No. 647,628. Patented Apr. 17, 1900.

J. O. HEUM.

FIRE ESCAPE.

(Application filed Nov. 7, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

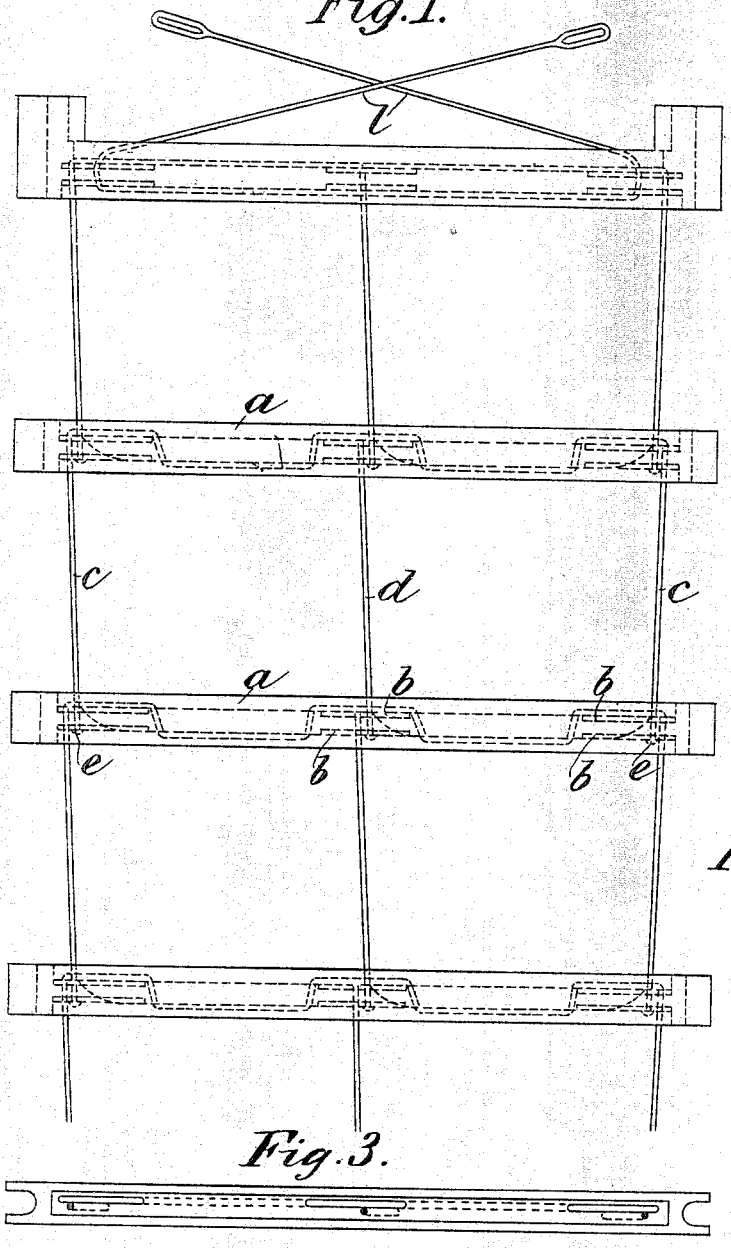

Fig 4.

Fig. 3.

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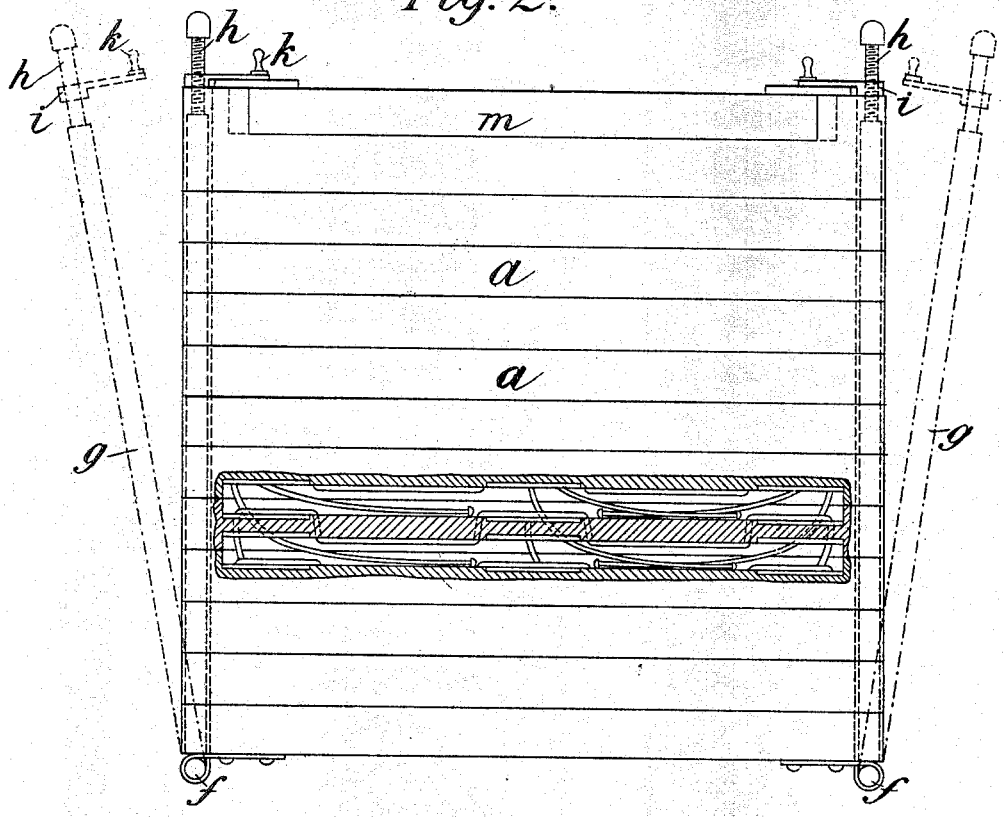
Fig. 2.



