(No Model.)

J. A. DALUMI.

FOLDING LADDER.

No. 446,433. Patented Feb. 17, 1891.

FIG. 1

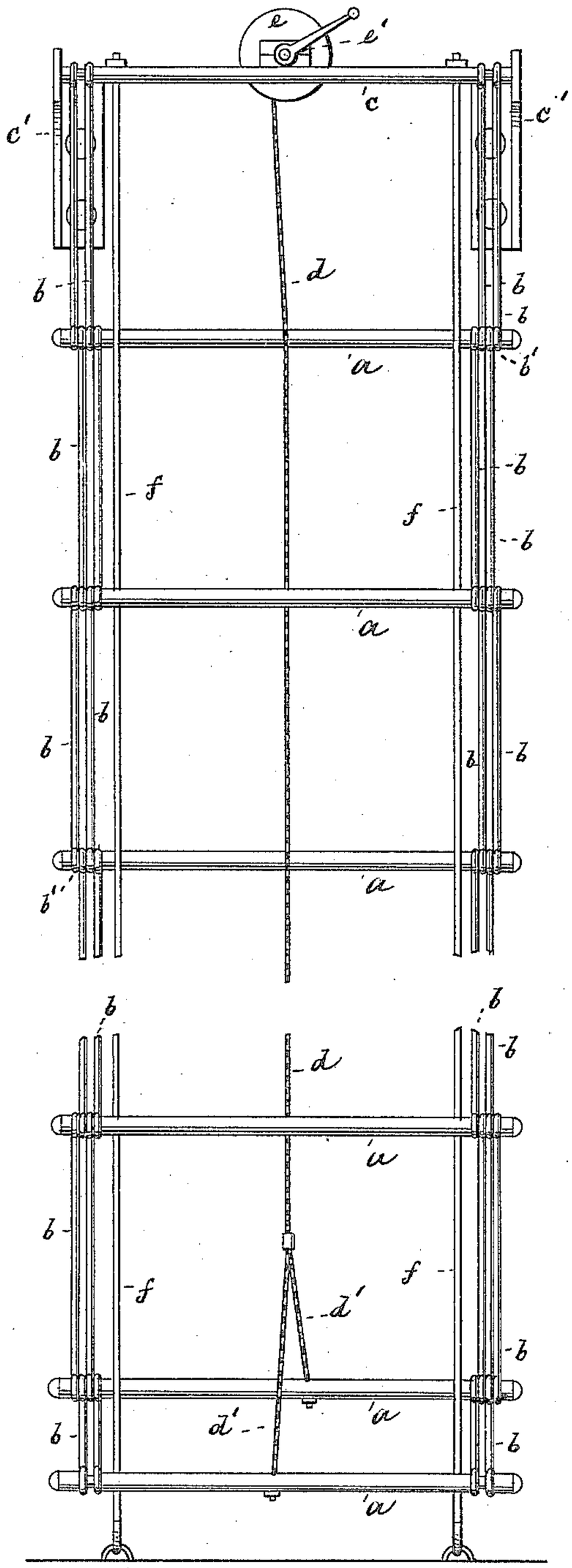


FIG. 3

