

2 Sheets—Sheet 1.

FOLDING FIRE ESCAPE LADDER.

Patented Sept. 9, 1884.

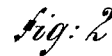
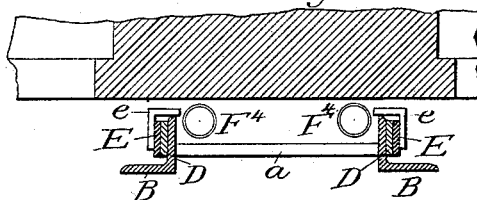


Fig. 2^a

A. Schehl.

Carl Kay



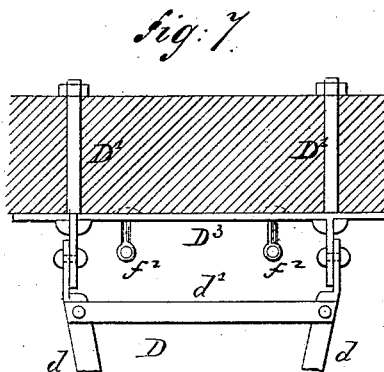
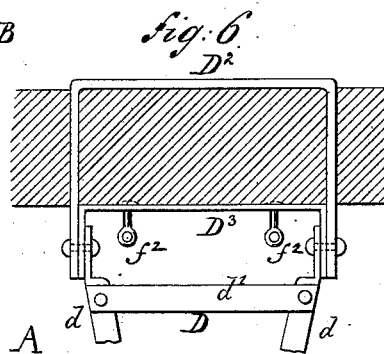
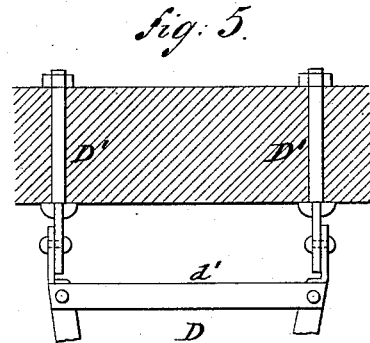
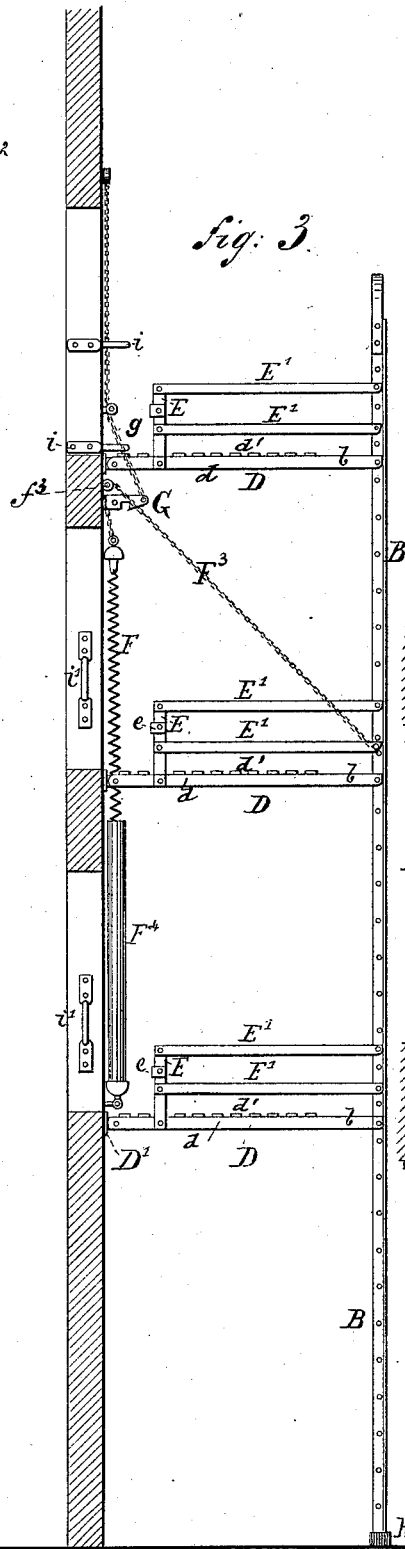
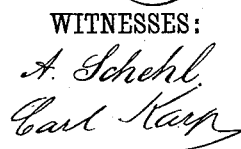
F. W. Hopfe

BY
Siegel & Ragsdale
ATTORNEYS.

2 Sheets—Sheet 2.

No. 304,821.

Patented Sept. 9, 1884.



INVENTOR

Ferdinand W. Hofele

BY

BY *Gospel & Regener*
ATTORNEYS.

UNITED STATES PATENT OFFICE.

FERDINAND W. HOFELE, OF NEW YORK, N. Y.

FOLDING FIRE-ESCAPE LADDER.

SPECIFICATION forming part of Letters Patent No. 304,821, dated September 9, 1884.

Application filed April 11, 1884. (No model.)

