J. S. SMITH & J. M. DAVIS.
Extension Ladder.

No. 201,844. Patented March 26, 1878.

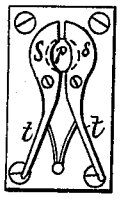
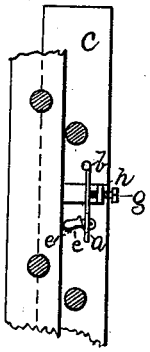


Fig. 5



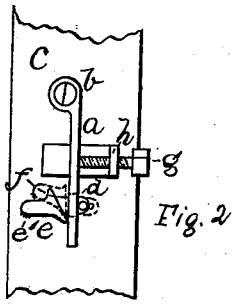


Fig. 2

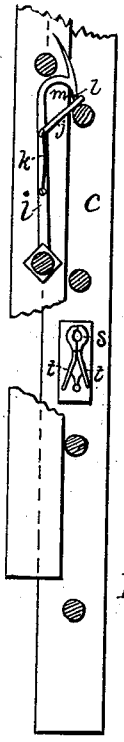


Fig. 1.

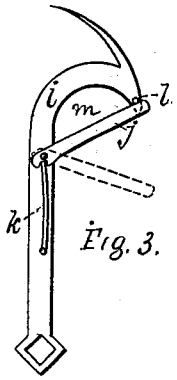


Fig. 3.

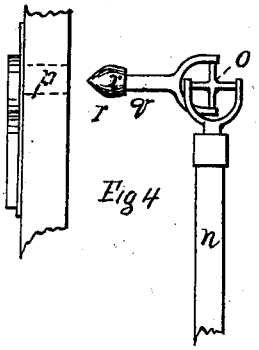


Fig 4

WITNESS

John R. Mason

G. L. Seavy

INVENTORS

Joseph S Smith

James M Davis

by their Franklin Deane Attys

UNITED STATES PATENT OFFICE.

JOSEPH S. SMITH AND JAMES M. DAVIS, OF BANGOR, MAINE; SAID DAVIS ASSIGNOR TO SAID SMITH.

IMPROVEMENT IN EXTENSION-LADDERS.

Specification forming part of Letters Patent No. **201,844**, dated March 26, 1878; application filed February 4, 1878.

To all whom it may concern:

Be it known that we, JOSEPH S. SMITH and JAMES M. DAVIS, both of Bangor, in the county of Penobscot and State of Maine, have invented certain new and useful Improvements in Extension-Ladders; and we do hereby declare that the following is a full, clear, and exact description thereof, that will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 shows a vertical section of our improved ladder; Fig. 2, side view of spring-brake; Fig. 3, side view of hook and tripper; Fig. 4, supporting-poles and joint; Fig. 5, spring-jaws for attaching supporting-poles.

Same figures show like parts.

Our invention consists of certain improvements upon extension-ladders, more particularly designed for application to the ladder patented, under date of March 23, 1875, to James M. Davis, but applicable to other ladders of similar construction.

These improvements relate, first, to means for preventing the too rapid fall of the traveling ladder or extension when being lowered, and for aiding or regulating the automatic action of the retaining-hooks; second, to devices attached to said hooks to prevent any possibility of catching when the extension is descending; and, third, to devices for attaching the supporting-poles, to allow movement in different directions, and also to render them readily attachable and detachable.

The general features of the ladder described in the Letters Patent above referred to consist of a ladder and extension raised and lowered by an endless chain, which also operates automatically retaining-hooks, raising them from the rounds as the extension descends, and closing them over the rounds as it rises.

Our present improvements will be understood by reference to the accompanying drawings.

The first feature consists of a spring-brake, attached to the stationary ladder, and operating against the extension. Fig. 2 best illustrates its construction. At *a* is a stiff spring, secured at one end, *b*, to the ladder *c*. In a slot, *d*, in the lower end of this is a loosely-fitting dog, *e*, having shoulders *f*, cut at an angle, as shown. As the extension rises it raises the dog, moving freely over it, but when lowered it draws the dog down, causing it to press upon the spring with its angular shoulder, and to act as a brake upon the ladder.

The degree of friction may be regulated by a set-screw, *g*, fixed in an angle-iron, *h*, and acting against the spring.

Short teeth or projections may be added, as shown at *e'*, on the under side of the dog *e*, to insure the bite of the extension.

The second feature is shown in Fig. 3, and consists of a tripper, secured to one or both of the hooks *i*. This is shown at *j*, and consists of an arm sufficiently long to extend beyond the line of ladder-rounds when hanging at right angles to the hook. This arm is jointed to the hook in such a manner as to close its jaws when raised. Upon the point of the hook is a stud, *l*, against which the end of the tripper strikes when raised. As the extension is lowered, the tripper *i* strikes against the rounds of the stationary ladder and is lifted, closing the jaw *m* of the hook *i*, and, striking against the stud or pin, lifts the hook over the rounds.

The arm *j* is kept at a right angle to the hook, or nearly so, by a spring, *k*, which allows the arm to rise with the extension without being checked by the rounds of the ladder.

We attach the side poles or supports *n* to the ladder by a universal joint, *o*. This permits them to be readily placed in any position without strain upon the connections. We further attach them removably, as follows: Through the ladder *c* is a hole, *p*, into which a rod, *q*, attached to the joint, is inserted. This rod has a ball or acorn shaped nut, *r*, upon its free end, and upon the inside of the ladder are placed spring-jaws *s*. As the rod *q* is forced in it presses these jaws apart, and as they close behind the nut *r* they secure it in place. To remove the poles, it is only necessary to open the jaws by compressing their handles *t* and withdraw the rod *q*.

The lifting of the hook of the extension is usually performed by the action of the endless

chain, and the tripper above described is intended as a safeguard against accident.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. In an extension-ladder, a friction-brake secured to the stationary ladder, and acting upon the extension only when the same is descending, substantially as and for the purposes set forth.

2. The combination of the spring *a*, movable dog *e*, and adjusting-screw *g*, constructed and operating substantially as set forth.

3. The combination of the hook *i* and arm or tripper *j*, pivoted upon the shank of said hook, and spring *k*, whereby frictional drag upon said tripper is sustained entirely by the pivot, substantially as and for the purposes specified.

4. The combination of the ladder *c*, poles *n*, and connecting-joint with the rod *q*, attached to said joint, nut *r*, and spring-jaws *s*, arranged and operating substantially in the manner and for the purposes set forth.

In testimony that we claim the foregoing we have hereunto set our hands this 20th day of December, 1877.

JOSEPH SEWALL SMITH.
JAMES MADISON DAVIS.

Witnesses:
JOHN R. MASON,
WM. FRANKLIN SEAVEY.