

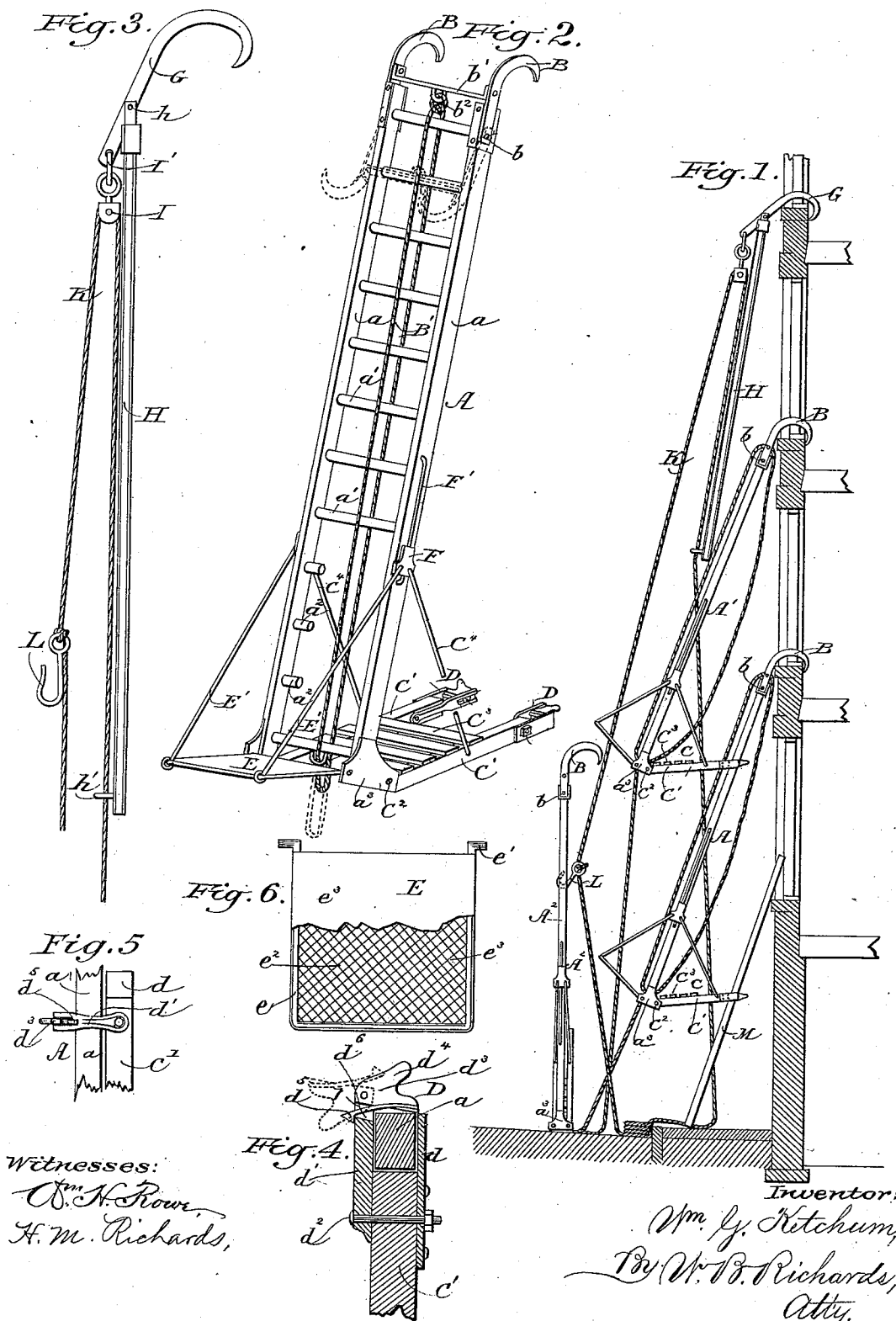
(No Model.)

W. G. KETCHUM.

## FIRE ESCAPE.

No. 334,237.

Patented Jan. 12, 1886.



# UNITED STATES PATENT OFFICE.

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## FIRE-ESCAPE.

SPECIFICATION forming part of Letters Patent No. 334,237, dated January 12, 1886.

Application filed December 3, 1883. Serial No. 113,486. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM G. KETCHUM, a citizen of the United States, residing at Augusta, in the county of Hancock and State of Illinois, have invented certain new and useful Improvements in Fire-Escapes, of which the following is a specification.

