M. DAVIS.

Fire-Escape Ladder.

No. 159,022. Patented Jan. 26, 1875.

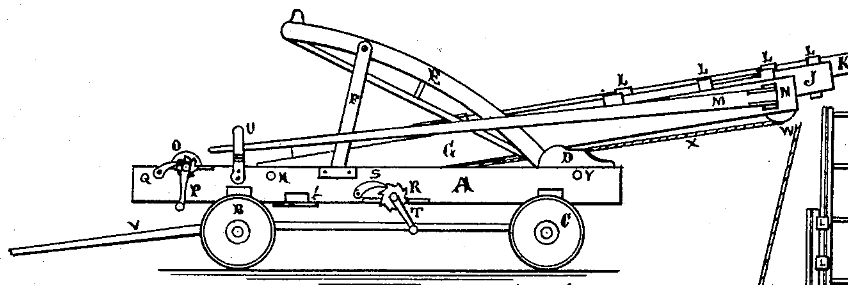

Fig. 1

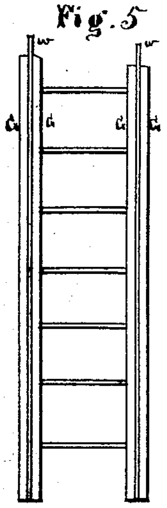

Fig. 5

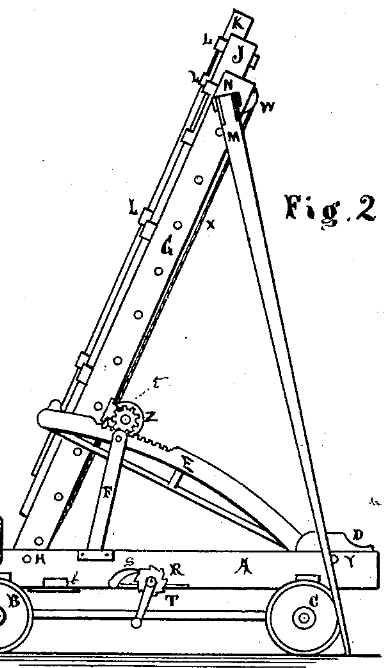

Fig. 2

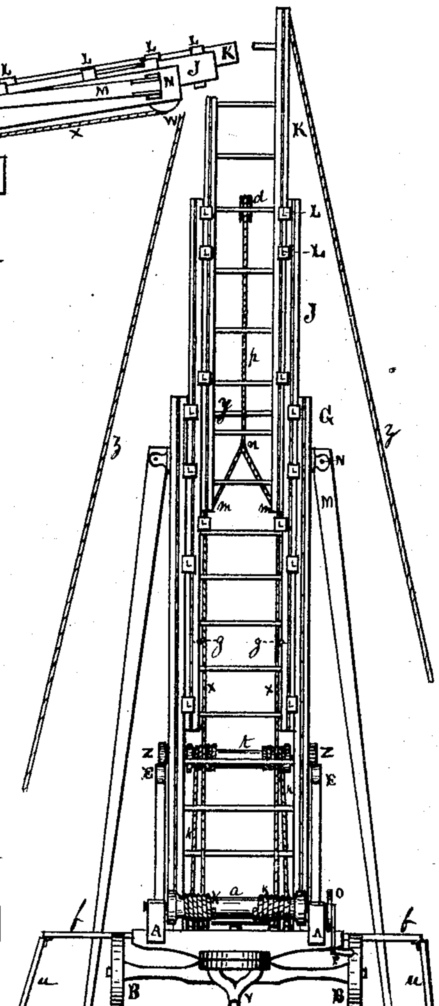

Fig. 3

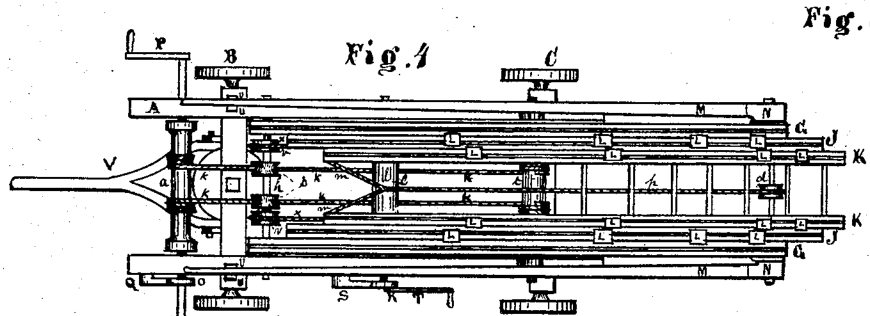

Fig. 4

Witnesses;

[illegible]

[illegible]

Inventor;

Morgan Davis

THE GRAPHIC CO. PHOTO-LITH. 39 & 41 PARK PLACE, N.Y.

UNITED STATES PATENT OFFICE.

MORGAN DAVIS, OF COVINGTON, INDIANA.

IMPROVEMENT IN FIRE-ESCAPE LADDERS.

Specification forming part of Letters Patent No. **159,022**, dated January 26, 1875; application filed December 5, 1874.