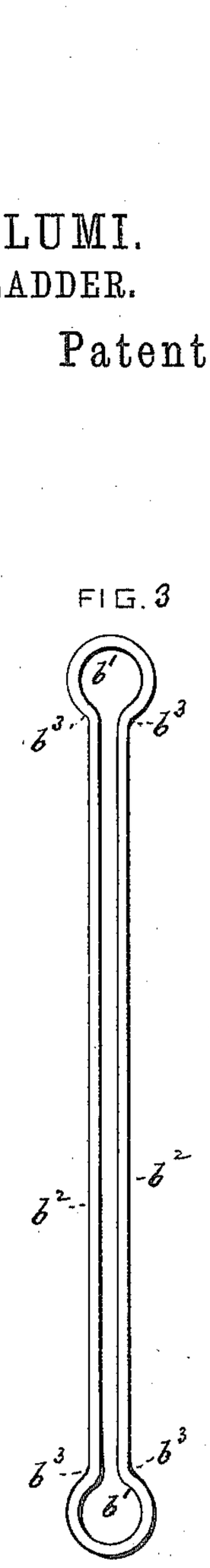


FIG. 2

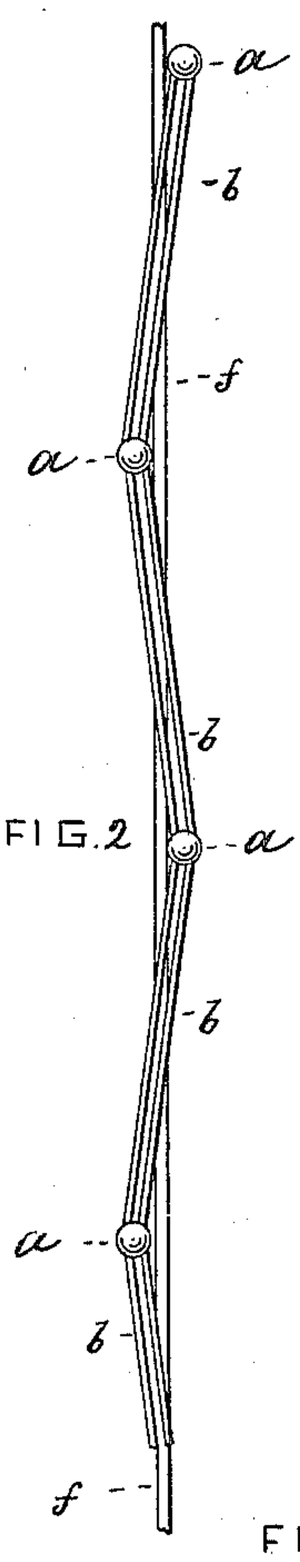
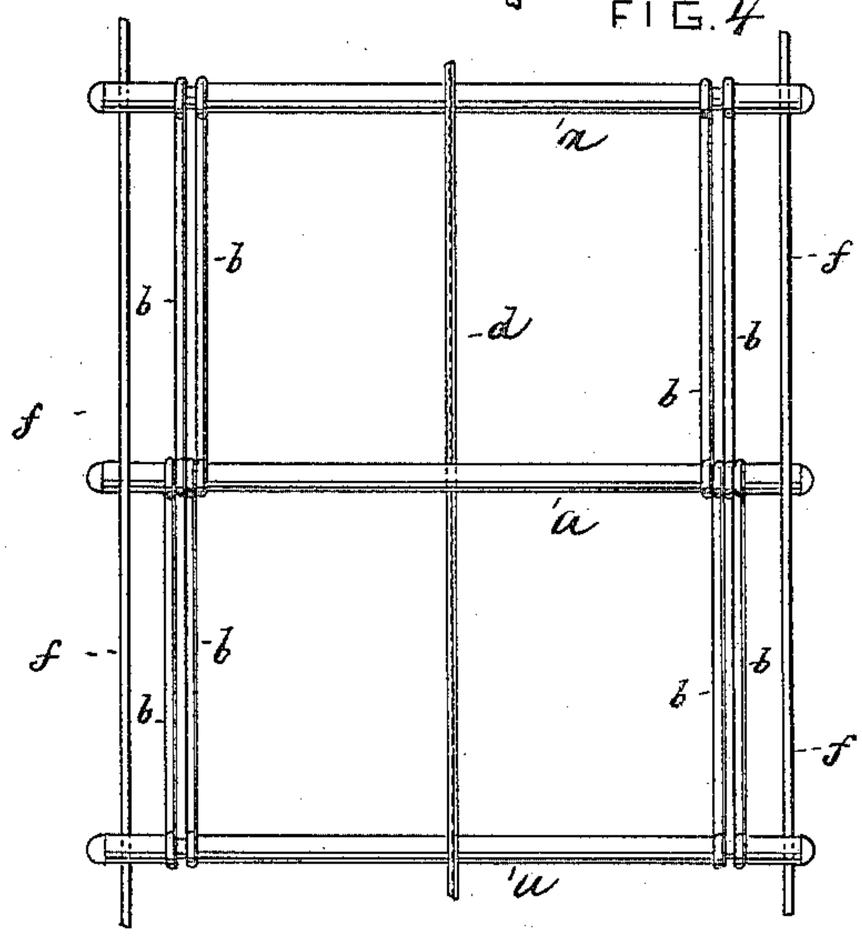


