D. SANFORD.

Fire-Escape Ladder.

No. 164,769. Patented June 22, 1875.

Fig. 3.

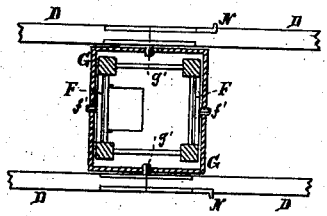
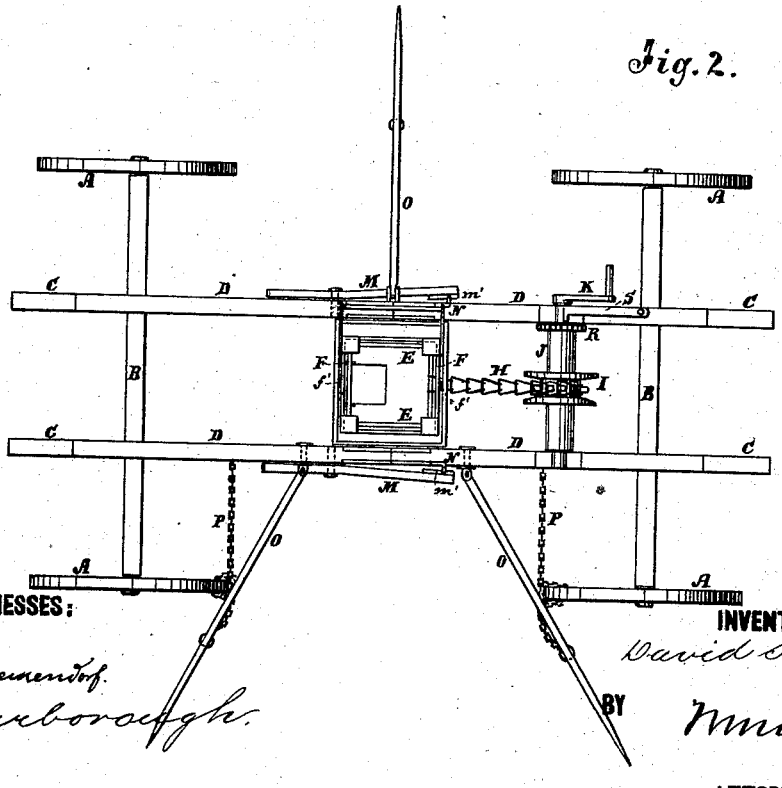


Fig. 1.

Fig. 2.



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UNITED STATES PATENT OFFICE.

DAVID SANFORD, OF ASHTON, ILLINOIS.

IMPROVEMENT IN FIRE-ESCAPE LADDERS.

Specification forming part of Letters Patent No. **164,769**, dated June 22, 1875; application filed March 6, 1875.

To all whom it may concern:

Be it known that I, DAVID SANFORD, of Ashton, in the county of Lee and State of Illinois, have invented a new and useful Improvement in Combined Fireman's Ladder and Fire-Escape, of which the following is a specification:

Figure 1 is a side view of the carriage and lower section of my improved device. Fig. 2 is a top view of the same. Fig. 3 is a detail cross-section showing the manner in which the ladder is hung, taken through the line *x x*, Fig. 1.

Similar letters of reference indicate corresponding parts.

This invention is an improvement upon the fire-escape ladder for which I obtained Letters Patent No. 158,984, dated January 19, 1875. The invention consists in the construction and arrangement of parts, as hereinafter described and claimed.

