(No Model.) 2 Sheets—Sheet 1.

W. N. DERBY.

EXTENSION LADDER.

No. 326,205. Patented Sept. 15, 1885.

Fig. 1.

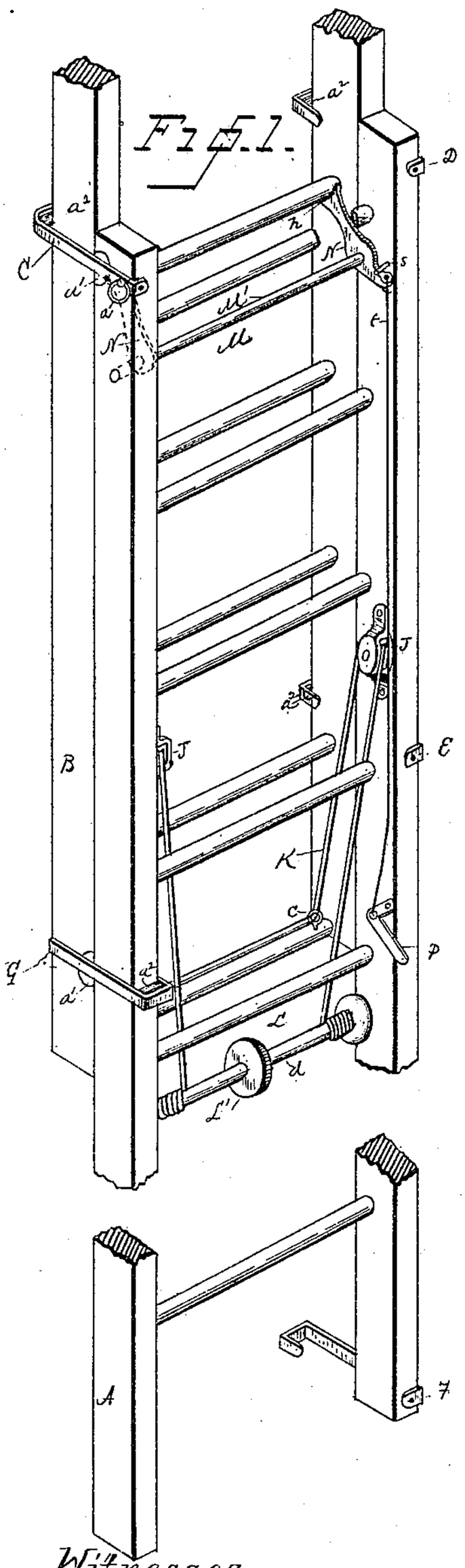
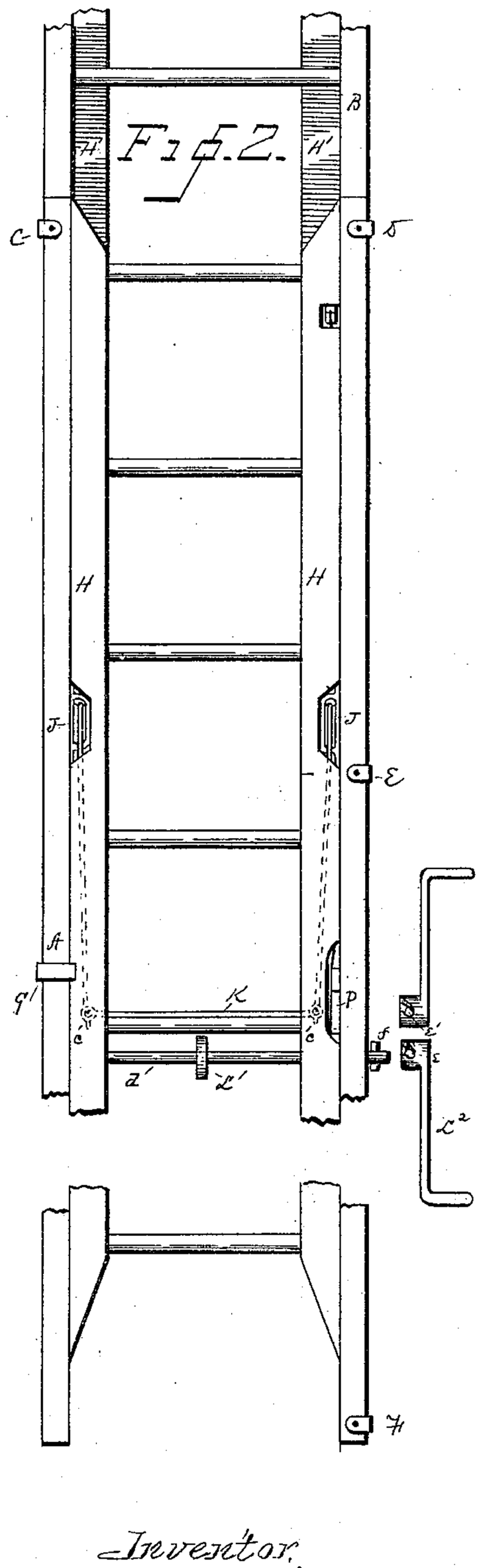


Fig. 2.