FIG. 4



WITNESSES

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JULIUS A. DALUMI, OF NEW YORK, N. Y.

FOLDING LADDER.

SPECIFICATION forming part of Letters Patent No. 446,433, dated February 17, 1891.

Application filed July 10, 1890. Serial No. 358,273. (No model.)

To all whom it may concern:

Be it known that I, JULIUS A. DALUMI, of New York city, New York, have invented an Improved Folding Ladder, of which the following is a specification.

This invention relates to a folding ladder of simple construction, more especially designed for fire-escapes, though it may also be used for other purposes.

The invention consists in the various features of improvement more fully pointed out in the claims.

In the accompanying drawings, Figure 1 is an elevation of my improved folding ladder; Fig. 2, an end view thereof; Fig. 3, an enlarged side view of one of the links *b*, and Fig. 4 a face view of a modification.

The letters *a a* represent the rungs of the folding ladder connected by a series of links *b*, that constitute the sectional uprights. Each link is endless or completely closed, Fig. 3, its ends being connected by welding, preferably by electrical fusion. The links are provided at the top and bottom with an eye *b'*, encircling the rung and with a pair of parallel shanks b^2 connecting the eyes. At the junction of the shank and eye an offset b^3 is formed that closes the eye sufficiently for preventing the rung from slipping out of the eye and between the shanks b^2.

In the manufacture of the ladders I prefer to first form plain elongated loop-shaped links, slip them over the rungs, and then pinch them together above and below each rung, so as to obtain a shape substantially as illustrated. The advantage connected with a link of this kind is that it is very strong, can be cheaply manufactured, and readily applied. If the links are made of very thin wire, two links should be placed at each side of the ladder, as shown. The ladder is suspended from a shaft *c*, supported in bearings *c'*, that are secured to a house. To fold or draw up the ladder, I employ a chain or rope *d*, terminating at its lower end in two arms *d'*, secured to the two lowermost rungs. At its upper end the chain *d* is wound around a pulley *e*, mounted on crank-shaft *e'*. The chain is passed alternately back of one rung and in front of the next rung, as shown. In this way when the chain is wound upon the pulley *e* by turning the crank *e'* the ladder will be quickly and correctly folded.

In descending, the ladder is very apt to shake and the rungs are apt to come out of line vertically, thus rendering the foothold insecure, especially to nervous persons. To hold the ladder at all times in a proper vertical position when let down, I employ two vertical wires or rods *f*, rigidly secured in place at the top and bottom These wires are placed at such a distance from the building as the ladder itself is placed, so as to be in line substantially with the links *b*. The wires pass between alternate rungs *a*, and thus one half of the rungs are behind the wires while the other half are in front of the wires. In this way it will be seen that the wires prevent the ladder from swinging either toward or away from the building.

In Fig. 1 the wires *f* are shown to be placed inside of the links *b*.

In Fig. 4 the links are shown to be placed inside of the wires.

What I claim is—

1. A folding ladder having uprights that are composed of closed or endless links, each link being provided with eyes at the ends, and a pair of shanks between the eyes, substantially as specified.

2. The combination of a folding ladder with a chain *d*, attached to the lowermost rung and passing up in front and behind alternate rungs, and with a windlass, to which the upper end of the chain is fastened, substantially as specified.

3. The combination of a folding ladder with vertical wires *f*, rigidly secured at their upper and lower ends and passing in front of and behind alternate rungs, substantially as specified.

JULIUS A. DALUMI.

Witnesses:
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