(No Model.)

J. POTTER.

EXTENSION LADDER.

No. 354,612. Patented Dec. 21, 1886.

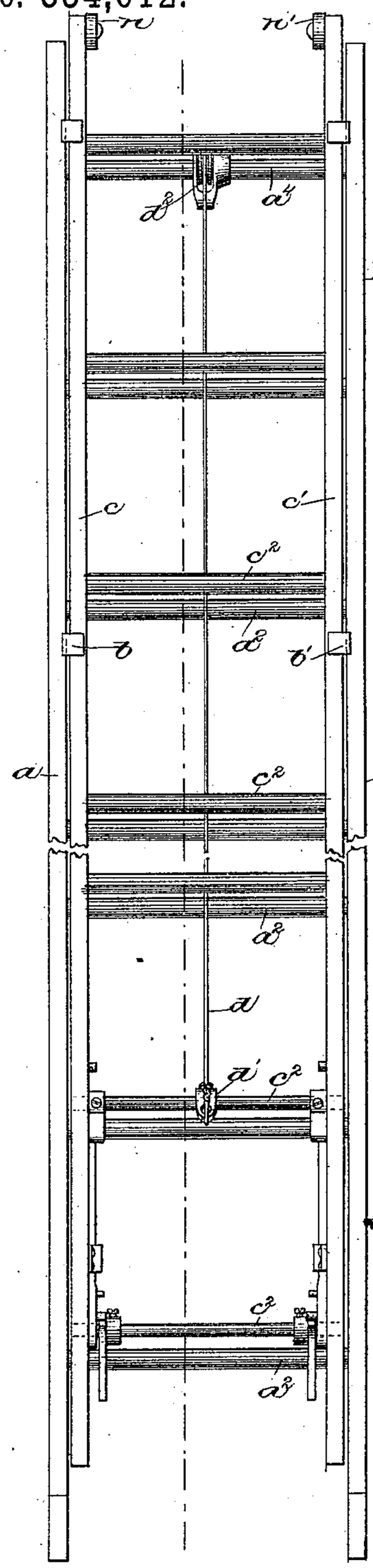

Fig. 1.

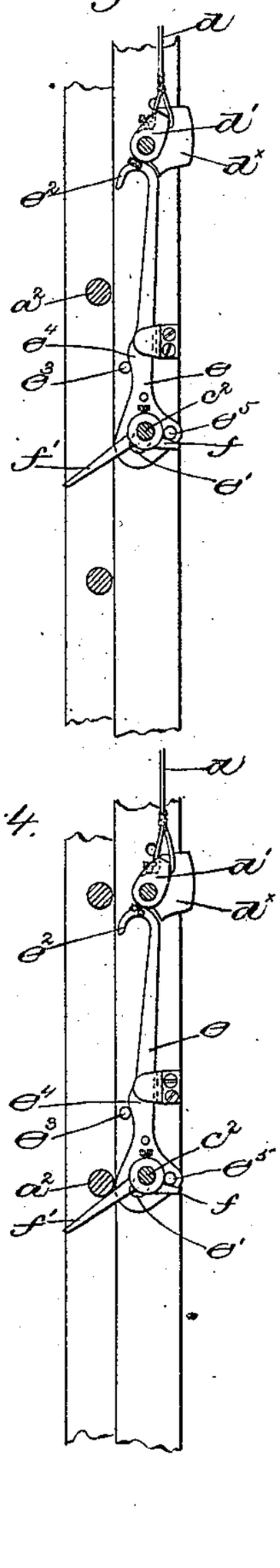

Fig. 3.

Fig. 4.