Witnesses.

W. H. Jones,

Wm. F. Williams

Inventor.

Walter N. Derby

per H. W. Cragin.

Atty.

(No Model.)

2 Sheets—Sheet 2.

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Fig. 5.

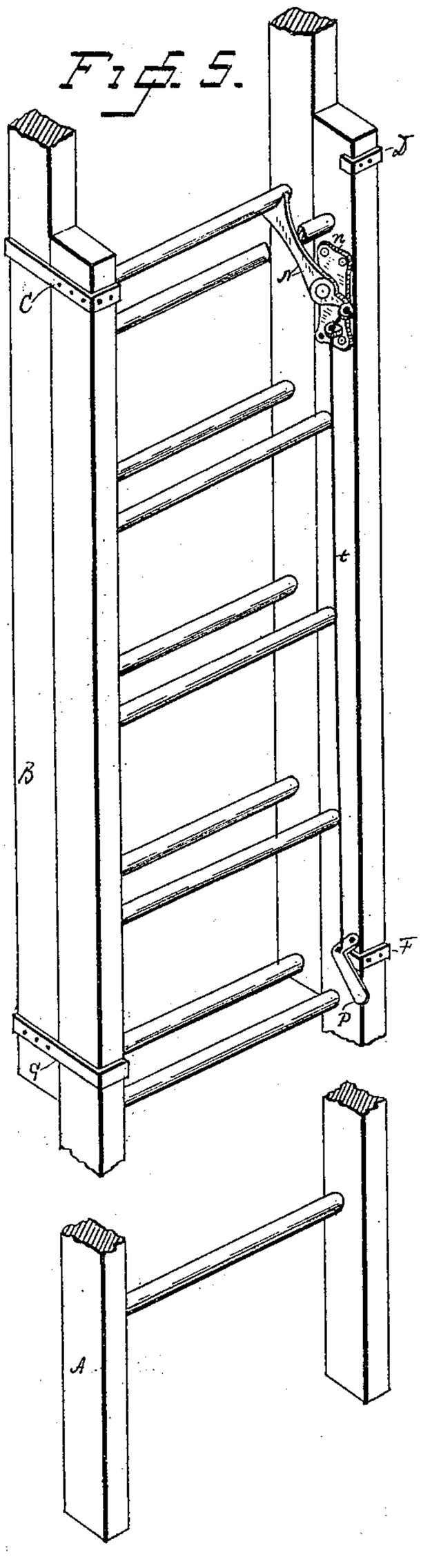


Fig. 3.

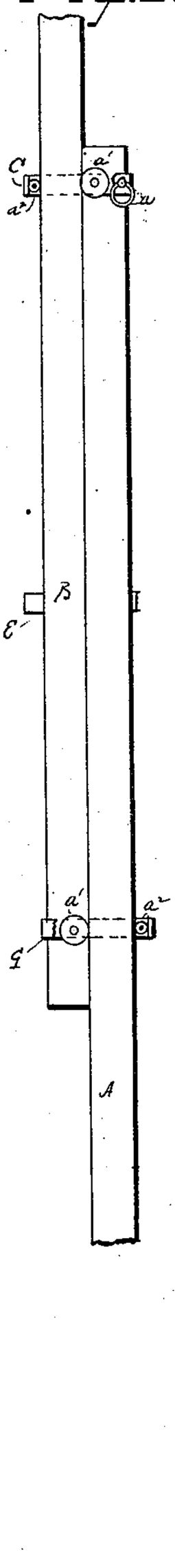


Fig. 4.