The object of my invention is to provide a fireman's ladder or fire-escape which may be easily and quickly applied to buildings of any height and firmly supported upon and secured thereto, which will be light, strong, and compact, and may be easily carried about and handled to place it in position upon or remove it from a building, and which may be erected within a narrow compass and at the same time have a sufficient inclination to be easily ascended and descended with celerity and perfect safety, and to permit the use of suitable guards which facilitate descending it with confidence and safety from great heights.

The improvement consists, generally, in a series of ladders suspended at their upper ends from the windows, cornices, or other openings or projections of the walls of a building, and supported at their lower ends in an inclined position by inwardly-projecting base-supporting arms or platforms which rest against the upper end of the ladder immediately beneath; to provide a series of ladders arranged one above the other and similarly inclined to extend from story to story; in providing means for passing from the upper end of the ladder to the lower end of the adjoining ladder; in providing a platform beneath each of the ladders and each of the windows, upon which persons ascending and descending or mounted upon the ladders may stand securely; in providing outwardly-projecting guards or platforms at the foot of the ladders for arresting the fall of persons therefrom and for their support thereon; in providing means for folding the platforms and guides against the sides of the ladder; in providing means for locking the lower end of the ladder to the upper end of the adjoining ladder and for locking the platforms in their folded positions; in pivoting the suspension-hooks to the upper ends of the ladders and providing means for driving them through the windows or wood-work and withdrawing them therefrom to attach or detach the ladders; in providing a novel device

for securing a pulley-block and hoisting-rope to the windows, openings, or projections of the building in an elevated position to raise or lower the ladders to or from their working position, and in certain details of construction hereinafter more fully set forth, and specifically indicated by the claims.

Figure 1 is a sectional elevation of a building with two of my improved ladders and the ladder-elevating device in working position, and with a third ladder in position to be lifted to its place against the wall; Fig. 2, a perspective of a ladder-section constructed in accordance with my invention, showing by dotted lines the grappling-hooks in the positions occupied by them before they are driven into the windows; Fig. 3, an enlarged side elevation of the device for raising and lowering the ladders to and from their position upon the building; Fig. 4, an enlarged sectional detail of the end of the inner platform or base-support of a ladder and the rail of an adjoining ladder, with a novel device for locking the ladders together, shown by full lines in its closed position and by dotted lines in its open position; Fig. 5, an enlarged elevation of a fragmental part of the ladder, rail, and end of the inner platform folded upon it and locked thereto by my improved device; Fig. 6, an enlarged plan of a guard or outer platform with the flooring partly broken away.

In describing in detail the construction of the parts constituting my invention it must be borne in mind that its distinguishing feature consists in the employment of a number of ladders, A A' A<sup>2</sup>, each of which will answer the same description, and which will be herein designated by similar letters. These ladders provide separate sections complete in themselves, to be independently elevated, supported, and lowered, but which may be joined together to form a continuous ladder formed of separate flights, for each story of a building, with a landing or platform between each section.

The ladders A A' A<sup>2</sup> are each separately suspended by hooks B, secured to their upper ends, and supported in inclined positions against the side or face of a building by a base-support, C, secured to the lower end of the ladder. The ladder consists of side rails, a, and steps a', joined together in the usual

well-known manner; but in this instance steps at the lower end of the ladder are cut away, and short projecting pins or sub-steps  $a^2$ , secured to one of the side rails, or to both of them, if preferred, provide an open passage between the side rails at the foot of the ladder, through which persons may pass from one side to the other side of the ladder with perfect safety, and thereby be enabled to pass to or from a platform, or to or from the upper end of an adjoining ladder to a platform, in ascending and descending a series of the ladders.

The base-support or platform C is preferably formed of arms  $C'$ , pivoted at  $C^2$  to plates  $a^3$ , secured to the lower ends of the side rails in such manner that the said arms  $C'$  may be folded closely against the lower ends of the side rails,  $a$ , when the ladder is not in use, or when it is desired to carry it from place to place. The arms  $C'$  may be connected by cross-strips  $C^3$  to form a platform, C, which will project from the inner side of the lower end of the ladder, to provide a landing for persons ascending or descending the ladder, or for the support of firemen engaged in their work. It is obvious that the platform forms an integral part of the arms  $C'$ , and will fold with the arms against the lower end of the ladder.

