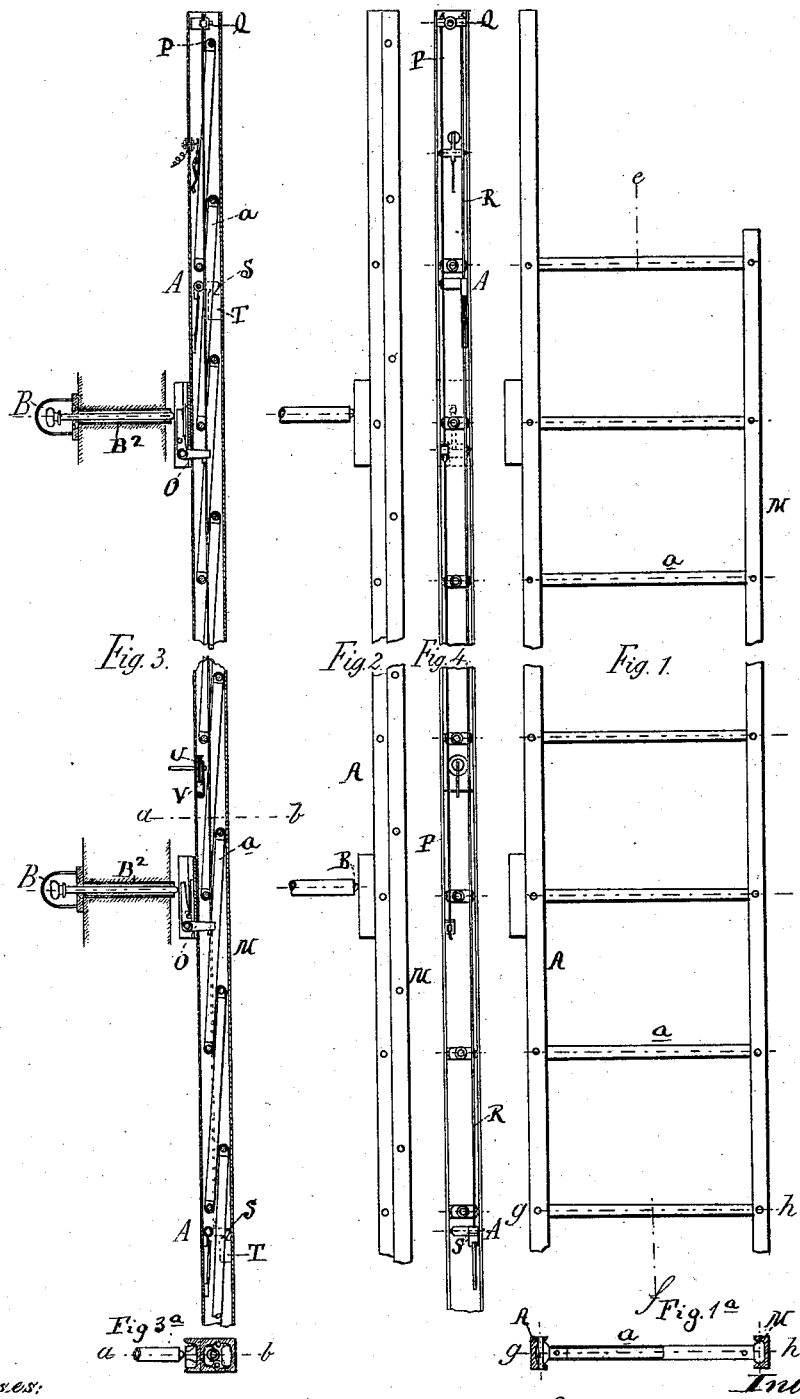
(No Model.) 4 Sheets—Sheet 1.

J. AMSLER-LAFFON.

PERMANENT FIRE ESCAPE.

No. 301,785. Patented July 8, 1884.



Witnesses:
C. F. Bett.
A. M. Tanner.

