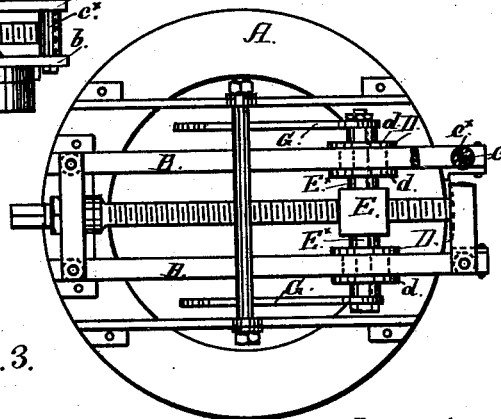
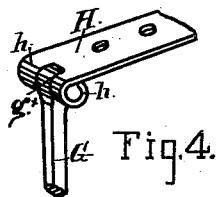
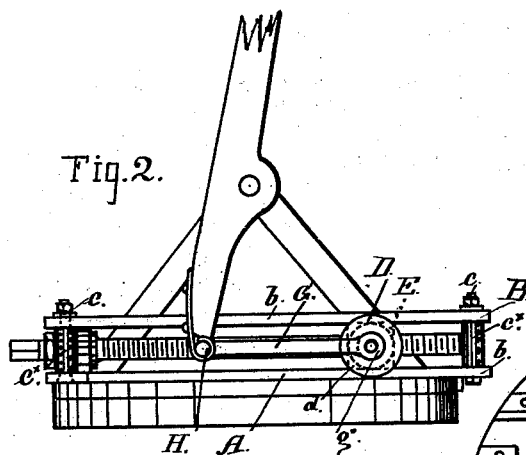
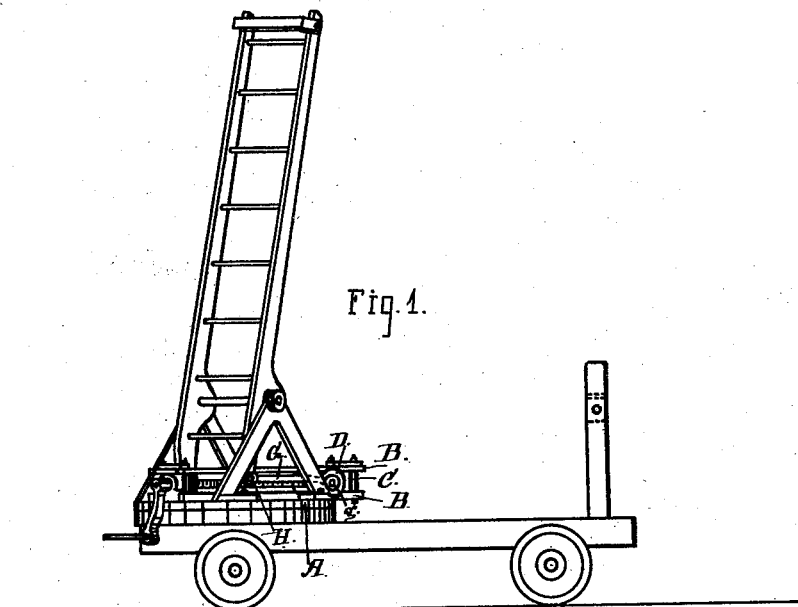


(No Model.)

D. D. HAYES.
EXTENSION FIRE LADDER.

No. 345,686.

Patented July 20, 1886.



Witnesses:

Wm. May...
Edw. Moore

Inventor:

Daniel D. Hayes
By *Samuel Smith*
Attg.

UNITED STATES PATENT OFFICE.

DANIEL D. HAYES, OF OAKLAND, CALIFORNIA.

EXTENSION FIRE-LADDER.

SPECIFICATION forming part of Letters Patent No. 345,686, dated July 20, 1886.

Application filed December 16, 1885. Serial No. 185,865. (No model.)

