M. DURAND.

FIRE-ESCAPE.

No. 190,837. Patented May 15, 1877.

FIG. 1.

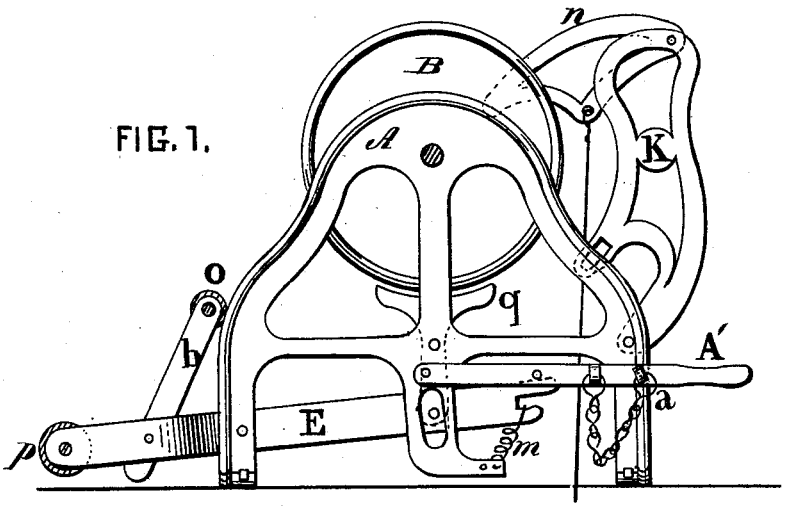


FIG. 2.

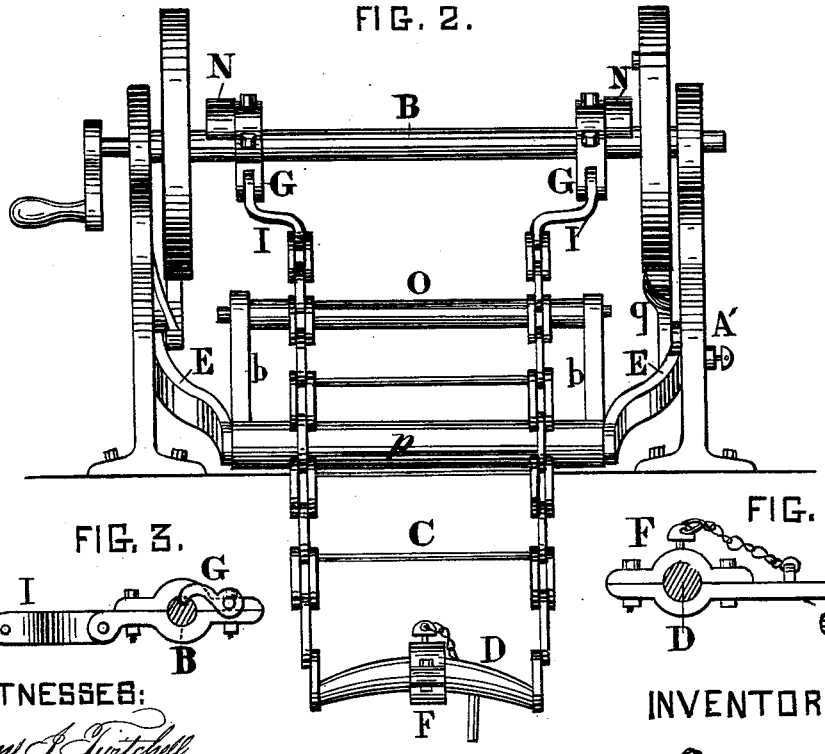
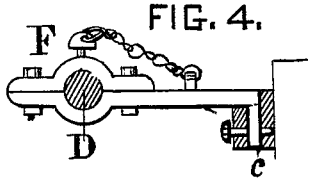


FIG. 3.

FIG. 4.



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UNITED STATES PATENT OFFICE.

MICHEL DURAND, OF MONTREAL, QUEBEC, CANADA.

IMPROVEMENT IN FIRE-ESCAPES.

Specification forming part of Letters Patent No. **190,837**, dated May 15, 1877; application filed January 15, 1877.

To all whom it may concern:

Be it known that I, MICHEL DURAND, of the city of Montreal, in the Province of Quebec and Dominion of Canada, have invented certain new and useful Improvements in Fire-Escapes; and I hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making part of this specification.

My present invention relates to improvements in the fire-escape for which Letters Patent were granted to me, bearing date July 25, 1876, No. 180,209; and consists, first, in connecting the upper end of the flexible ladder to the shaft of the take-up drum by means of loose sleeves and pivoted dogs thereon, in order that the momentum which the drum acquires during the descent of the ladder may not cause the winding of the same backward thereon; second, in the use of an eccentric or bent round at the lower end of the ladder, for the purpose of drawing the same down and holding it taut while in position for use; and, lastly, in the peculiar arrangement of the brake, and in other minor details hereinafter described.

