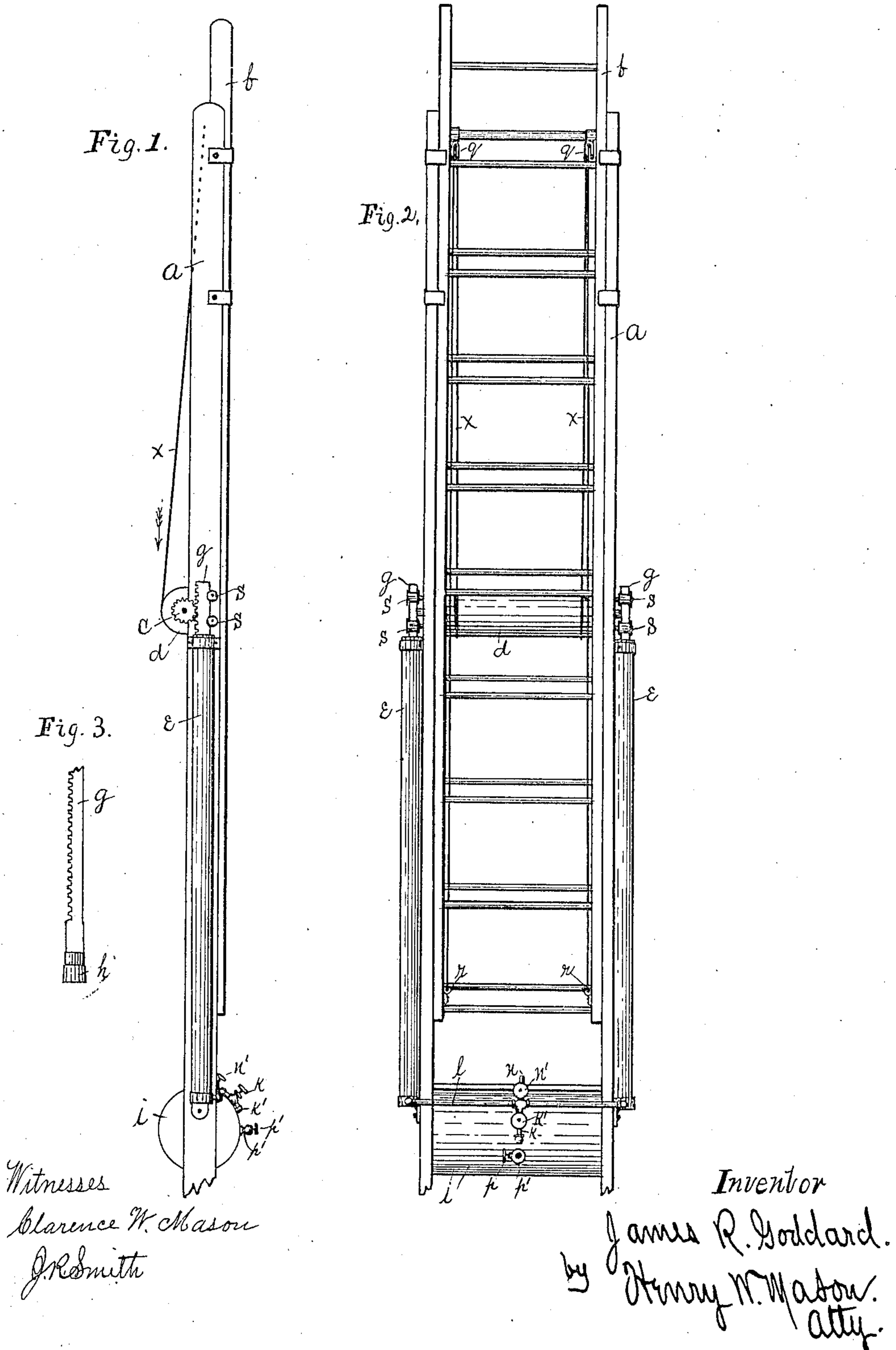


No. 843,204.

