(No Model.)

F. L. BLOM.

LADDER FIRE ESCAPE.

No. 382,862. Patented May 15, 1888.

Fig. 1.

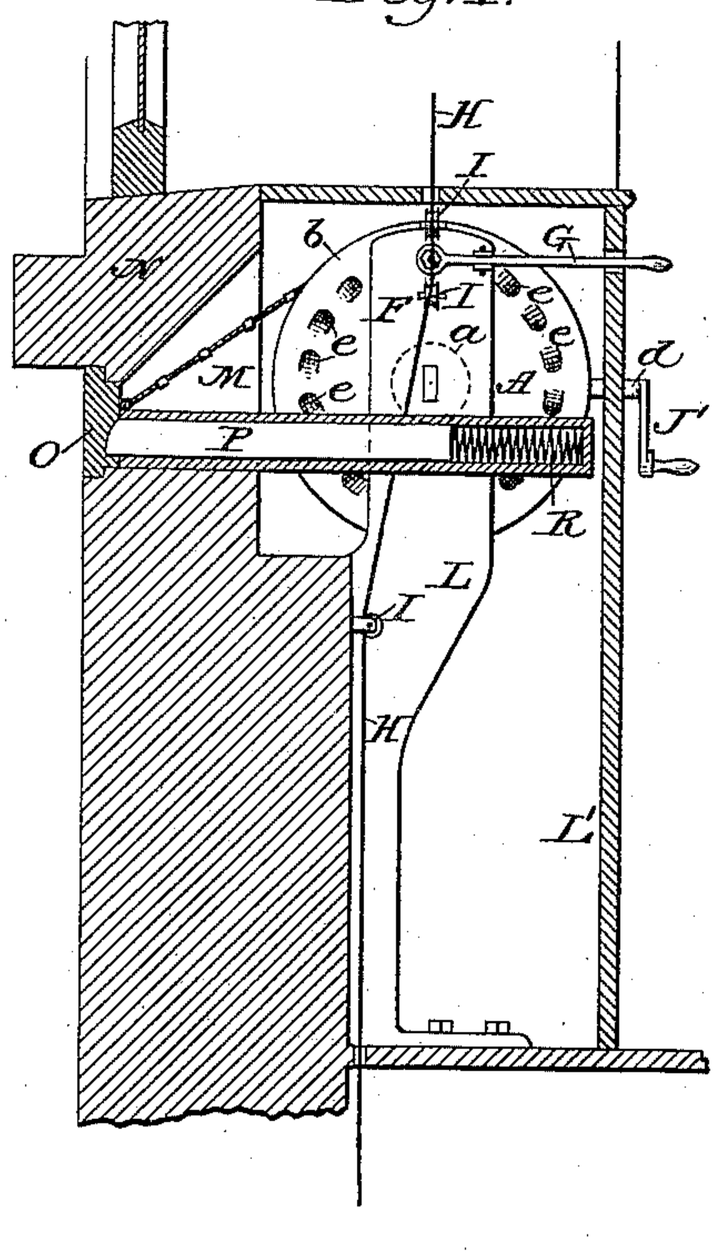


Fig. 2.