A are the wheels, which revolve upon the journals of the axles B, and which should be of such a size that the men can readily pass beneath the frame-work of the carriage to enter and leave the doorway in the lower part of the ladder. To the axles B are secured the end parts of two longitudinal bars, C, which are placed at such a distance apart as to receive the ladder between them. To the end parts of the upper side of each of the bars C are attached the outer ends of two inclined bars, D, the inner ends of which meet at an angle, and are firmly secured to each other. E is the lower section of the square hollow ladder, the upper section and extension mechanism of which, being the same as shown in Patent No. 158,984, are omitted. To the front and rear sides of the ladder section E are attached bars F, which may be extended into a band, if desired. To the centers of the bars F are attached gudgeons *f'*, which work in bearings in the centers of the front and rear bars of the band G. To the centers of the side bars of the band G are attached gudgeons *g'*, which work in bearings in the angles of the inclined bars or braces D. The band G is made wider than the ladder E, so that the said ladder may have a lateral oscillation upon the gudgeons *f'*, within the said band G. The ladder E has a front and rear oscillation upon the gudgeons *g'* of the band G, the said band oscillating with it. The gimbal-coupling F G is placed at such a distance from the lower end of the ladder E that the said end may clear the ground as it swings into and out of a vertical position. The lower end of the ladder E may be made heavy, or may be weighted, to give it additional steadiness when raised into an upright position. H is a chain, one end of which is attached to the lower end of the ladder E. The other end of the chain H is attached to the ladder E at about the same distance above the gimbal F G that the first or lower end is below said gimbal. The chain H passes around a chain or spur-wheel, I, which is made with ring-flanges upon both sides of its circle of spurs or teeth, to prevent the chain H from slipping off said wheel into whatever position the ladder E may be adjusted. The spur-wheel I is placed upon and is secured to a shaft, J, the journals of which revolve in bearings attached to the carriage-frame C D. To one or both ends of the shaft J is attached a crank, K, by means of which the said shaft and spur-wheel J I are turned to raise the ladder E into or toward a vertical position, or lower it into or toward a horizontal position. The crank-shaft J is provided with a ratchet-wheel, R, and a pawl, S, to enable the ladder E to be held securely in any position into which it may be adjusted. To the opposite sides of the lower end of the ladder E are attached the lower ends of two chains, L, the upper ends of which are attached to two levers, M. The levers M are pivoted to the side bars C, and their longer arms project across ratchet-bars N, attached to the frame C D, and have pawls *m'* formed upon or attached to them to engage with the teeth of the said ratchet-bars N. The chains L and levers M enable the ladder E to be adjusted laterally as may be required. To the inclined side bars D are swiveled the ends of one, two, or more brace-bars, O, the ends of which are designed to rest upon the ground and brace and steady the machine when in use, the swivel enabling them to be turned back and laid upon the carriage when not in use. P are chains, the ends of which are attached to the side bars C, and which pass through rings attached to the braces O, and

have hooks attached to their outer or free ends to hook into the links of the inner parts of the said chains P, and thus hold the points of the said braces down upon the ground. In case two of the braces O are used upon the same side of the carriage, the braces O when extended should be inclined to rest against the rims of the wheels A, and thus block the said wheels. In this case the free ends of the chains P should be passed around the rims and spokes of the wheels A, before being hooked into the inner parts of said chains, to more thoroughly secure the said wheels. When only one of the braces O is connected with the side of the frame C D, it should be set, when extended, at right angles or nearly at right angles with the length of said frame. To the upper end of each section, except the upper one, and at the lower end of each swinging ladder or brace, is attached a brace or bracket, Q, to support said swinging ladder or brace when extended, to give it greater steadiness, and at the same time assist in again bringing it into place.

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

1. The combination of the inclined parts D D of the wheeled frame, and the hollow ladder E, pivoted between the bars, and at the angle thereof, by means of gimbal-coupling F G, as shown and described, for the purpose specified.

2. The combination of the chain H, spur-wheel I, and crank-shaft J, with the ladder E, gimbal F G, and carriage-frame C D, substantially as herein shown and described.

3. The combination of the chains L, levers M, and ratchet-bars N, with the ladder E, the gimbal F G, and the carriage-frame C D, substantially as herein shown and described.

4. The combination of the swiveled braces O, and the chains P, with the carriage A B C D, of the pivoted ladder E, substantially as herein shown and described.

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