C. O. MICHEL.

FOLDING LADDER.

APPLICATION FILED JULY 23, 1913.

1,101,808. Patented June 30, 1914.

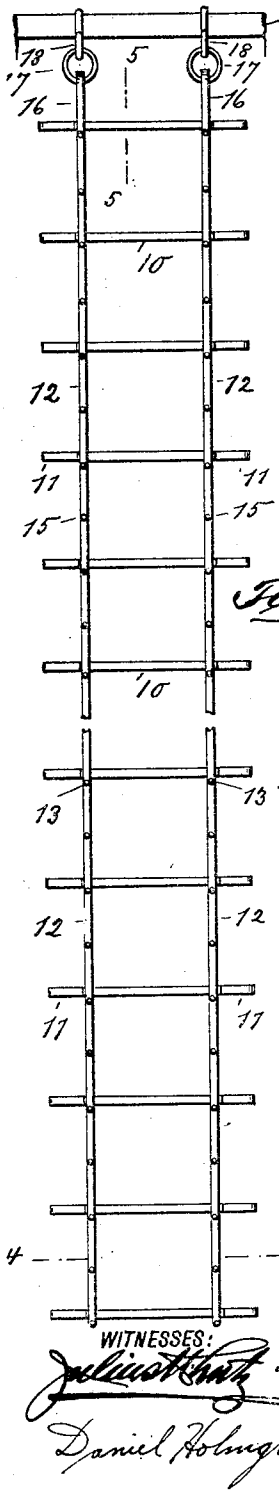


Fig. 1.

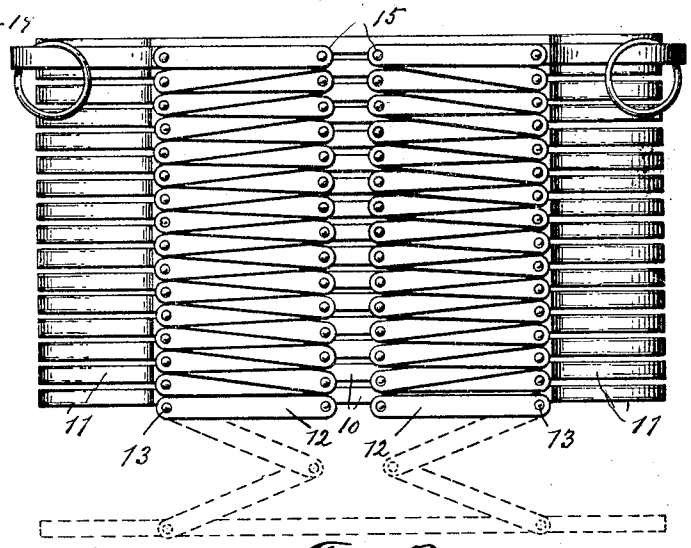


Fig. 2.

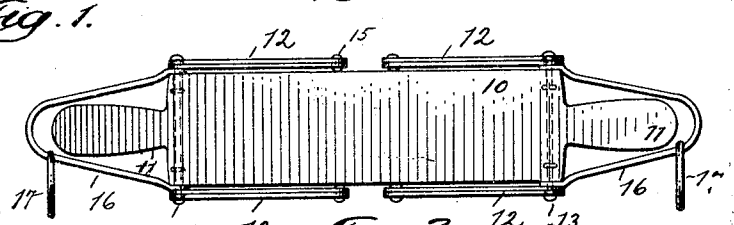


Fig. 3.

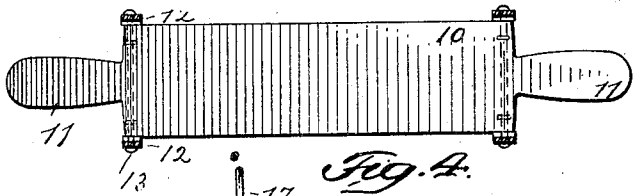


Fig. 4.