The swinging ends of the arms  $C'$  are provided with clamps D, of novel construction, as hereinafter described, for securing them to the upper ends of the rails of an adjoining ladder when two or more ladders are connected together, as shown in Fig. 1, and also for securing the swinging ends of the arms  $C'$  to the rails of the ladder to which they are pivoted, when it is desired to fold said arms and platform out of the way. A guard or platform, E, preferably formed of an iron frame,  $e$ , pivotally connected to the plates  $a^3$  by projecting ends  $e'$ , and covered with a wire-netting,  $e^2$ , which latter is provided with a canvas cover,  $e^3$ , to provide a light semi-elastic stretcher or extension at the foot of the outer side of the ladder, and is supported approximately at right angles thereto by links or rods  $E'$ , which extend downwardly and diagonally from the side rails,  $a$ , of the ladder. The guards E will thus provide an extension to arrest the fall of persons from the ladder, will provide a landing or platform upon which persons may stand in helping others down the ladder, or in performing the work of firemen, and will also provide a safe footing for persons in passing up or down the ladders and from the lower end of one ladder to the upper end of another adjoining ladder.

The presence and sight of the guard and platforms above described will give to timid persons greater assurance, so that they may pass down the ladders with increased safety, and without danger of stepping off the ladder or hurriedly descending below the foot of the ladder-section upon which they are mounted. Firemen may conveniently stand with their feet, respectively, upon the outer and inner

platforms, and hold onto the side rails of the ladder while engaged in helping persons to descend with safety, and pass them through the opening at the foot of the ladder to the inner platform, and from thence to a secure support upon the upper end of the next succeeding ladder-section.

The outer guard or platform, E, and the inner platform, C, may both be folded together and opened jointly by means of suspension-rods  $E'$ , connecting the swinging end of the platform E, and a similar rod,  $C'$ , connecting the swinging end of the arms  $C'$  with a sliding block, F, supported upon a guide-rod,  $F'$ , secured to the outer side of the ladder-rail. When the block F is raised upon the guide-rod, the platforms E and C will be folded against the lower outer and inner sides of the ladder, and may be together clamped in their folded position by the clamp D, secured to the swinging end of the arm C, as shown in Fig. 5. The clamp D is formed of the side plate or jaw,  $d$ , firmly bolted to the outer side of the swinging end of the arms  $C'$ , and of a plate,  $d'$ , pivotally secured at  $d^2$  to the inner side of said arms  $C'$ , immediately opposite the jaw  $d$ , and which will, together therewith, embrace the opposite sides of the rails  $a$  of an adjoining ladder. A locking-jaw,  $d^3$ , is pivotally secured to the slotted swinging end of the plate  $d'$ , and is provided with a projecting ear,  $d^4$ , which affords convenient means for operating the jaw  $d^3$ . A spring-catch,  $d^5$ , is secured to the face of the jaw  $d^3$ , and projects through the slot  $d^6$  in the swinging end of the jaw  $d'$  and engages with the outer edge of said slot to lock the jaw  $d^3$  in its closed position across the rail of the ladder, and hold the said rail securely between the plates  $d$   $d'$  and to the swinging end of the arm  $C'$ . The locking-jaw  $d^3$ , upon releasing the catch  $d^5$ , may be swung back to the position shown by dotted lines in Fig. 4, to release the rail of the ladder from between the plates  $d$  or  $d'$ , and also to permit the plate  $d'$  to be swung upon its pivot  $d^2$  when the arm  $C'$  is folded against the lower end of the ladder, and projects alongside of and to the front of the rail  $a'$  of the ladder. When the arm  $C'$ , plate  $d$ , and locking-jaw  $d^3$  are thus placed, the locking-jaw  $d^3$  may be swung upon its pivot across the front side of the rail of the ladder, and held in this position securely by the catch  $d^5$ , to lock the swinging arm  $C'$  and the parts connected therewith in their folded positions. The suspension-rods  $E'$   $C'$ , sliding block F, and platforms E and C are all thus held in their raised or folded positions by a single instrumentality—viz., the clamp D—and the said clamp also serves to hold the base-support securely to the rail of an adjacent ladder. By means of the connecting-rods and block above named the platforms E and C are also held in their extended positions.