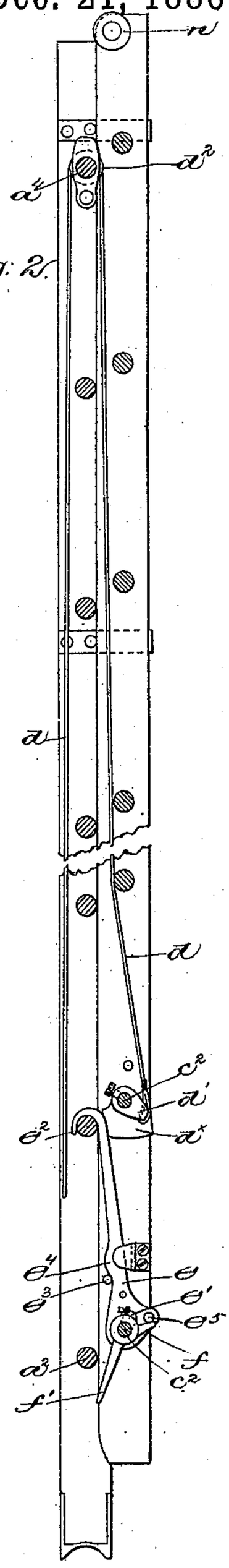

Fig. 2.

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UNITED STATES PATENT OFFICE.

JOSEPH POTTER, OF BOSTON, MASSACHUSETTS.

EXTENSION-LADDER.

SPECIFICATION forming part of Letters Patent No. 354,612, dated December 21, 1886.

Application filed June 29, 1886. Serial No. 206,642. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH POTTER, of Boston, county of Suffolk, and State of Massachusetts, have invented an Improvement in Extension-Ladders, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention has for its object to construct an extension-ladder which may be extended or raised to any desired height within a prescribed limit and be locked or held rigidly in any position in which it may be set.

In accordance with this invention, the main ladder is preferably provided upon each side with guide-hooks, within which the supplemental ladder may slide. A cord or chain connected with one of the lower rounds of the supplemental ladder passes over a pulley or sheave mounted upon one of the upper rounds of the main ladder, said cord or chain hanging loosely, and being of sufficient length to come within reach of the operator upon the ground, so that he may, by pulling upon the cord or chain, raise the supplemental ladder in its guides.

The locking or retaining device consists of a lever having a curved or diagonal slot at one end, through which slot the lowermost round of the supplemental ladder is placed, that the said lever may thus have a loose connection, and the opposite end of the lever is provided with a hooked end to engage one of the rounds of the main ladder. One side of the locking-lever, near its slotted end, is provided with a cam-shaped projection, which bears against a pin or stud projecting from the inside of that side piece of the supplemental ladder near which the locking-lever is placed, to cause the said locking-lever to recede, so as not to touch the rounds of the main ladder when in its lowermost position, the said projection, however, permitting the said locking-lever to move forward to engage a round of the main ladder when raised into position. A suitable lifting-lever is provided, it co-operating with the rounds of the main ladder as the supplemental ladder is raised, to thereby raise the locking-lever into such position that its hooked end may engage one of the rounds of the main ladder, said lifting-lever being sufficiently light to permit the locking-lever to resume its lowermost position by gravity when the lifting-lever is disengaged, thereby causing its hooked end to recede. Suitable devices are also provided for automatically causing the hooked end of the engaging-lever to engage one of the rounds of the main ladder should the cord or chain accidentally break.

Figure 1 shows in front elevation an extension-ladder embodying this invention; Fig. 2, a vertical section of Fig. 1, taken on the dotted line *x x;* Fig. 3, a detail of the locking device disengaged, and Fig. 4, a similar view to Fig. 3, with the locking device in another position, to be referred to.

The side pieces or rails, *a a'*, and rounds a^2 of the main ladder, and the side pieces or rails, *c c'*, and rounds c^2 of the supplemental ladder, are of usual construction, the supplemental ladder being somewhat narrower than the main ladder and following in guide hooks or ways *b b'*, secured to the side rails of the main ladder. A cord or chain, *d*, is connected to a collar, *d'*, secured to one of the lowermost rounds, c^2, of the supplemental ladder, the opposite end of the cord extending upward and passing over a sheave or pulley, d^2, mounted upon the uppermost round, a^4, of the main ladder, the free end of the said cord hanging downward loosely to be within easy reach of the operator.

