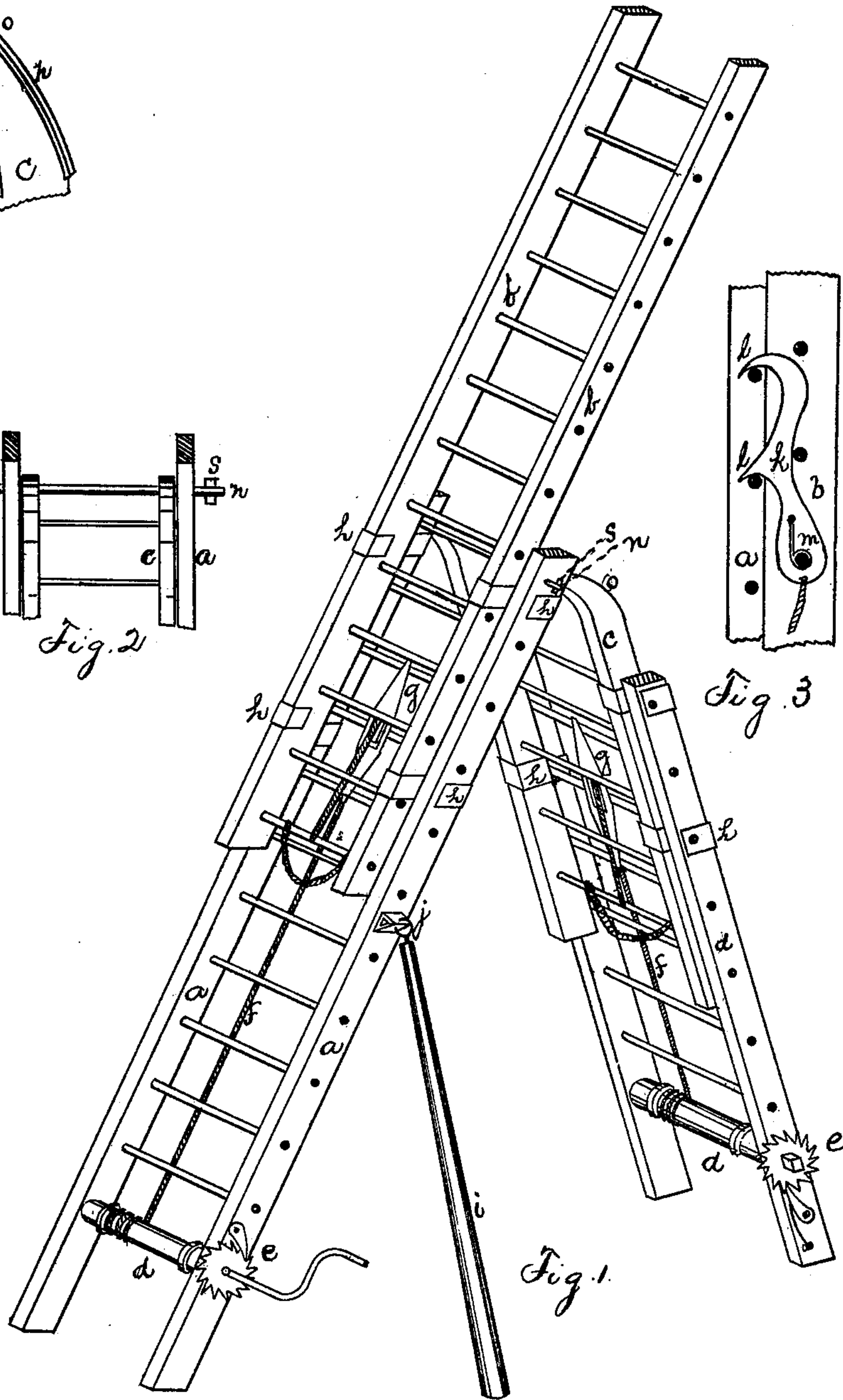