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JOHAN OLSEN HEUM, OF MOSS, NORWAY.

FIRE-ESCAPE.

SPECIFICATION forming part of Letters Patent No. 647,628, dated April 17, 1900.

Application filed November 7, 1899. Serial No. 736,146. (No model.)

To all whom it may concern:

Be it known that I, JOHAN OLSEN HEUM, of Moss, Norway, have made an Invention Relating to Fire-Escapes, for which I have applied for a patent in Norway on April 15 and in Germany on October 16, 1899, and wishing to obtain United States patent for the same invention I hereby declare that the following is a full and clear specification of my invention.

The present fire-escape is characterized by the steps of the ladder forming in the collapsed condition of the same a board of no larger size than to allow of being suspended below the window, so that in the collapsed condition the ladder will neither occupy considerable place nor disfigure the apartment. The steps are connected between themselves by pendent joints consisting, preferably, of wire rope and being arranged in such a way that on collapsing the ladder they are received in cavities in the steps, but drop down automatically into the proper position when the ladder is unfolded for use.

In the accompanying drawings, Figure 1 shows in the unfolded condition part of a ladder embodying the present invention, and Fig. 2 the whole ladder in the collapsed condition and partly in section. Fig. 3 is a plan view of one of the steps, and Fig. 4 a cross-section.

The steps *a* are preferably made out of wood with rectangular cross-sections and provided on the upper as well as on the under side with longitudinal slots and mounted at each end and at the middle of these slots on both sides with irons *b*, openings of a suitable form being cut through said irons and the intervening wood to receive the wire ropes forming the pendent members of the ladder. In order to add to the security of the ladder, three such pendant members are provided between the steps, the two side joints *c* being formed continuously out of a single wire rope ascending on one side from a lower step to and piercing the adjacent one, passing then along the iron and once more down to the under side of the step and along the same to the iron mounted in the middle of the step, ascending to the upper side and piercing the step, once more arriving on the under side of the step to the iron mounted on the other end of the same, and ascending to the upper side it finally pierces the step to form the pendent member on the other side. At the lower end the side ropes are provided with a knot *e*, by which the subjacent step is suspended. The upper end of the middle rope *d* is simply fastened to the middle iron or connected with the wire *c*. On collapsing the ladder the wires are pulled through the irons of the subjacent step and put into the slots provided in the steps, as is shown in Fig. 2. For this purpose the openings in the irons of one side are formed in the shape of enlarged rounded slots, so that the wires only need to be moderately bent. The above arrangement is profitable by strengthening the steps. In case, however, that a step should be broken yet the ladder will be held together and not become unavailable.

In order to fix the steps in the collapsed condition, a bar *g*, pivoted at *f*, is provided on both sides, said bars fitting into recesses at the ends of the steps and being screw-threaded at their upper ends to receive a nut *i*, provided with a handle *k*.

The ropes *l* are provided with loops, by means of which the ladder is suspended on hooks in the window-frame, and when collapsed the upper end of the board is formed by a loose piece *m*.

As will be easily understood from the above description, the present fire-escape is entirely safe and of easy manipulation to anybody. It is only required to unscrew the bars *g* and suspend the ladder by the ropes *l*, after which the steps will drop automatically and the ladder be ready for use. Three pendent members being provided between the steps, the ladder will be fully available, even though one of them should be broken. By using wire rope for pendent members a maximum of strength and a minimum of weight are attained at the same time. The invention may, however, be carried out by using instead of wire another material—for instance, iron bars provided with hinges close to the under side of each step.

It should be understood that although I have stated the members *c* are made of wire rope I do not limit myself to such construction, as the same may be made of any other material. It is also to be understood that although I prefer to employ three such mem-

bers only two may be used without departing from the invention.

I claim—

1. A collapsible fire-escape ladder comprising a series of rigid rungs having recesses in two longitudinal sides, and connections between the rungs adapted to be confined in the recesses when the ladder is collapsed, said connections being flexible throughout the length of the same.

2. In combination in a ladder fire-escape, a series of rungs having recesses in two longitudinal sides, a series of flexible connections between the rungs, the edges of the rungs being adapted to abut each other when the ladder is collapsed and hold said connections in said recesses, the ends of the connections secured in the rungs being adapted to shift in relation to the same.

3. In combination in a collapsible ladder, a series of rigid rungs, and a series of connecting ropes or wires having their ends held in opposite ends of one rung and their intermediate portions engaging the next rung above, and extending longitudinally of the same, substantially as described.

4. In combination in a collapsible ladder, a series of rigid rungs, flexible connections between the same, each of said connections extending longitudinally along the upper side of one rung with its end portions depending through the same and passing through the next lower rung, means on said ends to prevent their withdrawal through the latter rung, said end portions being adapted to slide through the rung engaged by the same and to fold within said rung when the ladder is collapsed.

In witness whereof I have hereunto set my hand in presence of two witnesses.

JOHAN OLSEN HEUM.

Witnesses:

ALFRED J. BRYN,

AUG. OLSEN.