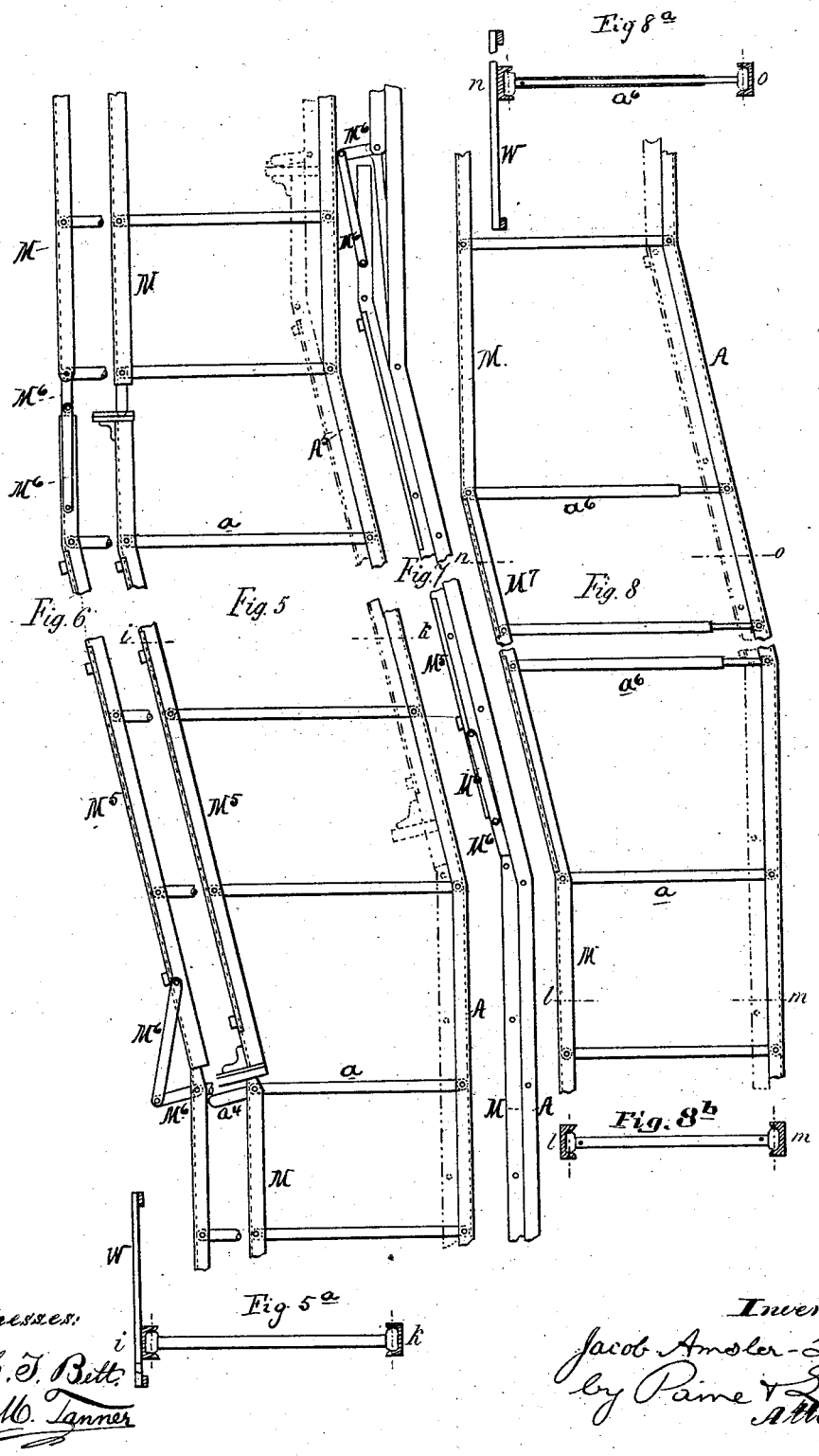
Inventor
Jacob Amsler-Laffon
by Paine & Gould
Attorneys.

(No Model.) 4 Sheets—Sheet 2.

J. AMSLER-LAFFON.

PERMANENT FIRE ESCAPE.

No. 301,785. Patented July 8, 1884.



Witnesses:
C. F. Britt
A. M. Tanner

Inventor:
Jacob Amsler-Laffon
by Paine & Laffit
Attorneys

(No Model.)

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J. AMSLER-LAFFON.

PERMANENT FIRE ESCAPE.

No. 301,785. Patented July 8, 1884.