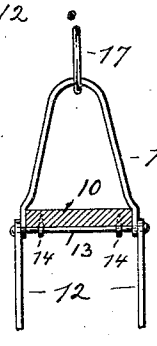


Fig. 5.

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FOLDING LADDER.

1,101,808. Specification of Letters Patent. **Patented June 30, 1914.**

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To all whom it may concern:

Be it known that I, CHARLES OTTO MICHEL, a citizen of the United States, residing at Hoboken, county of Hudson, and State of New Jersey, have invented a new and Improved Folding Ladder, of which the following is a specification.

This invention relates to a folding ladder of novel construction which is well adapted for use as a fire escape, ship's ladder or similar device. The ladder may be readily folded and unfolded, presents a firm support for hands and feet, and is of such rigidity, that it is not liable to sway during use.

In the accompanying drawing; Figure 1 is a front view of my improved folding ladder, showing it unfolded; Fig. 2, a similar view on an enlarged scale, showing it folded; Fig. 3, a top view of Fig. 2; Fig. 4, an enlarged section on line 4, 4 Fig. 1, and Fig. 5, an enlarged section on line 5, 5 Fig. 1.

Each step of the ladder is composed of a flat wooden rectangular tread 10 the width of which is reduced at both ends along the forward as well as the rear edges to form a pair of laterally projecting integral grips or handles 11. These grips are located in substantially the axial center of the step and are thus set off a pronounced distance from the front and rear edges thereof, so that the steps while insuring a firm foot hold, assume the additional function of holding the handles off the wall etc. along which the ladder is lowered, and this without regard to which side of the ladder happens to be foremost. To each step (with the exception of the top and bottom steps) there are pivoted at the four corners of its tread, a pair of metal straps 12, one member of each strap-pair, being directed upward while the other member is directed downward, during the unfolded position of the ladder.

In order to secure the straps to the steps, and at the same time obtain a firm bearing for the latter, a transverse bolt 13, is arranged beneath each end of the tread, and firmly secured thereto by staples 14 or in similar manner. The length of the bolts is somewhat greater than the width of the steps, so that each bolt protrudes slightly beyond the front and rear edges thereof. These protruding ends of the bolts are engaged by the eyed ends of the straps, so that the latter are freely foldable, the bolts being upset after assemblage, to permanently unite the parts. The free ends of the straps, *i. e.*, those ends which are not secured to the steps, are made to overlap the corresponding straps of the adjoining steps to which they are hingedly secured by pins 15. In other words, the depending straps of any one step are hingedly secured to the corresponding ascending straps of the step next below, while the depending straps of this second step are hingedly secured to the ascending straps of the third step etc. It will thus be seen, that the ladder is provided with four foldable side rails, two at the front, and two at the rear of each tread, and that the grips 11, protrude laterally beyond such side rails, so as to be freely accessible. So also the side rails though freely foldable, are provided with a minimum number of hinge connections, which renders the structure stiff and checks swaying, which is liable to occur by weather conditions or by the movements of unskilled or timorous persons. Finally, the ladder may be folded up into a very compact form (Fig. 2) to occupy a minimum amount of space when not in use or during transportation.

With the uppermost step, the four ascending straps 12, are replaced by a pair of yokes 16, carried by its bolts 13, and loosely encompassing a pair of rings 17. These rings are adapted to be engaged by hooks 18, which are permanently secured to the window 19 or other structure from which the ladder is to be suspended. All that is therefore required to place the ladder in commission, is to slip the rings 17 into the hooks 18, and then release the bottom step, whereupon the side rails will become unfolded by the weight of the steps.

I claim:

A folding ladder comprising a plurality of steps of flat rectangular shape, each step being reduced at both ends along the front and rear edges thereof to form a pair of laterally extending integral handles that are set off a pronounced distance from said front and rear edges, and foldable uprights, that are pivotally secured to each of the corners of the steps.

CHARLES OTTO MICHEL.

Witnesses:

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FRIEDA ELMAN.