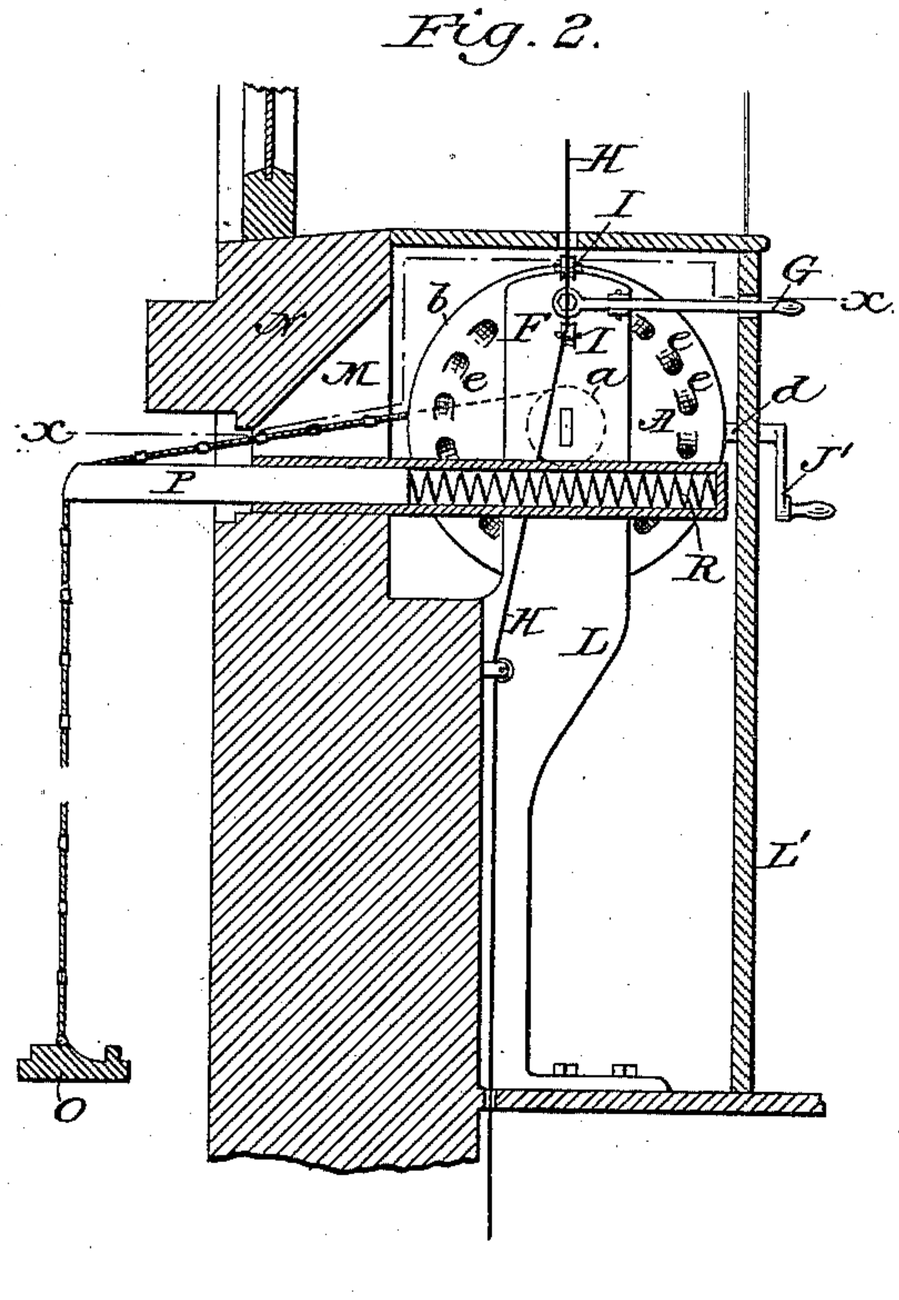


Fig. 3.