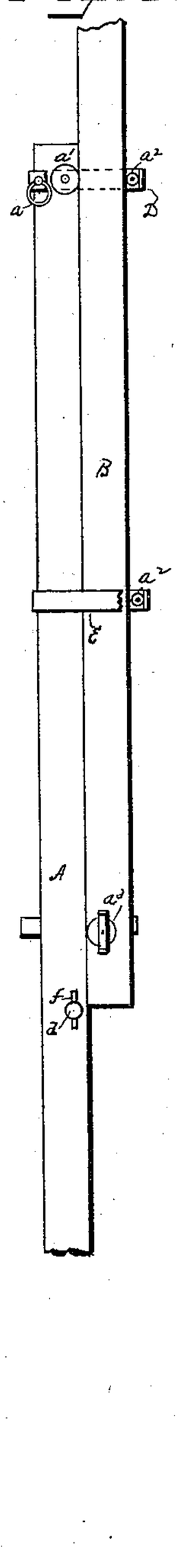
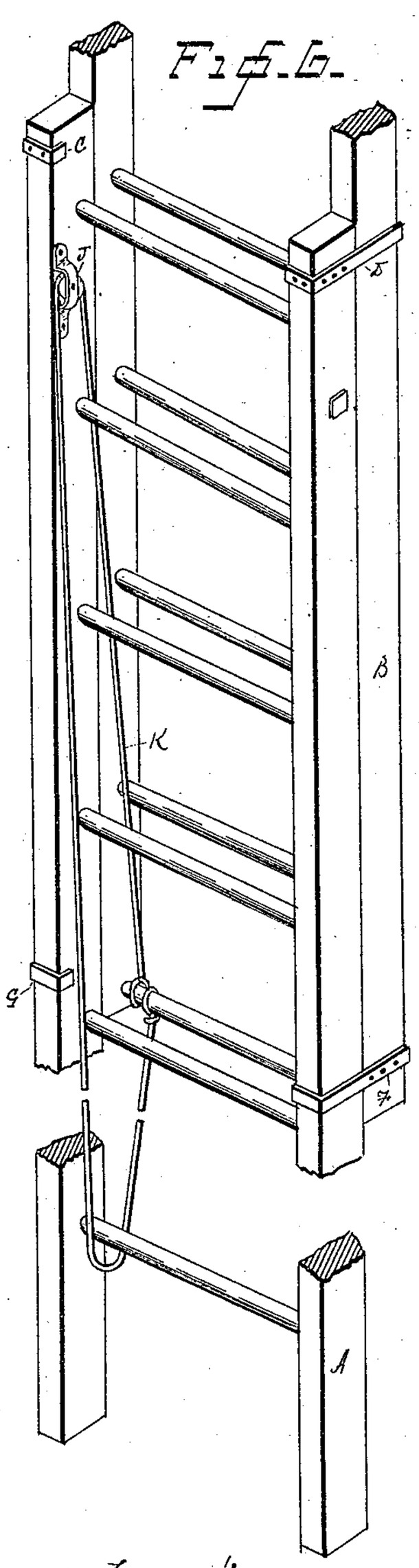


Fig. 6.



Witnesses

Wm. H. Jones.

Wm. G. Williams

Inventor

Walter N. Derby

per W. W. Cragin. Atty.

UNITED STATES PATENT OFFICE.

WALTER N. DERBY, OF ETNA, NEW HAMPSHIRE.

EXTENSION-LADDER.

SPECIFICATION forming part of Letters Patent No. 326,205, dated September 15, 1885.

Application filed June 25, 1885. (No model.)

To all whom it may concern:

Be it known that I, WALTER N. DERBY, a citizen of the United States, residing at Etna, in the county of Grafton and State of New Hampshire, have invented certain new and useful improvements in Extension-Ladders; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

The nature of my invention will be described below, and pointed out in the claims.

In the drawings, Figure 1 is a perspective view, the upper round of the lower section being broken away to show the form of dog used. Fig. 2 is a front view showing the stiffening-boards applied to the rounds of the two sections. Figs. 3 and 4 are opposite side views, partly in broken section. Figs. 5 and 6 are perspective views, partly in broken section, of a modified form of ladder.

Like letters refer to like parts.

A represents the lower section, and B the upper. These are held together by clamps C, D, E, F, and G. The clamps C and D have rings, *a a* attached to their sides, to which ropes may be connected for holding the ladder away from the building while it is being raised.

Journaled between the sides of these two clamps and the inner side of the lower section are friction-rolls a' a', nearly countersunk in said section, and in the bend of said clamps, back of the upper section, are also journaled friction-rolls a^2 a^2. The clamp E has simply the friction-roll a^2 back of the upper section, and the clamp G has both of the friction-rolls a' a^2, the roll a^2 operating here on the outside of the lower section, and the roll a' being partly countersunk in the upper, as shown.

