequence, a plurality of clip-bands on the side bars of each ladder-section near the upper end, two derrick-arms removably connectible with the clip-bands on the ladder-sections, and a windlass device on the lower ladder-section, and flexible connections between said windlass device and the other ladder-sections, for raising or lowering said ladder-sections.

2. In an extension-ladder, a plurality of ladder-sections connectible in sequence, two derrick-arms removably securable on the upper portion of each ladder-section, a pulley held to rotate on the upper end of each derrick-arm, a windlass device on the lower part of the lower ladder-section, and flexible connections wrapped at one end on the windlass device and extended upward to engage with the pulleys.

3. An extension-ladder, comprising a plurality of ladder-sections, connectible in sequence, a windlass on the lower section, two flexible connections extended upward from the windlass, two derrick-arms removably held on side bars of a ladder-section near its upper end, a pulley on the upper end of each derrick-arm engaged by a respective flexible connection, and a hook on the upper end of each flexible connection, adapted to engage a lower rung of a ladder-section for its elevation when the windlass is rotated.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM HENRY SIBLEY.

Witnesses:
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S. D. MCLELLAN.