PATENTED FEB. 5, 1907.

J. R. GODDARD.
EXTENSION LADDER.
APPLICATION FILED NOV. 20, 1906.



UNITED STATES PATENT OFFICE.

JAMES R. GODDARD, OF NEW BEDFORD, MASSACHUSETTS.

EXTENSION-LADDER.

No. 843,204.

Specification of Letters Patent.

Patented Feb. 5, 1907.

Application filed November 20, 1906. Serial No. 344,343.

To all whom it may concern:

Be it known that I, JAMES R. GODDARD, a citizen of the United States, residing at New Bedford, in the county of Bristol and State of Massachusetts, have invented certain new and useful Improvements in Extension-Ladders, of which the following is a specification.

The object of my invention is to provide an extension-ladder capable of being extended to its full length within a few seconds of time and carrying with it at the same time one or more men, together with fire-hose, and still be under the perfect control of the operator to retract or extend to any desired intermediate point or degree.

To this end my invention consists in providing means whereby the extension part of said ladder is extended by the force of compressed air, the construction and operation of which means is illustrated in the accompanying drawings, in which—

Figure 1 is a side view of an extension-ladder provided with my improvements. Fig. 2 is a front view of the same, and Fig. 3 is a view of some of the detail.

Similar letters refer to similar parts in the several views.

The letter *a* represents the primary ladder, and *b* represents the secondary or extension ladder. The primary ladder *a* is provided with cylinders *e e*, secured to its base and connected with a receiver or air-tank *i*. The tank *i* is provided with an outlet-pipe *k*, having the valve *k'*, and is connected with the pipe *l l*, which pipe is connected with the bottoms of the cylinders *e e*. The pipe *l l* is provided with the escape-pipe *n*, having a valve *n'*. The cylinders *e e* are provided with racks or pistons *g*, having their lower ends provided with piston-heads *h*, as shown in Fig. 3.

To about the center of the primary ladder *a* is journaled the drum *d*, having secured to the ends of its shaft the spur-gears *c c*, which are adapted to mesh with the racks *g g*.

s s represent flanged rollers journaled to the sides of the primary ladder, which serve to hold the racks *g* in contact with the gears *c* and also as guides for said racks or pistons.

x x represent wire ropes, having one of

their ends secured to the drum *d* and passing over the pulleys *q q*, which are secured to the outer end of the primary ladder *a*. The opposite ends of said ropes are secured to the inner end of the extension-ladder *b* at *r r*.

The operation of the device is as follows: The tank *i* is charged with compressed air through the inlet-pipe *p*, having valve *p'*. The valve *n'* being closed, the valve *k'* is opened and the force exerted by the compressed air in tank *i* allowed to operate on the piston-heads *h* to drive them to the opposite ends of the cylinders *e e*, which motion, through the racks *g* and gears *c*, revolves the drum *d* and winds the ropes *x* upon it, thereby extending the ladder *b* to any desired height which it is adapted to attain. To lower the ladder *b*, the valve *k'* is closed and the valve *n'* opened, thereby allowing the force of compressed air exerted on the under side of the piston-heads *h* to escape, thus causing the ladder *b* to descend to its normal or any desired point by its own weight.

By means of my improvements the ladder *b* can be extended to its full capacity while carrying one or more men, together with fire-hose, within a few seconds of time.

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

An extension-ladder, provided with a cylinder, or cylinders connected with a receiver or tank through which the force of compressed air is adapted to be exerted on the heads of pistons in said cylinders; means whereby the motion of said pistons is caused to revolve a drum journaled on said ladder; a rope, adapted to be wound upon said drum, having one end secured to the ladder to be extended; whereby when the force of compressed air is exerted in the cylinders, the extension portion of said ladder is extended.

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

JAMES R. GODDARD.

Witnesses:

J. R. SMITH,

HENRY W. MASON.