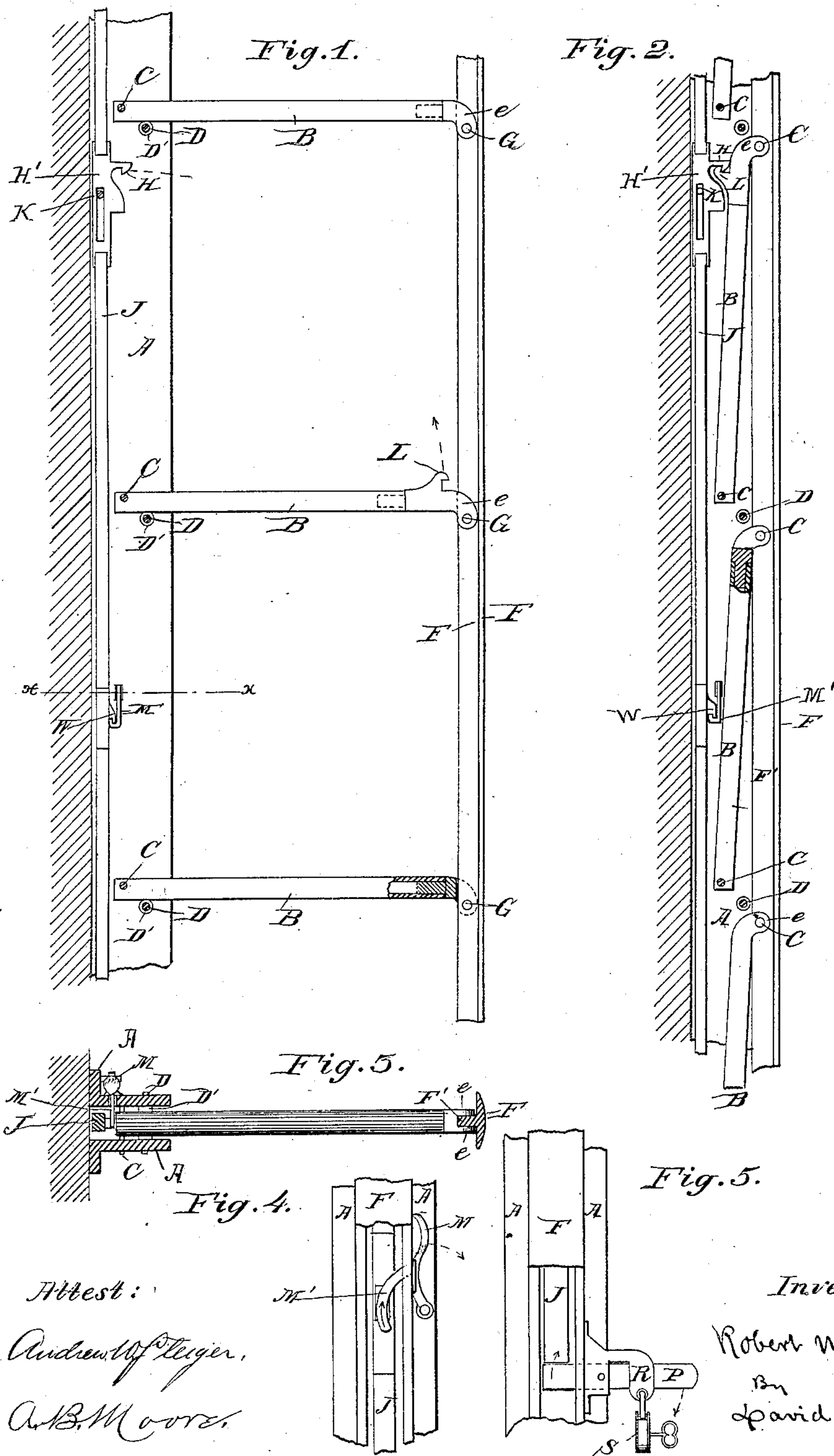


(No Model.)

R. M. WILSON.
FIRE ESCAPE LADDER.

No. 314,899.

Patented Mar. 31, 1885.



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UNITED STATES PATENT OFFICE.

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FIRE-ESCAPE LADDER.

SPECIFICATION forming part of Letters Patent No. 314,899, dated March 31, 1885.

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To all whom it may concern:

Be it known that I, ROBERT M. WILSON, of the city, county, and State of New York, have invented a new and useful Improvement in Fire-Escape Ladders; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

My invention relates to that class of fire-escape ladders which are constructed with one bar or side of the ladder permanently attached to the building, and its outer bar or rail connected to the first by pivoted rounds, which permit the ladder to be folded up closely against the building when not required for use.