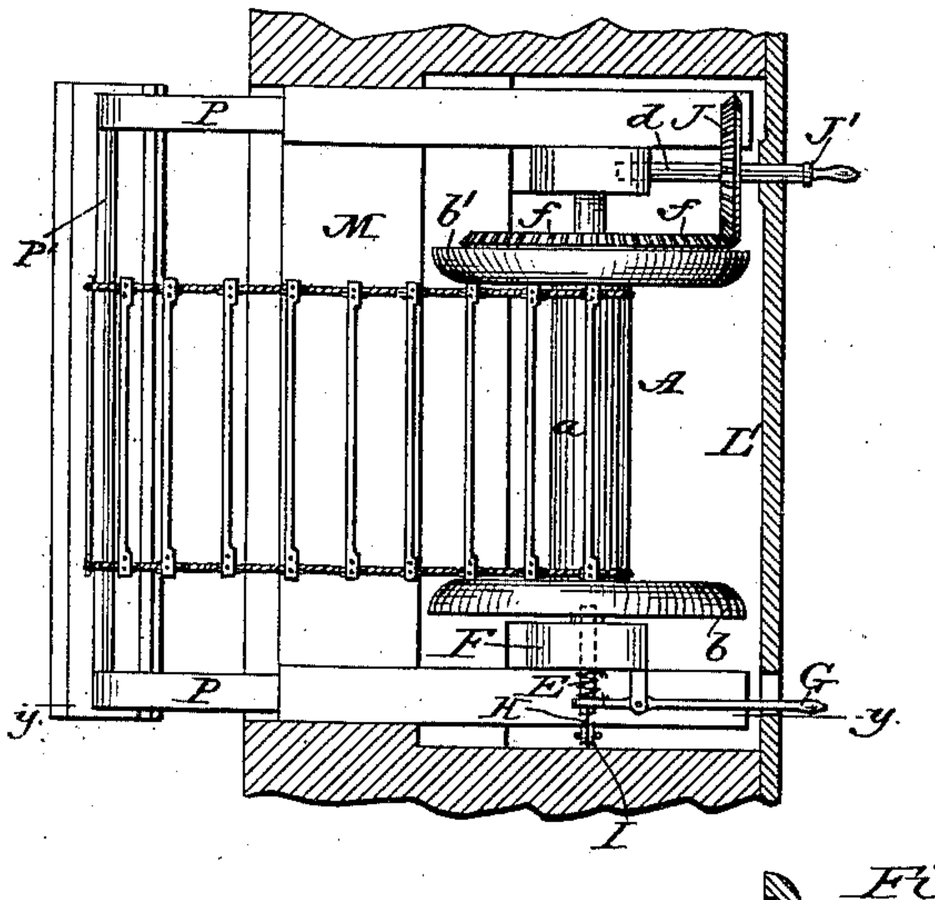


Fig. 5.

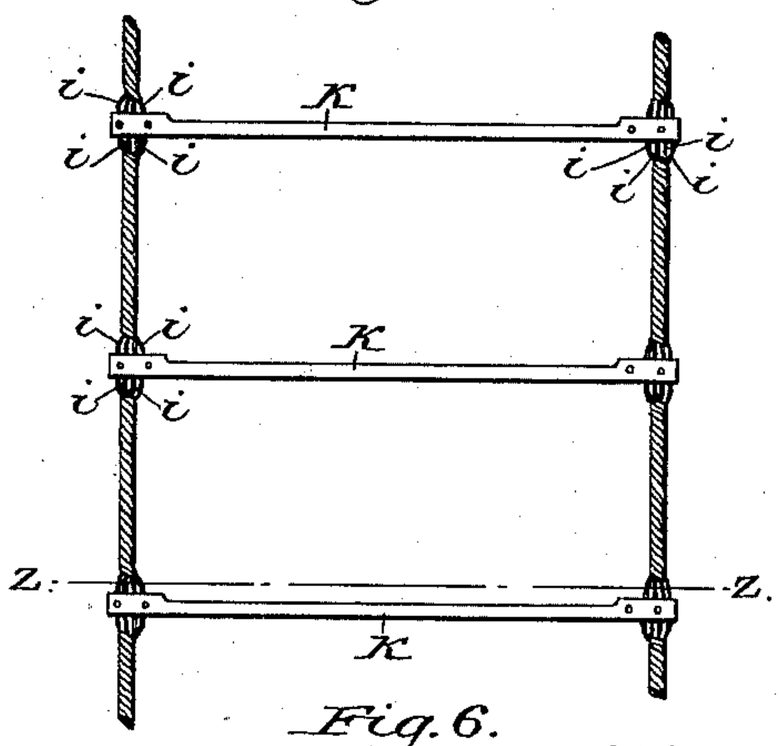


Fig. 6.

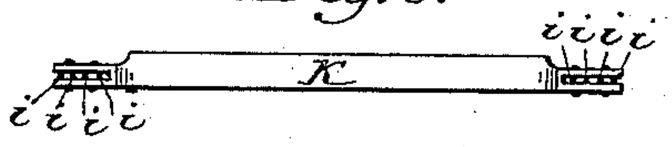
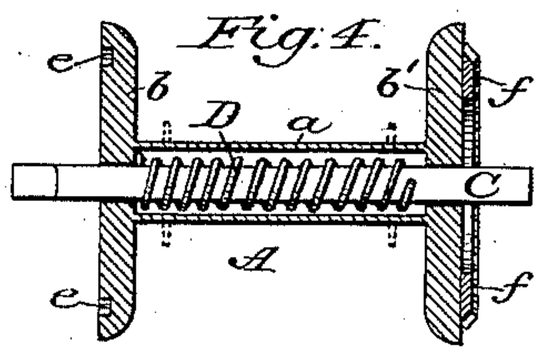


Fig. 4.



