L. HAUERWAS.

EXTENSION-LADDERS.

No. 194,089. Patented Aug. 14, 1877.

Fig. 1.

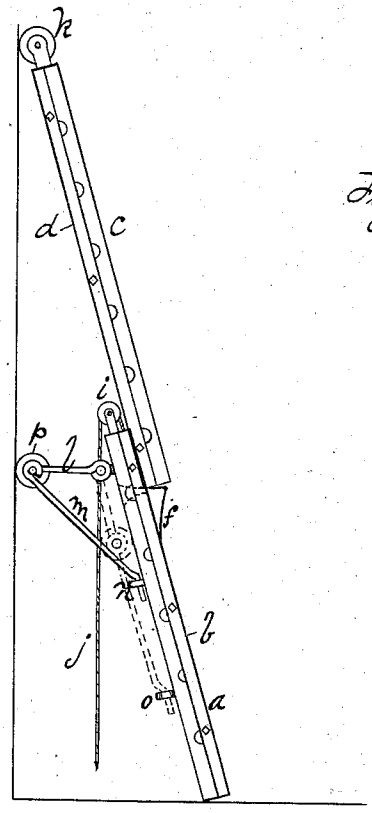


Fig. 2.

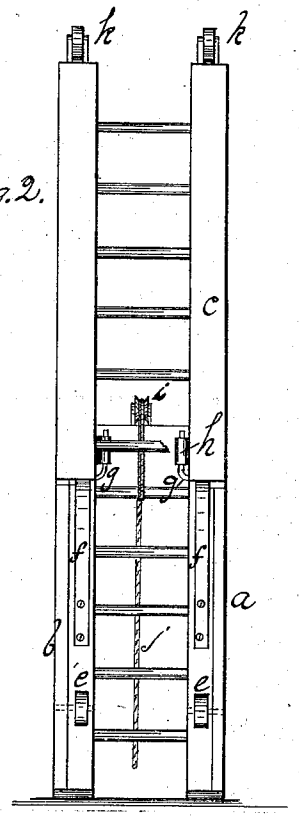


Fig. 4.

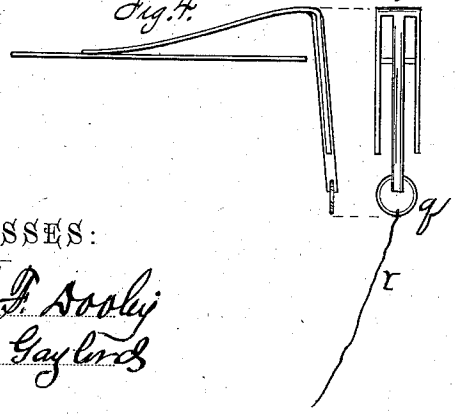
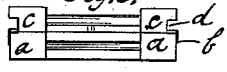


Fig. 5.

Fig. 3.



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LUDWIG HAUERWAS, OF HARTFORD, CONNECTICUT.

IMPROVEMENT IN EXTENSION-LADDERS.

Specification forming part of Letters Patent No. **194,089**, dated August 14, 1877; application filed June 29, 1877.

To all whom it may concern:

Be it known that I, LUDWIG HAUERWAS, of Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements Pertaining to an Extension-Ladder, of which the following is a specification, reference being had to the accompanying drawings, where—

Figure 1 is a side view of the ladder extended. Fig. 2 is a front view of the same. Fig. 3 is an end view of the same. Fig. 4 is a detail view of the spring-catch—a side view. Fig. 5 is an end view of the spring-catch.

This ladder is more particularly designed for a fire-escape, though it may be used for other purposes.

The letter *a* denotes the lower or base length of the ladder, equipped on the outer side of each side rail with a plate, *b*, bent to an angle (substantially a right angle) inward, a little distance above each rail. The extension-length *c* is equipped on the outer side of each side-rail with a plate, *d*, bent to a right angle outward, the lateral leaf running under the lateral leaf of the plate *b*, and so holding the two lengths to each other while allowing longitudinal movement. The plates *b* and *d*, in each case, cover wholly or partially the ends of the rounds, and thus prevent that endwise movement of the rounds which is so fruitful of accidents. In the rails of the base-length are hung friction-pulleys *e*, to give easy movement of one length upon another.

When the extension-length has risen to the top of its play the spring-catches *f* snap out under the rails and hold the ladder thus extended.

The lateral arms of these springs have to pierce the rails of the base-lengths. That they may do this and not require large holes, these lateral arms are forked, and a small hole bored for each tine of the fork.

The extension-length is prevented from rising too high by the catch-rods *g* striking into the catch-tubes *h*.

In order to raise the extension-length easily, and that from the ground, the pulley *i* is provided at the top of the base-length, and the rope *j*, fastened to the lower round of the extension-length, runs up over it and returns to the ground. By means of this rope, fastened at its free end to a round of the base-length, the extension-length can be secured at any desired height. The extension-length is furnished with the pulleys *k*, that it may run up easily on a house wall. To the rear of the side-rails of the base-length are pivoted the jointed supports *l m*. Arm *l* is pivoted to the ladder, and arm *m* is pivoted to arm *l*, and its lower end rests, when the jointed support is extended, in the ring *n*. The ring *o* holds the lower end at other times. At the joining of these two arms the friction-pulley *p* is hung. The jointed supports avail to give a support for the upper end of the base-length when the ladder is extended, as shown in Fig. 1. The dotted lines in this figure show one of these supports in the position of non-extension.

To the end of the lateral arm of each spring-catch a ring, *q*, is hung, and from this depends a cord, *r*, so that these catches may be pulled in from the ground, and the extension-length allowed to drop. To this end the holes or mortises in the side rails, which contain the lateral arms of these spring-catches, are beveled downward toward the rear side, as represented in dotted lines in Fig. 1.

It is obvious that more than one extension-length can be used when desired.

I claim as my invention—

1. The combination of the ladder-lengths *a c* and the connecting slide-plates *b d*, when these plates are made to confine the ends of the rounds, substantially as shown and described.

2. The spring-catches *f*, forked, as described, for the purposes set forth.

3. The combination of the base-length *a*, provided with the friction-pulleys *e*, and the extension-length *c*, provided with the friction-pulley *k*.

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Witnesses:
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