The object of my invention is to furnish a ladder which, constructed with rounds of ordinary gas-piping, may be put together without special fitting and yet receive uniform and complete support at each round when opened out, and which will not become fastened in its closed position by the effects of rust, nor useless because of inoperative catches, but will remain at all times serviceable, strong, and easy of management.

It consists of improvements in the construction of the hinge by which the outer end of each round is connected to the T-bar constituting the outer rail of the ladder, in the manner of holding up the ladder by catches connected with a lifting or tripping bar, and in the means for throwing out the ladder, as hereinafter fully described, whereby its construction is simplified, its cost reduced, and its ready operation at all times assured.

In the accompanying drawings, Figure 1 is a side elevation of the ladder with one of the side plates or angle-irons forming its case removed, and the outer end of one of the rounds in section; Fig. 2, a similar elevation of the ladder when closed; Fig. 3, a transverse section of the open ladder in line *xx* of Fig. 1; Fig. 4, a front view of a portion of the ladder with the outer bar broken away, illustrating the device for locking and opening the ladder; and Fig. 5 a similar detached view illustrating the lever at the lower end of the ladder for opening it from the street-level.

A A are the side plates forming the casing,

to which the inner ends of the rounds B B of the ladder are pivoted, and within which they are inclosed when the ladder is folded up. These side plates are constructed of angle-iron to facilitate their secure attachment to the wall of a building. The sides of the irons which project from the building are parallel, while those which rest against the wall are turned in opposite directions, leaving a clear open space between the projecting sides extending from the face of the wall to their outer edges. The width of this longitudinal open space in the casing is slightly greater than the thickness or diameter of the rounds B B, and the inner end of each round is inserted therein and pivoted upon a transverse pin, C, which is led through the sides of the casing and through the end of the round at the center or above its longitudinal axis, preferably the latter, to give strength to the round. A transverse supporting-pin, D, is inserted through the casing below the round in front of the pivot-pin and parallel thereto, so that the round may rest thereon when extended in a horizontal position at a right angle to the casing, as shown in Fig. 1.

A sleeve or collar, D', of a length to fit closely between the sides A A of the casing, is fitted upon each supporting-pin, and serves as a brace to stiffen the casing and afford support to its projecting sides. The outer end of each round terminates in two parallel knuckles, *ee*, (see Fig. 3,) which bend outwardly from the round with a regular curve, so that their ends shall project at a right angle to its length beyond the under side thereof. (See Fig. 1.) These knuckles *ee* are made to embrace between them the central inner flange, F', of a T-iron, F, forming the outer rail of the ladder, to which they are pivoted each by a pivot-pin, G, passing through the knuckles and the flange. The outer face of the T-iron is of a width equal to that of the casing A A, so that when closed up against the same it shall fully cover the edges of its projecting sides, and it is preferably rounded transversely, as shown in Fig. 3, to make a neat finish for the casing when it covers the same. The depth of the slot or recess between the knuckles *ee* of each round is preferably so proportioned with reference to the width between the outer edge of the flange F' and the pivot-pin G of the round,

as that when the round is at a right angle to the flange the edge of the flange shall come into contact with the inner end of the recess and find support against the same, (as is shown in the sectional view given of the end of the lower round in Fig. 1.) The knuckles *e e* may be formed in one piece with the round, or, by preference, the rounds are made of tubing, and the knuckles are cast upon a separate piece adapted to be driven into the end of the tube and riveted thereto, as illustrated in the drawings.

When the outer T-rail of the ladder is folded up against the inner casing, A A, the rounds are wholly concealed within the casing, as shown in Fig. 2, and the rail and rounds are securely held in this position by means of one or more catches or detents, H, carried by a rod or bar, J, fitted to play loosely longitudinally within the casing, between the inner ends of the rounds and the wall of the building to which the casing is secured. This locking-bar J extends from near the bottom of the ladder to its upper end, and is confined by means of one or more transverse pins, K, passing through corresponding longitudinal slots in the bar, so that while the bar is thereby held in place within the casing it is free to have a limited longitudinal movement. By preference the slot for each pin K is formed in a block, H', upon which the detent H is also formed, in which case the bar J is divided into sections, between which the block or blocks H' are interposed as a coupling to connect them, as shown in the drawings, Figs. 1 and 2. The detent H, which may be in the form of a hook, is so placed upon the bar J as to engage readily a counterpart hook or catch, L, formed in or upon the outer end of one of the rounds or in or upon the knuckles or hinge-block fitted to said end. The ends of the two catches H and L are brought into contact when the round is swung and folded up against the locking-bar, and their opposite edges are so beveled as that the inward movement of the round shall cause its catch or hook L to raise the hook H, (and the locking-bar to which it is attached,) so as to pass its point and interlock therewith, as illustrated in Fig. 2.