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UNITED STATES PATENT OFFICE.

FRANS L. BLOM, OF NEW YORK, N. Y.

LADDER FIRE-ESCAPE.

SPECIFICATION forming part of Letters Patent No. 382,862, dated May 15, 1888.

Application filed September 21, 1887. Serial No. 250,315. (No model.)

To all whom it may concern:

Be it known that I, FRANS L. BLOM, of the city, county, and State of New York, have invented certain new and useful Improvements in Ladder Fire-Escapes; 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, in which—

Figure 1 is a view in vertical transverse section in line *y y* of Fig. 3 of the improved fire-escape with the ladder drawn up; Fig. 2, a similar view representing the ladder when partly lowered; Fig. 3, an irregular horizontal section in line *x x* of Fig. 2; Fig. 4, a longitudinal section through the axis of the drum; Fig. 5, a detached view in elevation, upon an enlarged scale, of a section of the ladder; and Fig. 6, a transverse section in line *z z* of Fig. 5.

My invention relates to that class of fire-escapes in which a flexible ladder wound up upon a drum in the upper part of a building is employed; and it has for its object to simplify and perfect the operation of such an escape-ladder.

It consists in an improved construction of ladder, and in the combination of devices, hereinafter fully described, for raising and lowering the ladder and for liberating it, so that it shall automatically drop to the ground in position for use when required.

In the accompanying drawings, A represents a drum, preferably constructed of a cylinder, *a*, connecting the wheels *b b* and mounted to revolve upon a fixed axle, C, as shown in Fig. 4. The cylinder *a* is so much larger in diameter than the axle C as to leave a concentric space between the two, within which may be fitted a coiled spring, D, one end of which is made fast to the cylinder and the other to the axle, so that in revolving the drum to wind up a ladder thereon the spring will be wound up and made ready thereby to produce automatically, when liberated, a reverse movement of the drum to unwind the ladder.

To hold fast the drum when the spring is wound up, a ratchet or a series of holes or recesses, *e e*, each beveled at one side, are formed concentrically in the outer face of one of the wheels *b*, and a spring-actuated pin or pawl, E, (see Fig. 3,) is fitted in a proximate standard, F, to engage said ratchet *e e* and prevent a reverse movement of the drum under the action of the spring.

The disengagement of the pawl E and the consequent release of the drum A are effected from the apartment in which the drum is placed by means of a lever, G, pivoted in position to engage at its inner end and upon one side of its pivot the pawl E, and to extend out at the other within the apartment, as shown in Figs. 1, 2, and 3. To effect from apartments above or below the drum a disengagement of the pawl, cords H H are connected to its outer end, and are led over pulleys I I above and below the pin, and thence to said several apartments, so that a pull upon either cord operating to pull back the pawl will disengage it and liberate the drum.

To wind up the drum, beveled teeth *f f* are formed upon the outer face of its opposite wheel, *b'*, to be engaged by a beveled pinion, J, actuated by a crank, J'. The crank-shaft *d*, to which the pinion J is fixed, is fitted to slide longitudinally in its journal-bearings at a right angle to the axis of the drum to admit of being thrown by said movement in or out of gear with the beveled wheel *b'*, so that after the drum has been wound up by means of the crank and pinion, the latter is disengaged, leaving the drum wholly free for its reverse movement.

The flexible ladder to be wound up upon the drum may be of any of the approved forms of rope or chain ladders known to the art; but I prefer to use a ladder made of strands *i i i* of wire, twisted in rope form between each of the rounds K K, (see Fig. 5,) and opened and laid side by side in parallel lines at regular intervals for the attachment of the rounds thereto, the ends of the rounds K being longitudinally slotted to receive and embrace said parallel strands *i i*, as shown in Figs. 5 and 6.

The drum A may be mounted to revolve in a suitable frame-work, L, fitted in a case, L', under the window-casing in an upper room. The crank J' and lever G are left projecting outward from the case, and the operating-cords extend down therefrom along the wall and through the floor to the apartments below.

