(No Model.) 2 Sheets—Sheet 1.

J. P. T. DAVIS.

EXTENSION LADDER AND FIRE ESCAPE.

No. 312,979. Patented Feb. 24, 1885.

Fig. 1.

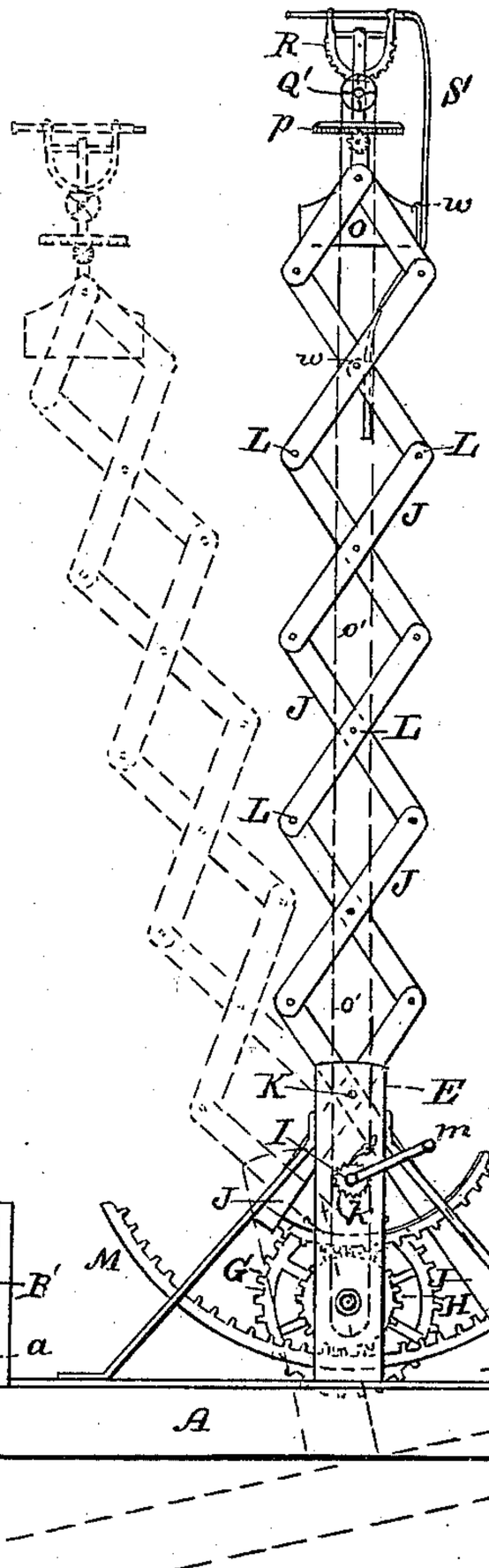


Fig. 4.

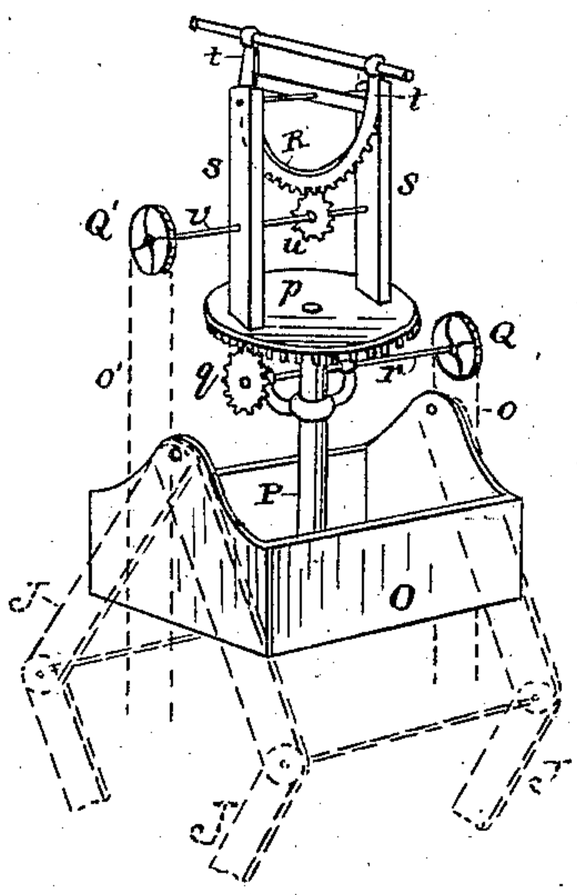
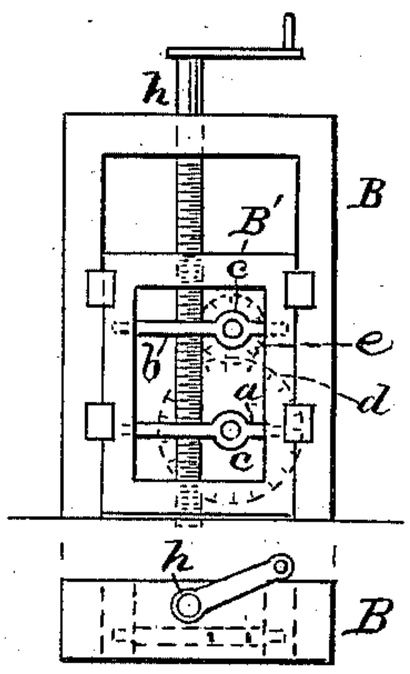