To lock the supplemental ladder to the main ladder in different positions desired, suitable locking devices are employed, which consist of a locking-lever, *e*, having at one end a slot, *e'*, preferably curved or diagonal, through which the round c^2 passes, thereby permitting the locking-lever *e* to be lifted and to fall by gravity a distance equal to the length of the slot. The opposite end of the locking-lever *e* is hooked, as at e^2, to engage one of the rounds of the main ladder when desired. A pin or stud, e^3, protrudes from the inner side of the side rail of the supplemental ladder near the pivot of the locking-lever *e*, one edge of the said locking-lever *e* being provided with a cam-shaped projection, e^4, which bears against the said pin or stud e^3. A lifting-lever is loosely mounted upon the round c^2, one arm

of which, as *f*, is located beneath the pin or stud e^5, projecting from one side of the locking-lever *e*, while the other arm, *f'*, of the lifting-lever extends forward to strike one of the rounds of the main ladder as the supplemental ladder is raised.

It will thus be seen that as the supplemental ladder is lifted by the cord *d* the arm *f'* of the lifting-lever *e* will strike the under side of one of the rounds a^2 of the main ladder, (see Fig. 4,) causing its other arm, *f*, to strike the pin e^5, and thereby raising the locking-lever *e;* and owing to the shape of the cam e^4 and the slot *e'* the said locking-lever will rock or tip forward, so that should the cord *d* be slackened the supplemental ladder will drop and the hooked end e^2 of the locking-lever engage one of the rounds of the main ladder, as shown in Fig. 2.

The lifting-lever is preferably of such construction that when once operated to raise the locking-lever and having passed one of the rounds of the main ladder the locking-lever will recede to its normal position by gravity and restore the lifting-lever to its normal position, in order that it may strike the next round of the main ladder. When lowering the supplemental ladder, the arm *f'* of the lifting-lever will strike upon the top of the rounds of the main ladder, and turning the arm *f* in the opposite direction will perform no function, thereby permitting the locking-lever to retain its normal position.

To insure the safety of a person upon the ladder, should the cord *d* become accidentally broken, the round c^2, to which the collar *d'* is secured, is mounted between the said rails of the ladder loosely, in order that it may rock, one or both of the ends of the said rocking round having a tumbler, $d^\times$, secured to it of such shape that when the cord *d* is slackened or broken the said tumbler, owing to its weight, will turn, and striking the hooked end e^2 of the locking-lever will force the same forward, so that it will engage one of the rounds of the main ladder during the descent of the supplemental ladder.

I have herein shown a locking device and safety device located upon each side of the supplemental ladder; but, being alike, only one has been fully described.

It is obvious that if it should be deemed necessary several such locking devices operated in unison might be employed.

To facilitate lifting the supplemental ladder when the same rests against the building, two rollers, *n n'*, are mounted thereon to bear against the side wall of the building.

I claim—

1. In an extension-ladder, the main and supplemental ladders, and cord or chain for raising and lowering the supplemental ladder, combined with a hooked locking-lever, substantially as described, pivoted by a slot inclosing the pivot at the lower end of the supplemental ladder, and a lifting-lever, substantially as described, located to strike one or another round of the main ladder as the supplemental ladder is raised, to thereby raise the locking-lever, as set forth.

2. In an extension-ladder, the main and supplemental ladders, and cord or chain for raising and lowering the supplemental ladder, combined with a hooked locking-lever slotted at one end and having a cam-shaped portion, e^4, as described, a pin, e^3, and means, substantially as described, for raising the locking-lever, that it may move forward and engage the round of the main ladder, as set forth.

3. In an extension-ladder, the main and supplemental ladders, and cord or chain for raising and lowering the supplemental ladder, combined with a hooked locking-lever slotted at one end and having a cam-shaped portion, e^4, as described, lifting-lever *f f'*, and a pin, e^3, against which one arm of the lifting-lever bears to raise the locking-lever, as set forth.

4. In an extension-ladder, the main and supplemental ladders, and a cord or chain for raising and lowering the supplemental ladder, combined with a pivoted locking-lever and a cam held out of engagement with said locking-lever by the cord or chain, but arranged to strike the locking-lever and turn it on its pivot when the cord or chain breaks, as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOSEPH POTTER.

Witnesses:
BERNICE J. NOYES,
F. CUTTER.