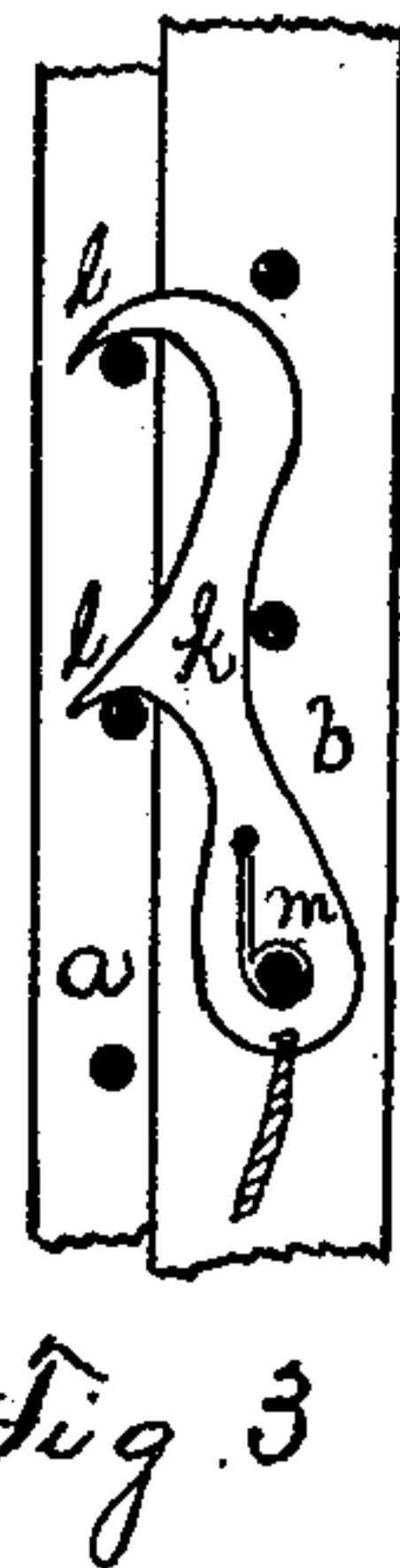
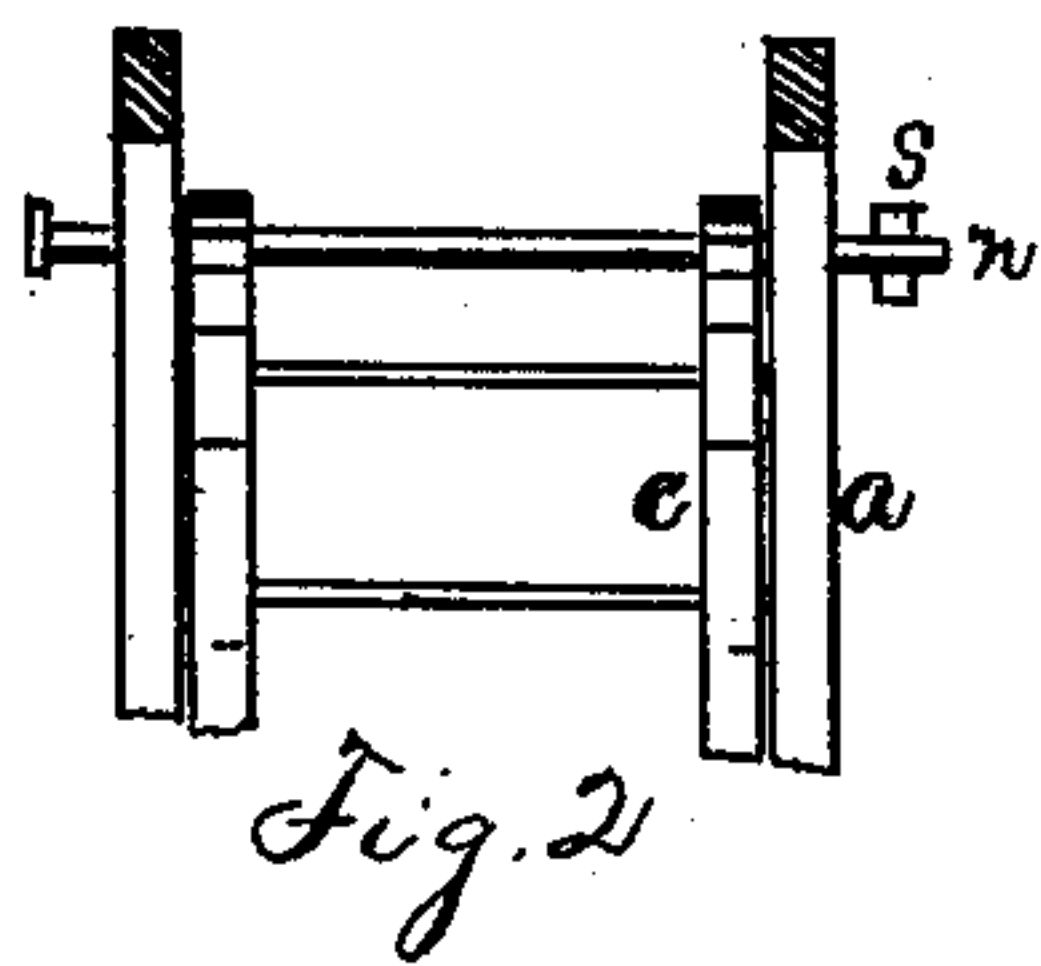