Fig. 5.



WITNESSES

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(No Model.) 2 Sheets—Sheet 2.

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EXTENSION LADDER AND FIRE ESCAPE.

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Fig. 2.

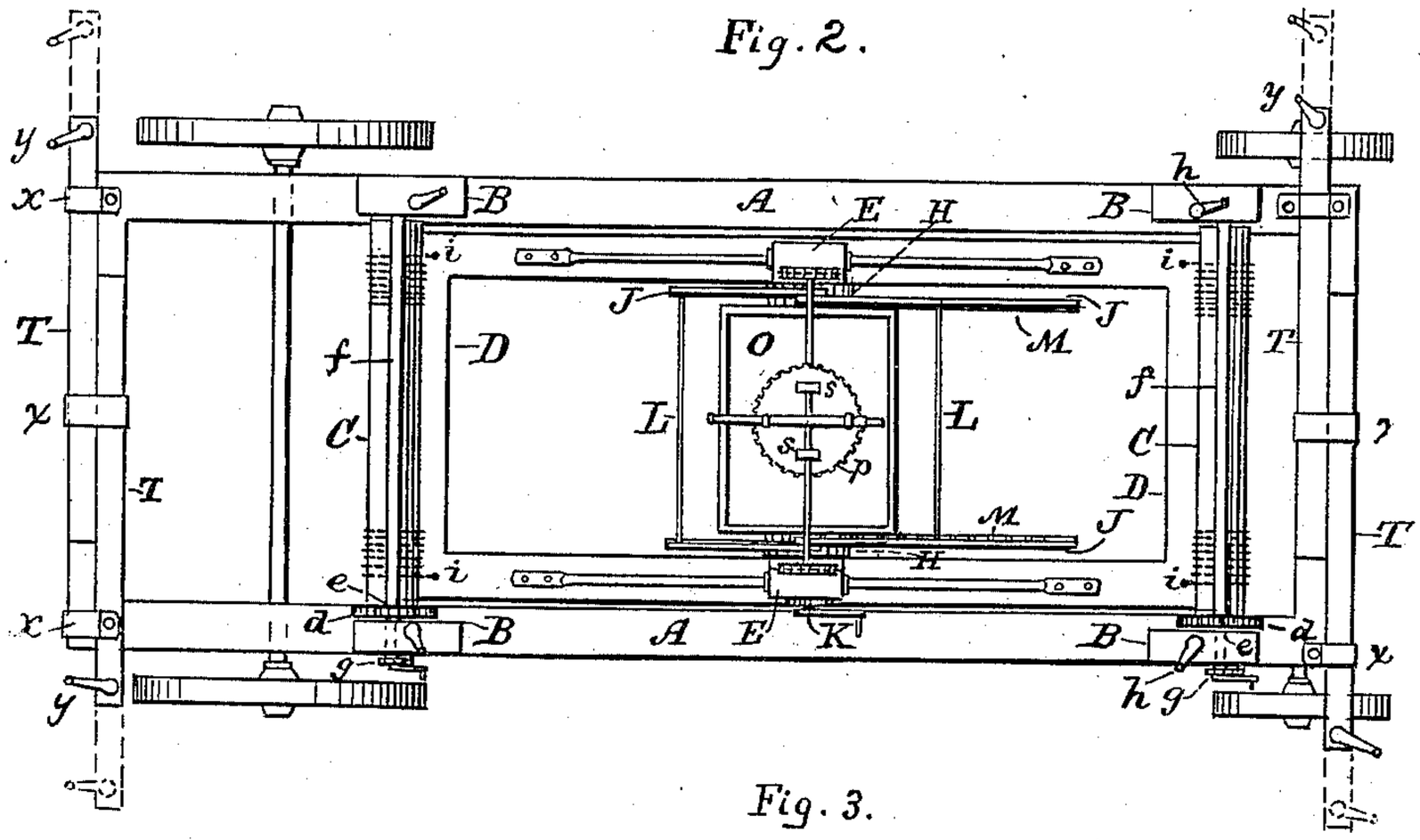
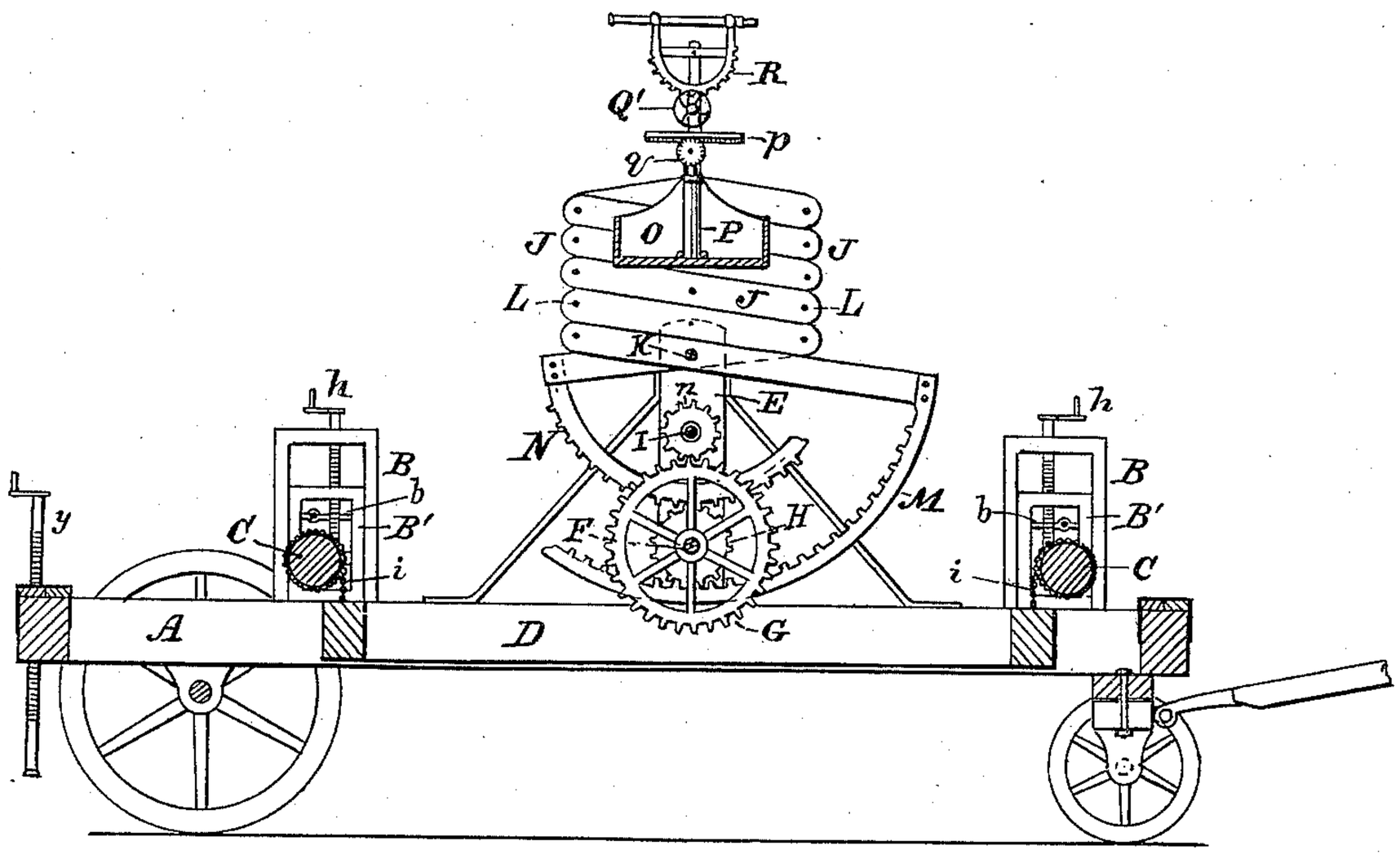


Fig. 3.