To all whom it may concern:

Be it known that I, FERDINAND W. HOFELE, of the city, county, and State of New York, have invented certain new and useful Improvements in Folding Fire-Escape Ladders, of which the following is a specification.

This invention has reference to certain improvements in the folding fire-escape ladder for which Letters Patent have been granted to me heretofore under date of February 26, 1884, No. 294,219, said improvements being designed with a view to render the operation of the fire-escape more effective, admit the unlocking of the ladder from any floor of the building, and dispense with the counterbalancing-weights at the inside of the building; and the invention consists of a folding fire-escape ladder that is connected by folding platforms with the wall of the building, and balanced by means of strong spiral springs that are inclosed, when the fire-escape ladder is placed close to the wall, in tubular casings, but which are drawn out of the casings when the fire-escape ladder is lowered to a position at some distance from the building. The platforms are provided with folding guard-railings, the uprights of which are provided with inwardly-projecting stops. The ladder is locked close to the building by a hinged hook that is lifted, so as to release the ladder, by chains that pass over pulleys located above the windows of the top story, and are conducted downward diagonally across the windows of the lower stories to points within reach of the ground. The lower ends of the ladder are provided with rubber cushioning-blocks, and the ladder inclosed by an exterior cover or shell attached to the side posts whenever it is desired to hide the same.

In the accompanying drawings, Figure 1 represents a front elevation of my improved folding fire-escape ladder, shown in raised position and locked to the wall of the building. Fig. 2 is a vertical transverse section of the same on line *x x*, Fig. 1. Fig. 2^a is a horizontal section on line *y y*, Fig. 1, drawn on a larger scale. Fig. 3 is a vertical transverse section showing the ladder in lowered position at some distance from the building and ready for use. Fig. 4 is a detail vertical central section of

one of the counterbalancing-springs and its inclosing-casing; and Figs. 5, 6, 7 are detail horizontal sections showing the method of anchoring the eyebolts to which the platforms are hinged to the walls of the building.

Similar letters of reference represent corresponding parts.

A in the drawings represents a vertical fire-escape ladder, which is composed of two side posts, B B, of suitable cross-section, and of horizontal rungs *a a*. The vertical ladder A is connected to the wall of the building by means of folding platforms D, one for each floor, which platforms are pivoted to the side posts, B B, and to eyebolts D', that are anchored to the wall of the building, as shown in Figs. 5 and 7, or to eyes of U-shaped irons D², that are passed around the pier of the building, as shown in Fig. 6. The anchoring-bolts D' or irons D² are connected at the front of the wall by transverse brace-plates D³. (Shown in Figs. 6 and 7.)

The platforms D D are constructed in any suitable manner of side rails, *d*, transverse metallic slats *d'*, and folding guard-railings E E'. The platforms have openings *b* next adjoining the ladder, said openings being of sufficient size to admit the descent of persons at the inside of the ladder. The folding guard-railings E E' are formed of uprights E, which are pivoted to the side rails, *d*, at some distance from the wall, for giving ready access to the platforms, and of horizontal rails E' E', that are pivoted to the uprights E and the side posts, B B, of the ladder. The uprights E E are provided with inwardly-bent stops *e e*, that abut against the side posts, B B, of the ladder A when the same is placed against the building, said stops holding the uprights E E and rails E' E' at an obtuse angle on the side posts, B B, of the ladder A, so as to prevent their springing into line against the side posts, which would exert a kind of locking action on the ladder and interfere with the proper downward motion of the same.

Instead of the counterbalancing-weights described in the patent heretofore referred to, which were hung to suspension-chains that were passed over pulleys located in extension-casings of the wall, it is preferable to counter-

balance the fire-escape ladder A and the folding platforms D D by means of one or more strong spiral springs, F F, according to the height and weight of the ladder and the platforms.

5 The spiral springs F are attached at their upper and lower ends to central eyebolts, $f f$, of cup-shaped sockets F^2 . The lower sockets F^2 are attached by eyes f' , made integral therewith to eyebolts f^2 , which are rigidly secured

10 to the building, preferably to the front brace-plates, D^3 , of the anchoring bolts or irons. The upper sockets F^2 are connected by their eyes f' to chains F^3 , which are passed over pulleys f^3 , attached to the wall or to said brace-plates

15 D^3 , and attached to the side rails of the ladder, as shown in Fig. 3. The spiral springs F are protected against rain, snow, and ice by means of tubular inclosing-casings F^4 , which are fitted at their upper and lower ends into

20 annular recesses of the cup-shaped sockets F^2 , the upper sockets F^2 being inverted, so as to properly shed the water, as shown in Fig. 4. When the fire-escape ladder is raised so as to rest close against the wall, the spiral springs

25 F take up a small space and are stored away entirely within the tubular casings F^4 . The sockets F^2 at the upper and lower ends of the casings F^4 serve in the nature of closing-plugs for the casings and close them tightly, so that

30 access of water and snow to the interior of the casings is prevented. When the vertical ladder A is lowered, as shown in Fig. 3, the spiral springs F are extended and drawn out of the casings, as shown in Fig. 3. When the