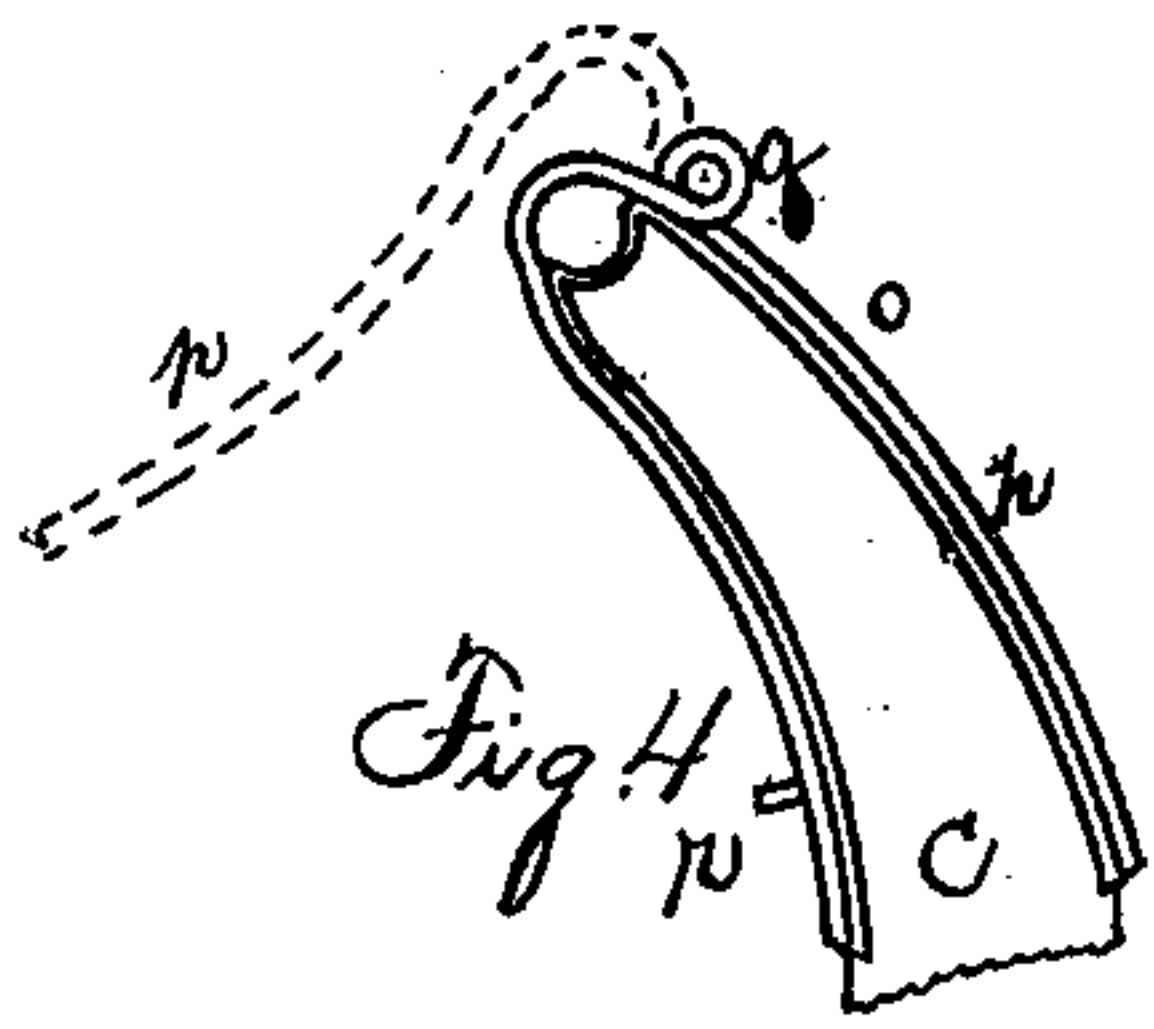