Figure 1 represents an end elevation of my improved apparatus; Fig. 2, a front elevation of the same; Fig. 3, a view showing the manner in which the ladder is connected to the drum-shaft; Fig. 4, a view illustrating the manner in which the eccentric round and its connections are arranged to hold the foot of the ladder.

In its general construction and operation the apparatus is similar to that shown in my original patent, consisting, essentially, of a rigid frame, A, to be mounted on the roof or in the upper part of the building, provided with a horizontal drum, B, and a flexible chain ladder attached to the drum, in such manner that it may be unwound and lowered in front of the building to the ground.

In the present apparatus the end of the ladder, instead of being attached, as usual, rigidly to the drum, is connected, either directly or by means of curved links I, to sleeves G, which are mounted loosely on the drum, and provided on their sides with pivoted dogs or pawls N, arranged to enter notches made for the purpose in the drum, as shown in Figs. 2 and 3. This arrangement permits the drum to turn forward until it loses the momentum acquired during the descent of the ladder without rewinding the upper end of the latter thereon, the drum turning forward freely in the sleeves without causing their rotation or affecting the ladder. When, however, the drum is turned backward to wind up the ladder, the dogs enter the notches, and cause the sleeves to rotate with the drum and take up the ladder, as usual.

By the use of the curved links I the sleeves G are thrown outside of the ladder, so that the latter may wind directly and compactly upon the drum between the sleeves.

In the lower end of the ladder C there is mounted a heavy rotating rung or round, D, which is bent, cranked, or otherwise constructed so that its middle is eccentric to, or out of line with, its ends; and on said round, at its middle, I journal one end of a bar, F, the opposite end of which is adapted to enter a socket, *c*, in the wall, or in the ground at the foot of the building, as shown in Figs. 2 and 4.

After the ladder is lowered in position for use, the free end of the bar is inserted into the socket, and secured firmly and rigidly in place by means of a pin or other fastening device, and then the round D rotated until the ladder is drawn taut, and held firmly in position, so that it can neither twist nor vibrate. The peculiar construction of the round, the manner of securing the end of the bar F, and the manner of rotating the round, may be varied, as circumstances may require or experience dictate.

For the purpose of limiting the speed of the drum during the descent of the ladder, a brake-shoe, *q*, is mounted in one end of the frame, and urged against the end or head of the drum by means of a spring, *m*, acting upon an arm, E, to which the shoe is connected. For the purpose of drawing the shoe away from the drum, and holding it out of action while the ladder is being wound up, I mount on the side of the frame a hand-lever, A′, provided with a stud, bearing on the arm E, and in the side

of the frame I form a recess, into which the lever may be locked, as shown in Fig. 1, when it is depressed so as to hold the shoe down.

As in my original apparatus, a stud on the drum is arranged to operate a pivoted dog, *n*, which is connected with a bell, for the purpose of sounding an alarm during the descent of the ladder. In the present apparatus I pivot the dog *n* to a standard, K, which is, in turn, pivoted to the frame, but limited in its movement by a slot, into which a stud on the frame projects, as shown. This arrangement admits of the standard and dog being adjusted forward and backward, in order to secure at all times the proper action of the bell.

In the front of the frame there is mounted the usual roll *p*, to guide and sustain the ladder in its descent, and also an extra roll, O, to facilitate the descent of the ladder, the latter roll being mounted in standards *r*, which have their lower ends pivoted to the arms E, attached to the sides of the frame, as shown.

It will be observed that the arm E, to which the brake-shoe is attached, is pivoted near its middle, and that at its outer end it sustains one end of the ladder-sustaining roll *p*, so that the weight of the pendent portion of the ladder bearing down the roll and the end of the arm E assists in forcing the brake-shoe against the drum. As the pendent portion of the ladder increases in length and weight, it, of course, exerts a correspondingly-increased pressure upon the brake, the retarding action of which upon the drum is thus increased automatically in proportion to the increasing strain of the ladder, and this, too, through the action of the ladder itself.

When desired, the spring *m* may be omitted, and the parts so proportioned that the weight of the chain will alone give the brake all the pressure required.

Having thus described my invention, what I claim is—

1. In a fire-escape, the combination, substantially in the manner shown and described, of a drum, B, and a flexible ladder, C, connected thereto in such manner that the drum may turn forward, but not backward, without winding the ladder thereon.

2. The combination of the drum B and the flexible ladder C, connected thereto by means of the loose sleeves G and dogs N, substantially as shown.

3. In combination with the drum B and ladder C, the sleeves G and curved links I, as and for the purpose described.

4. A pendent fire-escape ladder, provided at its lower end with a rotary curved or eccentric round, D, adapted to operate in connection with a fixed arm or bearing, to hold the foot of the ladder, as described and shown.

5. The combination of the frame A, drum B, brake-shoe *q*, arm E, and the hand-lever A′, arranged to depress the arm and lock into a recess in the frame, as shown.

6. In combination with the drum B and flexible ladder C, the arm or lever E, provided at one end with the brake-shoe *q*, and sustaining at the other end the ladder-supporting roll *p*, whereby the ladder is caused to apply a variable pressure to the brake-shoe, as and for the purposes described.

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