To all whom it may concern:

Be it known that I, DANIEL D. HAYES, a citizen of the United States, residing in the city of Oakland, in the county of Alameda and State of California, have invented certain new and useful Improvements in Extension Fire-Ladders, of which the following is a specification.

My invention relates to improvements made in mechanism for raising and lowering a hinged or pivoted ladder from its truck or platform; and it consists in certain improved construction and combination of parts, as hereinafter explained and pointed out.

The present improvement embraces a construction of slotted guide or way for the traveling nut of a screw-shaft and the connections by which the ladder is connected by its outer end or foot directly to the traveling nut. The construction of this guide and of the connections at the joints are features of this improvement.

I construct, apply, and carry out my invention in the following manner, the drawings that form part of this specification being referred to by figures and letters.

Figure 1 represents the improvement applied to a hinged fire-ladder on a truck, and shows the position of the parts with the ladder raised to the vertical position. Fig. 2 is a side elevation of the turn-table and the screw-shaft and parts of the elevating mechanism, on a larger scale. Fig. 3 is a plan of Fig. 2 without the ladder and with parts broken away to show the construction beneath. Fig. 4 is an enlarged detail view of one of the hinged connections with the foot of the ladder-rails.

A is the revolving ring or upper movable part of a turn-table upon which at the present time fire-ladders of the best construction are mounted.

B B are guides or ways, each composed of a bottom and a top rail or bar, *b*, secured together by means of spacing-bolts C C, to form a slotted way for a roller, D, to travel in. For this purpose I use bolts *c* and sleeves *c*^x, as shown in Fig. 2. The two guides are set across the turn-table parallel with and on opposite sides of the screw-shaft, to give a slotted

way on each side for the full length of travel of the nut E. The nut has trunnions E^x E^x, that extend through the guides and take the rollers D, each trunnion being long enough to project beyond its roller outside, in order that the end of the rod or bar G, connecting with the end of the ladder, may be suitably secured to it. From each trunnion, outside the guides, a stiff connection is thus made by means of such a rod, G, with the lower end or foot of the side bar of the ladder at that side. The connection at the trunnion end is an eye, *g*, and at the ladder end a hinge-joint, H. The construction of the joint I have produced for this connection is seen more particularly in Figs. 2 and 4.

The part H is a strap or flat plate, with screw-holes for fastening it to the foot, and with two knuckles, *h*, on the outer end, that are formed by slotting the end of the strap-plate, and then bending the two ends downward and underneath the plate. Into the space between the two knuckles is fitted the eye *g*^x in the end of the rod, and the pin forms the pintle of the joint. The rollers are formed with flat grooves of the same width as the face of the rails *b*, and with flanges *d d*, to run outside the edge of the rail. They are also set loose on the trunnions. This construction secures evenness and steadiness of movement, and prevents twisting and other irregularity of movement of the nut on the screw-shaft. It also relieves the shaft from the weight and strain of the ladder during operation. By this construction it will be seen that the shank of the screw operates only in one bearing or sleeve, which latter is connected to the front of the turn-table; also, that the grooved rollers working in the ways keep the traveling nut in its proper position.

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

1. The combination of the screw-shaft, the traveling nut E, provided with trunnions E^x E^x, the rollers D D, having projecting flanges *d d*, and carried by the trunnions, the slotted parallel guides B for the said rollers; and the connecting-bars G, having an eye at one end for attachment to the trunnions, and a hinge-

joint at the other to form a hinged connection at the foot of the ladder, substantially as shown and described.

2. In a fire-ladder, the slotted guides B, 5 formed by the spaced top and bottom rails, b, connected by bolts c and sleeves c^x, in combination with the traveling nut E, having trunnions E^x E^x, and carrying grooved flanged rollers D D, substantially as shown and described.

In testimony that I claim the foregoing I do have hereunto set my hand and seal.

DANIEL D. HAYES. [L. s.]

Witnesses:

C. W. M. SMITH,
JAMES L. KING.