Opposite clamp G there is a friction-roll, a^3, in the right-hand side of the upper section. The clamp F needs no friction-roll, in view of roll a^3. The object of these rolls is to keep the sections apart and to allow of their easy working, and the latter, even if the timbers shrink, swell, or twist.

The stiffening-boards H H′ are screwed to the rounds of either section, and serve to stiffen the ladders sidewise and strengthen the rounds.

In order to raise the upper section, pulleys J J, arranged in blocks, are attached opposite to each other within the sides of the lower section. On the lower round of the upper section are staples *c c*. Through these a rope, K, is passed, which extends up over the pulleys and then downward, as shown, the free end of said rope being attached to the spool *d* of a windlass, L, located in the lower section. The windlass-spool has thereon a loose round disk, L′, and the former is turned by a crank, L^2. This crank is diagonally slotted in opposite directions (see *e e′*) in its head to permit the said crank-head to engage with both the protruding end of the windlass and a pin, *f*, the latter extending through said end. If one side of the rope takes up faster than the other, the rope will slip through the staples, obviating slack and keeping up an even strain. If the rope winds out on the spool faster on one end than on the other, the loose disk will slide until it strikes the coil of rope on the other end and then double back, causing the spool to fill properly. As to the crank, it can be quickly attached or detached without the use of a nut, and when on the windlass the pin *f* and slots *e e* form a lock which prevents the crank from slipping.

To hold the upper section at any desired altitude, a double dog, M, is provided. It is located between the sides of the lower section and near the top. It consists of a rock-shaft, M′, and the rigidly-attached catches N N. The catches consist of a weighted head, concaved at *h*, and a right-angular lower portion or shank. A stop-pin, *s*, is placed above this shank to prevent the catches from falling too far forward as the upper section lifts. The catches are always ready to engage with the rounds of the upper section as the weight of metal in them causes them to fall toward said rounds, the concavity *h* coming then partly under them. The dog may be single or double; but I prefer to arrange it so that the rounds of both sections shall come practically opposite to each other, to avoid any half-steps. It will be seen that the rounds of the upper section push the catches back as they rise,

and that they fall forward as each round moves away from them. To draw the catches away from under said rounds, a wire, *t*, is extended from the shank to a bent lever, P. If desired, this lever may be pivoted to act like an eccentric, so as to give the wire a quick sharp pull, or the wire may be so taut as to move the catches back or forward.

In the modification shown in Figs. 5 and 6 the friction-rolls and the windlass are dispensed with; but the clamps C, D, F, and G are retained. One of the pulleys J is used only, and this is attached to the left side of the lower section. The rope K is passed over the pulley and both free ends are attached to the lower round of the upper section, making the rope a long loop, so that said section may be raised by hand. The double dog is dispensed with, and in its place a single catch, N, is placed on the right-hand side of the lower section and swings on a bolt passing through a side plate, *n*, and the said side. This plate has a perforated stud to match with the perforated shank of the catch. The wire *t* passes through the stud and is fastened to the said shank, and is operated just as in the first form of ladder. In both ladders the sliding section is away from the person, and the rope at one side, so as to be out of the way.

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

1. The lower section, A, combined with the inside pulleys, J, the rope K, attached to the upper section, B, and to a windlass on the lower section, the inside weighted catch or catches, N, the lever P, and connecting-wire *t*, and the upper section, B, held to the lower by clamps having friction-rolls, substantially as set forth.

2. The lower section A, provided with windlass L, the inside pulleys, J J, and the double catches N, connecting with lever P by wire *t*, combined with the upper section, B, having staples *c c* on the lower round, the rope K, attached to said staples and in connection with the windlass and pulleys, and the clamps C, D, E, and G, having friction-rolls, $a' a^2 a^3$, as set forth.

3. The clamps C and D, provided with the rings *a a*, adapted to receive guide-ropes, combined with the sections A and B, operated substantially as shown, as and for the purpose set forth.

4. The lower section, A, having the windlass-spool *d*, with loose disk L′, and a projecting end, with pin *f*, combined with the crank L^2, having diagonal slots *e e*, the rope K, and the upper section, B, as set forth.

5. The lower section, A, provided with the catch or catches N, consisting of the weighted head concaved at *h*, and an angular shank, combined with the wire *t*, lever P, rope K, and the upper section, B, as set forth.

6. The lower section, A, having the side plate, *n*, with an angular perforated shelf, and the catch N, consisting of the weighted head concaved at *h*, and the perforated angular shank connected with lever P by wire *t*, combined with the rope K and the upper section, B, as set forth.

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

WALTER N. DERBY.

Witnesses:
W. H. COTTON,
A. H. DERBY.