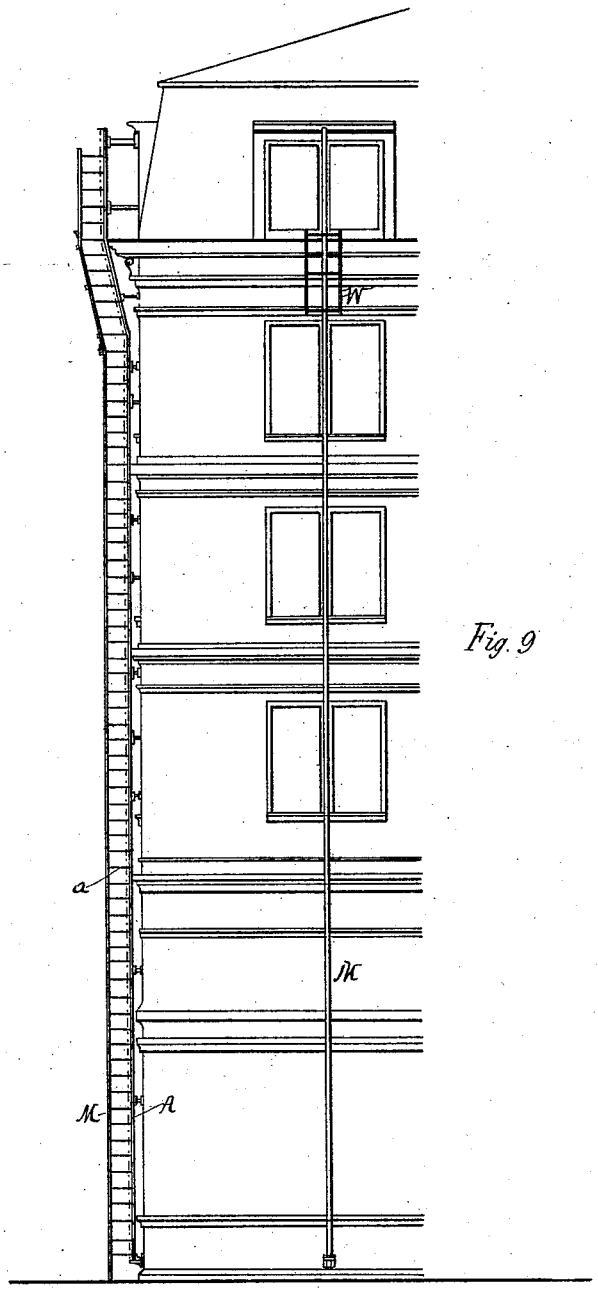


Fig. 9

Witnesses:
C. J. Belt
A. M. Tanner

Inventor:
Jacob Amsler-Laffon
by Paine & Ladd
Attorneys.

(No Model.) 4 Sheets—Sheet 4.

J. AMSLER-LAFFON.

PERMANENT FIRE ESCAPE.

No. 301,785. Patented July 8, 1884.

Fig. 10.

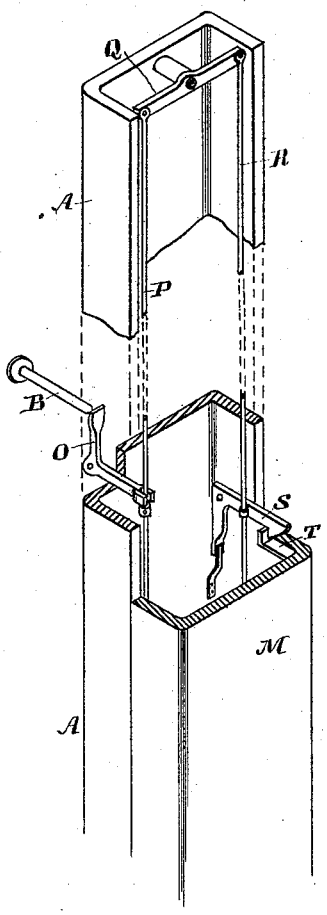
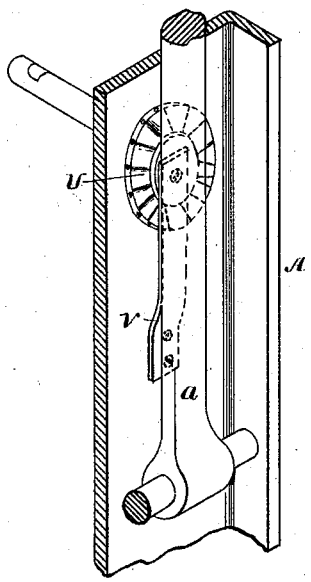


Fig. 11.