To all whom it may concern:

Be it known that I, MORGAN DAVIS, of Covington, Fountain county, State of Indiana, have invented an Improved Fire-Escape Ladder, of which the following is a specification:

The object of my invention is to arrange the different sections of ladders on a carriage in such a manner that they can be quickly elevated and extended without changing the position of the wheels; also, in the manner of strengthening the side rails of the ladders.

Figure 1 represents a side elevation of my improved fire-escape extension-ladder. Fig. 2 is a side elevation of the same, with the ladder elevated and braced. Fig. 3 is a front elevation, with the ladders partially extended and braced. Fig. 4 is a plan of my fire-escape ladders and carriage. Fig. 5 is an elevation, in section, of one section of the ladders, showing the arrangement of the wooden sides and thin strip of iron that is secured between them.

A A represent the frame of the carriage-bed, and is supported upon two pairs of wheels, B B C C, in the ordinary manner, except that both sets of wheels have a fifth-wheel, so that either end of the carriage can be moved, as desired. H represents a bolt or bar passing through the sides A A, on which is pivoted the end of the ladder G. Y represents the bolts that the lower end of the racks E E are pivoted to, near the rear end of the sides A A. These racks E E are so pivoted that they can be elevated, as shown in Figs. 1 and 2, and held in proper position by the braces F F; and if the braces F F are taken out of their sockets on the frames A A the racks E E can be lowered; or the racks E E may be stationary, as shown in the drawings. *t* represents a wooden roller or pulley, with a shaft passing through it from end to end, and extending out from each end far enough to receive the pinions Z Z. These pinions work in the racks E E. Between these pinions and the main pulley *t* are rollers, that the under sides of the rails of the ladder G slide on as it is elevated. At the top of the ladder G, and extending across with suitable bearings, is the shaft *y*, on each end of which, and just inside of the rails of the ladder, are two pulleys, *w w*. *a* represents the windlass that is used to elevate the ladders from the position shown in Fig. 1 to that in Fig. 2. *l* represents the windlass that is used to extend the ladder, as in Fig. 3.

In Fig. 5 it will be seen that the side rails of the ladders are formed with two strips of wood, G G, with a thin strip of iron, *w*, secured between them. This thin strip of iron greatly strengthens the rails, and does not add materially to the weight.

The operation of my improved machine is as follows: Fig. 1 represents the apparatus ready for use after backing the carriage into position. The operators revolve the windlass *a* by means of the cranks P P, and as the ropes *k k* (which pass under idle-pulleys *h* on the pivot-rod H) commence to wind up on the windlass *a* they commence to unroll from the pulley *t*, and communicate motion to the pinions Z Z, which commence to work upon the circular racks E E, and, as they advance, the rollers between the pinions Z Z and pulley *t* slide along under the side rails of the ladder G, and elevate it to any desired position, as shown in Fig. 2; then the pawl Q is placed against the ratchet O and the ladders are stationary, after which the braces M M, which are hung with a swivel, at N, at the top of the ladder G, are braced to hold the ladders firm. The ropes X X are secured to the windlass *l*, and extend from the windlass to the pulleys V V on the pivot-shaft H, and pass around the pulleys V V and under the rounds of the ladder G, and are then carried upward and around the pulleys W W at the upper end of the ladder G, and after passing around the pulleys W W are carried down between the rails and above the rounds of the ladder G, and are secured near the bottom, on the side rails of the ladder J, at *g g*. Immediately under the shaft that has the pulleys W W attached is a bar extending across from rail to rail, and on this bar is fastened one end of the rope *p*, which continues upward and passes over the pulley *d* at the top of section J, and then downward under the rounds of ladder K, and made fast near the bottom, at *m m*. After the ladders have been elevated, as in Fig. 2, the operators then go to the crank T on the windlass or pulley *l*, and, as it is revolved, the ropes X X commence to wind up on the pulley *l*, and the section J of the ladders com-

mences to raise in the slides L L L L. At the same time the rope *p*, by its connections, commences to elevate the ladders K; and the ladders can be extended to any desired height and held there by the pawls S engaging with the ratchet R. On the sides of the ladders, as they are extended, can be placed a spring-catch, so arranged as to hold the ladders against any accident to the ratchet and pawl S R, (by which they would become disengaged;) and this catch can be drawn out by a line when it is required to lower the ladders. After the ladders have been extended and the carriage adjusted so that the ends of the ladders are in their proper place, then the extension-bars *f f*, Fig. 3, are extended across the front of the ladders, having their support on or through the bed or sides A A, as at *b*, Fig. 2, and the braces *u u*, which are hinged to the ends of the extension-bar, are braced against the ground, and the whole mechanism is held firm and stationary. If more steadiness is required, then the guy-ropes *z z* can be used.

What I claim as new, and wish to secure by Letters Patent, is—

1. The pinions Z Z and pulley *t*, with rollers between the pinions Z Z and pulley *t*, in in combination with the ladder G, pulleys W W, wire ropes *k k*, idle-pulleys *h*, and windlass *a*, for the purpose of elevating the ladders, substantially as shown.

2. The pinions Z Z, pulley *t*, with the rollers between them, in combination with the racks E E, for the purposes specified.

3. The combination of two or more strips of wood with thin iron *w* between them, when used to form the side rails of a ladder, substantially as specified.

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

MORGAN DAVIS.

Witnesses:
JOHN W. COONS,
W. H. D. MERRILL.