The upper ends of the ladders A A'  $A^2$  are provided with suspension-hooks B, pivoted at  $b$  to the side rails,  $a$ , to project above the ends thereof and pass completely through a win-

dow-frame and casing and overlock the window-sill and inner side of the wall, as shown by full lines in Figs. 1 and 2, to thus provide a secure support for the upper end of the ladder and admit of its complete suspension therefrom. A cross-bar,  $b'$ , connects the middle portion of the hooks B, and has a staple,  $b''$ , secured thereto midway of its length. An endless cord, B', secured to the staple, extends downwardly the entire length of the ladder upon the outer side of the steps and back again upon the inner side of the steps to the cross-bar of the suspension-hooks.

When the ladder is to be raised in position to secure it to the side of the building, the suspension-hooks are thrown back to the position shown by dotted lines in Fig. 2, the said movement being effected by pulling upon the portion of the cord outside of the rungs of the ladder. When the upper end of the ladder has been placed directly opposite a window or other convenient place for its suspension, the portion of the cord inside of the rungs of the ladder is pulled quickly and forcibly, and the suspension-hooks are thereby swung with great force to break through the shutters, casing, windows, or other destructible portion of the building with which they may be brought in contact, and which will provide a secure means of attachment for the upper end of the ladder.

When ladders are to be suspended from points above convenient reach, and when a series of ladders are to be erected upon the side of a building, it is preferable to employ an implement for elevating or hoisting the ladders up to the position in which they are to be placed, and so support them until they are securely coupled together and the suspension-hooks properly secured to the building. The elevator employed by me for this purpose is shown in working position upon the building in Fig. 1 and in enlarged detail in Fig. 3, and consists in a grappling-hook, G, pivotally secured to the end of a rod, H, at  $h$ , and a pulley-block, I, suspended by a link, I', from the shank end of the grappling-hook. A cord, K, is passed over the pulley-block I, and is provided with a hook, L, by which it may be attached to one of the steps of a ladder. One end of the cord K passes through a staple or loop,  $h'$ , on the lower end of the rod H, and is pulled on by a person from the ground to raise the ladder, while the other end of the cord K may be held to guide and steady the ladder during its ascent or descent. The lower end of the rod H is firmly held by a person mounted upon a ladder secured in position until the next succeeding ladder is raised to its proper height and firmly connected to the building by means of the suspension-hooks. The rod H and its connections may be removed and the lower end of the ladder last raised is securely placed and held in an inclined position against the wall of the building by locking the swinging ends of the base-supports C to the upper ends of the rails of the

ladder immediately below, and previously secured in position, as shown at Fig. 1.

The grappling-hook G may, because of its shape, and also because of its pivotal connection to the rod H, be driven completely through a window-casing, and be securely hooked upon the window-sill or other convenient portion of the building, and will provide a secure support, and means for suspending the pulley block and tackle therefrom.

A crooked rod has heretofore been employed for bracing the lower end of a suspended ladder, but no means were connected therewith to hoist a ladder in position upon the wall above a ladder already secured thereon. I am also aware that a rod provided with forks or prongs, and with a block and tackle secured to its upper end, has been employed to raise and lower articles and persons from a burning building; but in this last-named device no means are shown for suspending the tackle from the building, as in my device, and both the object desired and means employed in the devices referred to are essentially different from that embodied in my invention.

The ladders are light and strong, and may be easily handled and raised and lowered from their positions upon the building in the following manner: A ladder, M, of ordinary construction, is first placed against the side of the building to extend from the ground to the first-story windows, and said ladder is ascended and the rod H carried up and secured to the second-story cornices or windows. The first escape-ladder, A, is then hooked onto the cord K and hoisted to position. The suspension-hooks of the ladder are then driven into the window or cornice by means of the cords B', and the base-supports C are unfolded and secured by means of the clamp D to the rails of the ladder M. The ladder A is then ascended and the rod H is elevated and hooked onto the cornice or window of the third story, and the cord K is secured by means of the hook L to the rung of the second ladder, A', which is raised into position as was the ladder A, previously described, the ends of the cord K being held or strained in opposite directions to guide the second ladder and direct it past the projecting lower end of the ladder already in position. The second ladder, A', is then secured to the building and to the upper end of the first ladder, A.

The operation of lowering and disconnecting the ladders from the building is the reverse of that above described for elevating and connecting them.