WITNESSES

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UNITED STATES PATENT OFFICE.

JOHN P. T. DAVIS, OF NEW TRENTON, INDIANA.

EXTENSION-LADDER AND FIRE-ESCAPE.

SPECIFICATION forming part of Letters Patent No. 312,979, dated February 24, 1885.

Application filed March 6, 1884. (No model.)

To all whom it may concern:

Be it known that I, JOHN P. T. DAVIS, a citizen of the United States, residing at New Trenton, in the county of Franklin and State of Indiana, have invented certain new and useful Improvements in Extension-Ladders and Fire-Escapes, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to extension-ladders and fire-escapes; and it consists in certain improvements in the construction of the same, as herein described and claimed.

In the accompanying drawings, Figure 1 represents a side view of an extension fire-ladder having my improvements. Fig. 2 is a plan view of the same closed. Fig. 3 is a vertical longitudinal section of the same, showing the ladder closed. Fig. 4 is a perspective view of the apparatus carried by the ladder, and connected with it at the top. Fig. 5 illustrates the devices for adjusting the ladder in position herein described.

A designates the base-frame, strongly made with side and end pieces, and mounted on a truck of ordinary form with four wheels.

B indicates several vertical frames mounted upon and fastened to the side pieces of frame A, two of them being placed near the front and two near the rear end, as shown.

Within each of frames B is placed a frame, B′, which has a limited movement up and down therein, such movement being effected by means of a hand-screw, *h*, which passes through an aperture in the top of frame B, and through threaded apertures in frame B′, the lower end of the screw resting on or in a socket in the frame A. Two windlasses, C, extend across frame A, each being journaled in two bars or shafts, *a*, carried by opposite frames, B′. Each windlass is provided with a gear-wheel, *d*, which engages with a pinion, *e*, on a shaft, *f*, which is also journaled and has bearings in bars *b*, carried by opposite frames, B′. The bars *a* and *b*, in which the windlasses and shafts have bearings *c*, have pivotal bearings in the frames B′, so as to be self-adjusting, and when the windlasses and shafts are somewhat inclined in position, by reason of the ground not being level, they are still allowed to turn freely on their bearings. One end of shaft *f* is extended, and is provided with a ratchet and pawl, *g*, to prevent backward movement, and a crank to rotate said shaft.

Within frame A is placed another rectangular frame, D, on which the extension-ladder is mounted, said frame D being suspended by chains *i*, attached to it at each end and connected with the windlasses and wound thereon.

E indicates two posts standing opposite each other on the side pieces of frame D, and fastened thereto midway of the same, and braced in position.

Fixed centrally on a shaft, F, extending across the frame, and having bearings in posts E, is a gear-wheel, G, and fixed to said shaft are two pinions, H, one being near each end of the shaft. Another shaft, I, has its bearings in posts E, one end of the shaft being extended and having a ratchet and pawl, *k*, applied thereto, to prevent a backward movement when the shaft is rotated by means of a crank, *m*.

On shaft I is fixed a pinion, *n*, which engages with gear-wheel G on the shaft F, and imparts motion to said shaft and to pinion H when shaft I is rotated.

The extension-ladder is composed of two sets of bars, J, the bars in each set forming one side part of the ladder, crossing each other, and being pivoted together in a manner similar to lazy-tongs. Each side of the ladder composed of bars J, as aforesaid, has a pivotal support on a shaft, K, having its bearings in posts E, and the bars J in opposite sides of the ladder are pivoted together at their extremities and at points of crossing by the cross-rods L, extending from side to side.