When the hooks or catches are thus interlocked, the weight of the bar J and its attachments operates to keep them securely locked, and the ladder is thereby held fast in its closed position, so that it may not be opened without lifting said bar. The lifting of the bar is accomplished by means of a lever, M, Fig. 4, pivoted to the angle-iron forming one side of the casing, so as to swing parallel with the wall of the building. An arm, M', describing a curve having the pivot of the lever as its center, (see Fig. 4,) is secured to the lever about one-third its length, to project inward through the outwardly-projecting flange of the casing in front of the locking-bar J, between two of the rounds, and its end is made

to hook under a lug, W, upon the bar, or into a recess therein, so that when the lever M is swung out from the side of the casing (see arrows in Fig. 4) its arm shall operate to lift the bar J. One of these lifting-levers may be placed at each balcony or near to a window in each story of the building, so as to be easily reached and operated by a person in the building. To permit the ladder to be opened from the street, a lever, P, is pivoted to the lower end of the casing to extend horizontally parallel with the building. The inner shorter end of the lever passes under the lower end of the locking-bar, and its outer end projects in position to be readily forced down with the foot, a movement which will serve to lift the rod J and release the ladder. To prevent the lever from being operated mischievously or improperly, a guard consisting of an arm, R, is secured to the casing to project parallel with the outer arm of the lever, above the same. The outer end of the arm R is preferably forked to embrace the outer arm of the lever when it is at rest, and the lever is then readily locked therein by means of a transverse pin or the hasp of a padlock, S, led through apertures in the fork below the lever, as shown in Fig. 5. Instead of forming the arm R with a forked end, it may be simply made to extend alongside of the lever, and the latter be locked thereto by a bolt or hasp passing through apertures brought into register in the lever P and arm R.

The upward movement of the rod J when it is lifted is made to force the outer rails and rounds outward, to cause the ladder to open automatically by means of an inclined surface, V, formed upon the outer side of each catch-block H, to bear against a counterpart opposed inclined surface upon the outer face of the round, the oppositely-inclined surfaces being brought into contact when the catches L and H interlock, as shown in Fig. 2.

When the ladder is constructed in separate sections, of which the lowermost one may drop independently of those above it, I form the engaging lip or hook of the catch or detent on the locking-bar of each section longer than that of the corresponding catch or detent of the section below it, so that the lifting of the bar shall release the lower section before releasing that above it, and by arresting the movement of the bar after one or more of the lower sections have been released and thrown open the upper section may remain closed.

I claim as my invention—

1. The slotted hinge connecting the outer end of each round with the central flange of the outer T-rail of the ladder, which consists of the curved knuckles projecting upon one side of the longitudinal axis of the round to embrace the flange, a pivot-pin passing transversely through the knuckles and flange, and a stop-surface formed at the inner end of the slot, between the knuckles, to abut against the edge of the flange when the round is lifted

at a right angle thereto, substantially in the manner and for the purpose herein set forth.

2. The combination, with a vertically-moving bar within the stationary case of the ladder and with a catch upon the outer end of one of its rounds, of a catch or detent fixed to or formed integral with the bar, in position to engage the catch upon the round when the latter is closed up into the case, substantially in the manner and for the purpose herein set forth.

3. The combination, with a beveled or inclined faced lug or offset formed upon or secured to the outer face of the vertically-moving bar in the stationary case of the ladder, of a counterpart inclined faced lug or offset upon the outer end of one of the pivoted rounds of the ladder adapted to rest against the lug or offset on the bar when the ladder is closed, so that a movement of the bar shall operate to force out the round therefrom, substantially in the manner and for the purpose herein set forth.

4. The combination, with the vertically-moving locking-bar fitted within the stationary case of the ladder, of a lever pivoted outside of the case, and constructed with a curved arm projecting through the side of the case to engage directly a lug or recess upon the face of the bar, and adapted thereby when

swung outward to lift said bar, substantially in the manner and for the purpose herein set forth.

5. The combination, with the vertically-moving locking-bar fitted within the stationary case of the ladder, of a horizontal pivoted lever whose shorter arm engages the bar directly and whose longer arm projects laterally from the case, so that pressure exerted upon said outer arm shall operate to lift the locking-bar, substantially in the manner and for the purpose herein set forth.

6. The combination, with the vertically-moving locking-bar within the stationary case of the ladder, and with a horizontal pivoted lever whose inner shorter arm engages the bar to lift the same, of a fixed bar extending parallel with the outer end of the lever and a transverse locking bolt or hasp led through an aperture in said fixed bar to lock and prevent the movement of the lever, substantially in the manner and for the purpose herein set forth.

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

ROBERT M. WILSON.

Witnesses:

A. B. MOORE,
ANDREW W. STEIGER.