WITNESSES

C. F. Bell.
Oscar Nauck.

INVENTOR

Jacob Amsler Laffon
By Paine & Ladd,
Attorneys.

UNITED STATES PATENT OFFICE.

JACOB AMSLER-LAFFON, OF SCHAFFHAUSEN, SWITZERLAND.

PERMANENT FIRE-ESCAPE.

SPECIFICATION forming part of Letters Patent No. 301,785, dated July 8, 1884.

Application filed June 19, 1883. (No model.)

To all whom it may concern:

Be it known that I, JACOB AMSLER-LAFFON, a citizen of Switzerland, residing at Schaffhausen, in the Canton of Schaffhausen and Republic of Switzerland, have invented certain new and useful Improvements in Permanent Fire-Escape Ladders; and I do hereby 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 letters or figures of reference marked thereon, which form a part of this specification.

This invention relates to that class of permanent fire-escapes which consist, essentially, of a folding ladder made of two side bars or beams and pivoted connecting-rounds or tread-surfaces, one of the side bars being secured to the wall of a building, and the other being free to move in an outward and downward direction therefrom to bring the connecting-rounds or tread-surfaces into a horizontal position when the ladder is to be used as a fire-escape.

The invention consists in means for holding the ladder in a closed or folded position, in a novel construction of the ladder whereby it will adapt itself to angles or cornices or other projections on the front of a building and permit a safe descent therefrom, and in a pneumatic-signal device arranged in a novel manner for giving warning to the occupant of a building that danger is impending, or that the ladder is in position for use.

In the drawings, Figure 1 is a front view of a straight fire-escape ladder, showing the same in an open or unfolded position. Fig. 1ª is a cross-section through the line *g h* of Fig. 1. Fig. 2 is an elevation showing the ladder in a closed or folded position. Fig. 3 is a vertical section of the closed or folded ladder and the means for releasing or tripping the same from the interior of a building. Fig. 3ª is a cross-section through the line *a b* of Fig. 3. Fig. 4 is a vertical section through the line *e f* of Fig. 1, showing more fully the means for locking and releasing the ladder. Fig. 5 is a face view of an escape-ladder having an angular section interposed between two straight sections. Fig. 5ª is a cross-section taken through the line *i k* of Fig. 5. Fig. 6 is another form of ladder having an angular side section, only one of the side bars and part of the connecting-rounds being shown in this figure. Fig. 7 is a side view of the ladder shown in Fig. 6 when in a closed position. Fig. 8 is a front view of a ladder having angular side bars and telescopically-sliding connecting-rounds. Fig. 8ª is a cross-section through the line *l m* of Fig. 8. Fig. 8ᵇ is a cross-section through the line *n o* of the same figure. Fig. 9 is a view of a building, representing two ladders in front and side elevation, and showing the guard-railing applied to an angular or inclined ladder-section. Fig. 10 is a detail view illustrating the operation of the retaining and releasing devices, and Fig. 11 illustrates the pneumatic signal.

The letter A designates a metallic bar, which is made of channel-iron, of any desired form in cross-section; and M is another bar of a corresponding form, which is connected with the bar A by means of rounds or tread-pieces *a*, that are connected with both bars by hinge or pivot joints, as is shown in Fig. 1ª, and are either made tubular or solid. These parts constitute a folding ladder, in which the rounds or tread-pieces fold into the hollow space formed when the two side bars of the ladder are brought together, as is shown in Fig. 3. The bar A is secured to the front of a building by brackets, clamps, or other fastening devices, and constitutes the permanent member of the ladder, the other parts being free to move in a downward and outward direction therefrom.

In Figs. 1 to 4, inclusive, I have shown a ladder adapted for a straight-walled building, and means for holding the ladder in a folded position and releasing the same when it is to be brought into a position for ready use. These retaining and releasing devices consist of push-buttons and pins B, which are located in the different stories of the building, and operate in shells or guide-tubes B², fitted in the wall of the building.