To the lowest couple of bars J in each side of the ladder are secured two segment racks, M and N, which engage with a pinion, H, on shaft F. The rack M is concave, and, passing under said pinion, is fastened to a bar, J, which is lengthened for the purpose, and the rack N, being made convex, is above pinion H, and is fastened to another bar J. The two bars J in each side carrying the segment racks cross each other at the point where the shaft K passes through them, and when shaft F is rotated the pinion H, engaging with the racks,

moves them in opposite directions, thus operating the lazy-tongs formed of bars J, and either extending or contracting the ladder, as desired. The uppermost bars J at the top of the ladder are short, being about half the length of the other bars, and are pivoted together at their upper ends, to which is also pivoted a swinging cage or platform, O, which is hung in such a manner that when the ladder is inclined in any direction the cage keeps in the same vertical position.

Rigidly fastened to the cage O is a post, P, at the top of which is a bevel gear-wheel, *p*, which engages with a bevel-pinion, *q*, fastened on a shaft, *r*, having bearings in or attached to said post.

At the outer end of shaft *r* is a sprocket or chain wheel, Q, on which passes an endless chain, *o*, which reaches the entire length of the ladder.

On the upper surface of wheel *p*, and made fast thereto, are the posts *s*, between which is a segment rack, R, having bearings carried by the said posts, the rack being provided with arms *t*, with suitable fastenings to hold a hose nozzle or pipe. The rack R engages with a pinion, *u*, fastened on a shaft, *v*, having bearings in the posts *s*.

At the outer end of shaft *v* is fixed a sprocket or chain wheel, Q′, on which is an endless chain, *o*′, extending downward the length of the ladder.

To the discharge pipe or nozzle carried by segment R is attached a pipe, S, provided with hooks *w*, for attaching the pipe to the upper cross-rods of the ladder, so that the pipe, with connecting hose, may be raised with the ladder when it is extended.

The mechanism and devices at the top of the ladder may be operated, by means of the chains *o* and *o*′, by pipemen standing on the ground, so as to direct a stream of water in any direction desired, thus enabling them to subdue a fire much sooner than they would be able to subdue it by means ordinarily employed. The ladder being also adjustable in height, the discharge-pipe is readily raised or lowered, as required.

By means of the adjustable bearings for the shafts *f* and the windlasses, the latter, and also the frame D carrying the ladder, may be kept in a level position when the machine-truck stands on uneven ground.

By means of the windlasses connecting with frame D the ladder may be readily brought to an inclined position in either direction, this being often desirable in using the ladder as a fire-escape.

For extending the base of the ladder sidewise and prevent its toppling over when extended, two bars, T, are placed side by side on each end piece of the frame A, within stirrups or retaining-guides *x*, so that said bars may be moved outward endwise in opposite directions. At the outer end of each of the bars is a vertical hand-screw, *y*, passing through the bar, and being long enough to reach the ground and rest thereon when it is run downward. The bars T being drawn outward when deemed expedient, and the screws *y* turned down, the ladder is more securely held in position.

Having described my invention, I claim—

1. In combination with an extension-ladder and fire-escape having its side parts formed of pivoted bars J, and carrying a swinging cage or platform at the top, the segment racks M and N, attached to the lower bars J of each side part of the ladder, a pinion, H, placed between and engaging with both of said racks, whereby the ladder is extended or contracted, an adjustable base-frame, D, and suitable operating mechanism, the parts being constructed substantially as shown, for the purpose set forth.

2. In combination with an extension-ladder, a segment rack, R, carrying a discharge-pipe, a pinion engaging with the rack, and a wheel, Q′, with a chain or cord passing over it, the parts being properly supported at the top of the ladder, and constructed substantially as shown, for the purpose set forth.

3. In an extension-ladder supported by a suitable frame, a swinging cage or platform secured to the top of the ladder and carrying gear-wheel *p*, shaft *r* with pinion *q*, and wheel Q with chain *o*, shaft *v* with pinion *u*, and wheel Q′ with chain *o*′, the posts *s*, and adjustable segment rack R, constructed and operating substantially as and for the purpose set forth.

4. In combination with frame A, the vertical frames B, movable frames B′, with rocking shafts *a* and *b*, forming journal-bearings, the screws *h*, the windlasses provided with gearing, and an inner frame, D, carrying an extension-ladder, substantially as and for the purposes set forth.

In testimony whereof I have affixed my signature in presence of two witnesses.

JOHN P. T. DAVIS.

Witnesses:
ROSA M. SALADIN,
J. T. HORNADAY.