The ladder K K is made of a length to reach from the drum to the ground, and its upper

or inner end is made fast to the cylinder *a* of the drum. It is passed thence out through an opening, M, made in the wall of the house beneath the window-sill N, and a metallic block, O, is attached to its lower end, said block being adapted to fit accurately within and completely close the opening M when the ladder is fully wound upon the drum.

To insure the automatic disengagement of the block O from the opening M when it is desired to lower the ladder, and to provide, furthermore, a brace for the ladder which will operate to keep it out from the wall clear of the window-sills or other projections below, two movable bars, P P, are fitted to project in line with the sides of the ladder within suitable incasing-boxes through the house-wall and into the drum-case L′. These bars are connected outwardly by a cross-rod, P′, and are adapted to be pushed back within the opening M by the block O when it is drawn up and inserted in its seat in said opening. A spiral spring, R, is inserted back of each bar P to force it outward. The two springs R R are compressed when the bars are forced inward, and are held under compression by the block O, which in turn is confined by the ladder wound up upon the drum. These springs thus operate as auxiliaries to the spring D within the drum A in the release of the ladder so soon as the pawl E, holding the drum, is disengaged therefrom.

In the operation of the device, when the ladder is needed, a pull upon either of the cords H H, or a movement of the lever G, will, by withdrawing the detaining pin or pawl E from the ratchet-wheel *h* of the drum, let it loose and free to revolve. The springs R R will thereupon be left free to push out the block O, whose weight will suffice to draw down the ladder K K, the spring D meantime operating to revolve the drum in the proper direction to unwind the ladder, so that it may drop without any resistance or friction from the drum.

When it is required to raise the ladder, an inward longitudinal movement of the crank-shaft *d* will bring the pinion J thereon into gear with the beveled wheel of the drum, so that the drum may be revolved to wind up the ladder by turning the crank J′.

When it is desired to store the ladder within the bottom of the case L′ rather than on the drum A, the ladder may be operated by means of radial pins fitted in the periphery of the drum (see dotted lines, Fig. 4) to engage the rounds of the ladder, or by means of equivalent sprocket-wheels to engage its sides when a chain ladder is employed.

I am aware that flexible ladders have been constructed whose sides are each formed of two parallel ropes, which are inserted and clamped side by side in recesses formed in the ends of the rungs, whereby they are separately secured to the rungs; but my invention differs therefrom in that the sides of my ladder are formed each of a single rope whose strands are opened out at each rung to pass through a longitudinal slit or recess therein, the twisting together into a rope between the several rungs of the strands passing singly through a recess in each, affording an element of strength and neatness which is both novel and useful in the ladder.

I claim as my invention—

1. The combination, in a fire-escape, of the drum, the flexible ladder winding up thereon, a block attached to the free end of the ladder and adapted to close an opening in the house-wall through which the ladder is carried, connected parallel bars extending at right angles to said block, each moving into a case fitted longitudinally into and through the house-wall, and springs compressed by each bar when the block is in place and operating automatically to force said block out of its seat, substantially in the manner and for the purpose herein set forth.

2. The combination, with a block closing an opening in the house-wall, a flexible fire-escape ladder attached to said block and extending inward through said opening, a drum upon which the ladder is wound, spring-actuated bars operating automatically to force out the block and ladder, of an auxiliary spring attached to the drum and operating automatically to revolve it so as to unwind the ladder, substantially in the manner and for the purpose herein set forth.

3. The combination of a block closing an opening in the house-wall, a flexible fire-escape ladder attached to said block and extending inward through said opening, a drum upon which the ladder is wound, spring-actuated bars operating automatically to force out the block and ladder, an auxiliary spring attached to the drum and operating automatically to revolve it so as to unwind the ladder, a beveled gear wheel carried by a crank-shaft mounted to rotate and to move longitudinally in bearings at a right angle to the axis of said wheel, and a beveled pinion upon the shaft adapted to be thrown in and out of gear by the longitudinal movement of the shaft, substantially in the manner and for the purpose herein set forth.

4. The flexible ladder herein described, having sides constructed of wire strands, which at regular intervals are laid flat and parallel to each other to permit of a ready attachment of the rounds thereto and are twisted together between the rounds, in combination with rounds made fast to said flat intervals, 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.

FRANS L. BLOM.

Witnesses:
A. N. JESBERA,
M. E. FINLEY.