At the back of the bar A, of the ladder are arranged bell-crank or elbow levers O, the vertical arms of which extend in front of the push-pins B, so that they can be rocked thereby. A vertical wire or rod, P, connected with the bell-crank levers belonging to the push-buttons of the different stories of the building, lies in the bar A, and is attached at its upper end to one end of a centrally-pivoted lever or

arm, Q, the other end of said lever carrying a rod or wire, R, which is connected with a suitable number of spring-hooks, S, that are pivoted to the permanent bar A of the latter. These hooks engage with projections T on the inner side of the movable bar of the ladder, it being obvious that when said movable bar is brought against the permanent bar the hooks engage in an automatic manner with the projections and hold the ladder closed. The tripping of the ladder can only be effected from the inside of the building, as the retaining devices are only capable of being released by means of the push-buttons and rods and the devices operated thereby. In the event of a fire or other cause rendering the use of the ladder necessary, any one of the push-buttons can be resorted to for releasing the fastening-hooks S, and then the ladder will assume the position shown in Fig. 1 and be ready for use. Simultaneously with the opening of the ladder a pneumatic signal is sounded in one or more parts of the building, warning the occupants that danger or fire is at hand. This pneumatic signal is operated by means of a flexible air bulb or bellows, U, that is arranged inside the stationary ladder-bar, and is held in a collapsed or inoperative state by the pressure of one of the ladder-rounds upon the same. When this pressure is removed by the opening or unfolding of the ladder, a spring, V, connected with the air-bulb or bellows and with the bar A, serves to distend or inflate said bulb or bellows, causing a suction of air through the pneumatic signal, which may be in the form of a horn or whistle. It is also proposed to operate a signal or bell electrically by means of an electrical circuit, and using a circuit breaker and closer, W, which is arranged on the ladder-bar A, and co-operates with the movable part of said ladder.

In Figs. 5 to 9, inclusive, I have represented various forms of folding ladders having angular or inclined sections or parts for adapting the same to buildings possessing angles, cornices, or other projections.

In Fig. 5 the permanent side bar, A, has the angular or inclined section A^5, and the movable bar is divided and has the intermediate angular section, M^5, which is connected with the angular section A^5 by the pivoted rounds or tread-pieces, the lower end of the angular section A^5 resting upon the top of the subjacent bar A when the ladder is in an open position. On closing the ladder an extension, a^4, of the tread-piece next adjoining the angular section M^5 comes against the lower end of the latter, and when the parts are folded together they assume the position shown in dotted lines in Fig. 5.

In Fig. 6 the angular section M^5 of the movable bar M is shown connected with the latter by means of pivoted lever-links M^6, which, when the ladder is closed, assume the position shown in Fig. 7 and cause the component parts of the ladder to lie close together, as will be readily understood.

In the construction shown in Fig. 8, I overcome the necessity of employing an independent intermediate section, and can make the outer bar, M, of a continuous length, having the proper angular position M^7. This is rendered possible by using connecting-rounds a^6, made of telescopically-sliding sections—that is, each round is formed of a tubular part and a solid part that enters and can slide in said tubular part.

It will be manifest that a ladder having an angular or inclined section following the contour of the building can be used as a safe means of descent, and in order to prevent any stepping off from the angular section of the ladder it is proposed to attach a guard-railing, W, thereto. This railing consists of arms extending at right angles to the bar M and vertical arms running parallel with the latter and connected with the other bars of the railing.

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

1. In a permanent fire-escape for buildings, the combination, with a folding ladder, of the retaining-hooks S, the vertical rods P R, the lever or arm Q, bell-crank levers O, and push-buttons and pins B, substantially as and for the purpose set forth.

2. In a permanent fire-escape for buildings, the combination of a folding ladder having an angular or inclined intermediate section and means, substantially as described, for connecting the same with straight top and bottom sections, as herein set forth.

3. In a permanent fire-escape for buildings, the combination of a folding ladder having side bars made with an angular or inclined portion and telescopically-sliding rounds for connecting said inclined portions, substantially as herein set forth.

4. In a permanent fire-escape for buildings, the combination, with a folding ladder, of an air-bulb or bellows having a distending-spring, with a pneumatic signal, substantially as set forth.

In testimony whereof I have affixed my signature in presence of two witnesses.

JACOB AMSLER-LAFFON.

Witnesses:
TUL. A. BOURRY,
JOHN FREY.