Where long ladders are employed upon buildings having low stories, a single ladder may be made to extend past several stories, as the lower end of the uppermost ladder may be connected to any part of the ladder beneath it. A portion of one ladder will thus be made to overlie the adjoining ladder and form an outer guard-barrier to prevent persons from falling from windows immediately opposite said overhanging ladders, and thus enable

persons to pass out of the windows and take their positions upon the ladders with safety.

I claim as my invention and desire to secure by Letters Patent—

- 5 1. A fire-escape ladder provided with hooks secured to the upper end of the ladder, and adapted for fastening its upper end to a building, in combination with a base-supporting piece hinged to its lower end, whereby it may  
10 project from or be folded up against the lower end of the ladder, substantially as and for the purpose described.
2. A fire-escape ladder formed in sections, each section provided with fastening-hooks at  
15 its upper end, in combination with a platform secured to the lower end and inner side of each section, whereby each section is held in an inclined position, with its upper end to the wall of the building, and its lower end outside  
20 of the upper end of the section below it, substantially as and for the purpose specified.
3. A fire-escape ladder provided with fastening-hooks for securing its upper end directly to a window, in combination with a  
25 platform extending inwardly therefrom at its lower end, upon which persons ascending and descending the ladder may stand, substantially as described.
4. A fire-escape ladder adapted to be held  
30 in an inclined position by means of fastening-hooks secured to its upper end, in combination with a section or platform hinged to its lower end, to project from and fold against the inner side thereof, substantially as described.
- 35 5. In a fire-escape, the combination, with the ladder-sections having partial steps at their lower ends, of fastening-hooks secured to the upper end of each section, and base-supports secured to the inner sides and lower ends of  
40 each section, substantially as and for the purpose specified.
6. A fire-escape ladder provided at its upper end with means for suspending it, in combination with a guard or platform hinged to  
45 the lower end of the ladder, to project from and fold against the outer side thereof, substantially as and for the purpose described.
7. A fire-escape ladder provided at its upper end with means for suspending it, in combination with a folding guard or platform hinged to its outer side, and a folding platform or base-support hinged to its inner side  
50 at the lower end of said ladder, substantially as described.
- 55 8. A fire-escape ladder provided at its upper end with means for suspending it, in combination with a guard or platform hinged to its outer side, a platform or base-support hinged to its inner side, and suspension-links

supported upon guide-rods on the rails of the ladder, to operate the outer and inner hinged portions jointly, substantially as described. 60

9. The combination, with a fire-escape ladder, of the hinged sections C E, links C' E', guide-rail F', and sliding block F, all arranged  
65 for joint operation, substantially as described.

10. A fire-escape ladder provided at its upper end with means for suspending it, in combination with a base-support secured to its lower end, and a locking-clamp secured to the  
70 base-support, substantially as and for the purpose described.

11. A fire-escape ladder, in combination with a base-support or platform hinged to the lower end of the ladder, and a clamp for  
75 securing said base-support or platform to the ladder, substantially as described.

12. A fire-escape ladder, in combination with a base-support or platform hinged thereto, to fold against the lower end thereof, and a  
80 clamp affixed to the swinging end of the base-support, and adapted to lock it when in its folded position, and secure it to another ladder when in its open position, substantially as described. 85

13. The combination of the jaws *d d'*, adapted to be secured to the swinging end of the base-support, the pivoted locking-jaw *d''*, and spring-catch *d'''*, all combined and arranged to  
90 operate substantially as described.

14. In combination, in a fire-escape ladder, a suspension hook pivotally secured to the upper end of the ladder, a cord secured to the hook and located at the outer side of the ladder, by means of which the hook may be pulled  
95 backward and downward, and another cord secured also to the hook, but located at the other side of the ladder, or side next the building, by means of which the hook may be thrust forward with force to engage it, substantially  
100 as described, and for the purpose specified.

15. An implement for elevating fire-escape ladders, consisting of the combination, with a suspension-hook, of a rod for elevating said hook, and a cord and pulley secured to said  
105 hook, these parts being combined and arranged to operate in the manner and for the purpose described.

16. The combination, in a ladder-elevator for fire-escapes, of the rod H, the suspension-hook pivotally connected therewith, and a cord and pulley secured to the suspension-hook, substantially as and for the purpose described. 110

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Witnesses:

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