W. SMALL, Jr.
LADDERS.

No. 180,733.

Patented Aug. 8, 1876.



WITNESSES

Herbert S. Briggs
George H. Aldrich

INVENTOR

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Atty

UNITED STATES PATENT OFFICE.

WILLIAM SMALL, JR., OF LISBON FALLS, MAINE.

IMPROVEMENT IN LADDERS.

Specification forming part of Letters Patent No. **180,733**, dated August 8, 1876; application filed May 17, 1876.

To all whom it may concern:

Be it known that I, WM. SMALL, Jr., of Lisbon Falls, in the county of Androscoggin and State of Maine, have invented certain new and useful Improvements in Ladders; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

Figure 1 is a perspective view of my invention. Fig. 2 is a detail of the two parts of the ladder where they are united by the bolt and key. Fig. 3 is a detail of the self-acting hook, showing its operation on the rounds of the immovable part of the ladder. Fig. 4 is a view of the hinged clasp.

Like letters show like parts.

The object of my invention is to provide an extensible ladder, for a fire-ladder, and for other purposes. It is composed of the four parts *a b c d*, with their adjuncts.

Description will first be made of the part *a*. This part is a ladder provided near the lower end with a windlass. This windlass is provided with a ratchet and pawl, *e*. Extending from the windlass *d* is the rope *f*, passing up over and through the fixed block *g*, and attached near its lower end to the part *b*. The object of this arrangement is obvious. The part *a* being provided with the guides *h*, the part *b* is so constructed as to slide upwardly or downwardly on *a*, and in the guides *h*. Thus, by turning the crank of the windlass *d* the part *b* is drawn upward, and the length of the ladder extended thereby. The pawl and ratchet *e* will hold the part *b* at any desired point.

i are side supports to *a*. They are connected to *a* at *j*, where a swivel is formed which admits, in combination with the ring or loop in the top of *i*, of the turning of *i* in any necessary direction. *k* is a spring-hook pivoted to the inside of one of the side rails of *b*. It has two points, *l*, which hook over the rounds of the section *a*. *m* is the spring. This is coiled around one of the rounds of *b*, and then connected with the hook. The spring forces the hook over the rounds of *a*. When *b* is moved upwardly the inclined upper edges of the hooks *l* strike the rounds of *a*, and the hook is pushed back by each round, thus al-

lowing the part *b* to move. When *b* is to be drawn downwardly, the hook *k* is drawn back by a cord or other convenient means. *a* and *c* are united together by a keyed bolt, *n*. *c* working inside of the side pieces of *a* enables the ladder to be compactly closed. *c* is curved at the top, as shown at *o*. These curved ends are covered with two metal straps to form the eyes for the key-bolt *n*. (See Fig. 4.) The outer of these two metal straps may be so made as to form a hinge-joint, as seen in Fig. 4. In such case the part *p* is hinged at *q*, and fastened down by a thumb-piece, *r*. This enables *c* and *d* to be easily separated from and united with *a* and *b*.

The part *c* slides upwardly and downwardly on the under side of *d*, and between the two side rails thereof. It is moved by a windlass, ratchet, and pawl, fixed block and cord, in the same manner as heretofore described concerning *a* and *b*. It moves also in guides like *h*. These are similarly lettered.

By removing the key *s* the bolt *n* may be withdrawn when the hinge-joint *p q* is not employed.

The method of using the ladder is obvious. The two parts *a* and *d* are drawn apart, as illustrated in Fig. 1. The two sliding parts *c* and *b* are then moved upwardly in order to reach the desired elevation. The side braces *i* are fixed in the ground to prevent the ladder from falling on either side. The pawl on *d* is a spring-pawl, as illustrated.

The part *c* is furnished with a spring-hook, like *k*, to operate on the rounds of *d*, as described and shown in Fig. 3, concerning the hook on the part *t* catching on the rounds of *a*.

What I claim as my invention, and desire to secure by Letters Patent, is—

The ladder, as described, composed of the four parts *a b c d*, and having the guides *h*, windlasses *d*, cords *f*, blocks *g*, ratchets and pawls *e*, side supports *i*, spring-hooks *k l m*, double metal straps on the upper end of *c*, forming the eyes for the key-bolt *s n*, bolt *s n*, the whole arranged and operating as herein set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

WM. SMALL, JR.

Witnesses:

HERBERT G. BRIGGS,
WILLIAM HENRY CLIFFORD.