35 ladder A is in raised position, it is locked to the wall by a weighted or spring actuated hook, G, which is pivoted to an eyebolt of the wall, or preferably to an eyebolt of the front plate, D^3 , of the anchoring bolts or irons. The

40 hook G engages one of the rungs of the ladder, and is connected to a chain, g , which passes in upward direction along the wall and branches out into two chains, g , that are passed over pulleys g^2 above the windows of the upper-

45 most story, and then extended downward diagonally across the windows, the chains g being guided by eyebolts g^3 of the wall, and provided at the lower ends with handles g^4 , which can be reached from the ground. By guiding

50 the chains diagonally across the windows at both sides of the ladder A, as shown in Fig. 1, the fire-escape may be lowered, whenever required, from any story by simply pulling one of the chains g' and releasing the hook G from

55 the ladder, upon which the same slowly descends into lowered position. The weight of the ladder and platforms bears such a relation to the tension of the counterbalancing-springs that the ladder moves slowly into lowered position at some distance from the building, as

60 shown in Fig. 3, when the locking-hook is released. The lower ends of the side posts, B B, of the ladder A are provided with large cushioning-blocks h , of rubber or other elastic

65 material, which, when arriving on the sidewalk or ground, neutralize the concussion of the ladder without injury to the same.

When the fire-escape is used for apartment and flat houses, hotels, &c., it is preferable to inclose the same by an exterior cover or shell, 70 H, which shell is flanged at both sides and attached to the side posts, B B. The cover H is preferably arranged with openings, and finished in a suitable ornamental manner, so as to improve the appearance of the ladder, the 75 openings of the cover being so arranged that it does not interfere with the descent of passers at the inside of the ladder, or with the ascending of the same from the outside by the firemen. The cover is shown in section in Fig. 80 2 and partly in Fig. 1, the rest being broken away.

When the fire-escape is used in connection with tenement-houses and factory buildings, the ornamental cover may be dispensed with. 85

To reach the fire-escape from the different parts of the building the wall is provided with horizontal rungs i between the windows, and with vertical hand-rungs i' , attached to the window-casings next adjoining the fire-escape ladder, said vertical rungs serving to facilitate the mounting of the platforms from the window-sills. 90

In case of fire the fire-escape is readily lowered by pulling one of the chains g' from any 95 story, by which the locking-hook G is released, so that the fire-escape ladder swings into lowered position at a distance from the wall equal to the length of the platforms until the cushioning-blocks $h h$ arrive on the ground, as 100 shown in Fig. 3. In this position the fire-escape can be used for the escape of persons, and also for giving access to the building.

Having thus described my invention, I claim as new and desire to secure by Letters Patent— 105

1. In a folding fire-escape ladder, the combination of a vertical fire-escape ladder, folding platforms connecting the ladder with the building, counterbalancing-springs that are attached at their lower ends to the building, 110 and chains that are attached to the upper ends of the springs and passed over guide-pulleys to the side posts of the ladder, substantially as set forth.

2. In a folding fire-escape ladder, the combination of a vertical ladder and folding platforms hinged to eyebolts of the building, said eyebolts being anchored to the building and braced by front plates having eyes for attaching the counterbalancing chains and pulleys, substantially as set forth. 115

3. In a folding fire-escape ladder, the combination of a vertical ladder, folding platforms connecting the ladder with the building, and counterbalancing-springs connected at 125 their lower ends to the building and at their upper ends to chains which pass over pulleys to the side posts of the ladder, said springs being inclosed in tubular casings, substantially as set forth. 130

4. In a folding fire-escape ladder, the combination of the vertical ladder and folding platforms with counterbalancing-springs connected at the lower ends by cup-shaped sock-

ets to the wall of the building and at the upper ends by sockets to connecting-chains, said springs being inclosed in tubular casings which are closed by said sockets, substantially as set forth.

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5. In a folding fire-escape ladder, the combination of the ladder and folding platforms with counterbalancing-springs, cup-shaped sockets having eyebolts to which the springs are attached, balancing-chains, and tubular casing fitted into annular recesses of the sockets, substantially as set forth.

6. In a folding fire-escape ladder, the combination of a vertical ladder, A, folding platforms D, connecting the ladder to the building, folding guard-railings composed of pivoted uprights and side rails, the uprights being provided with inwardly-projecting stops e, substantially as set forth.

7. In a folding fire-escape ladder, the combination of a vertical ladder, folding plat-

forms connecting the ladder with the building, counterbalancing springs and chains, a locking-hook, and chains passing from said locking-hook over guide-pulleys above the windows of the uppermost story and downward through guide-eyes and in front of the windows at both sides of the ladder to the lower part of the building, substantially as set forth.

8. In a folding fire-escape ladder, the combination of the vertical ladder with an exterior cover or shell having side flanges attached to the side posts of the ladder, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

FERDINAND W. HOFELE.

Witnesses:

CARL KARP,
SIDNEY MANN.