Dec. 29, 1925. 1,567,447

C. C. McCRACKEN

FOLDING LADDER

Filed Sept. 5, 1924

Fig 1

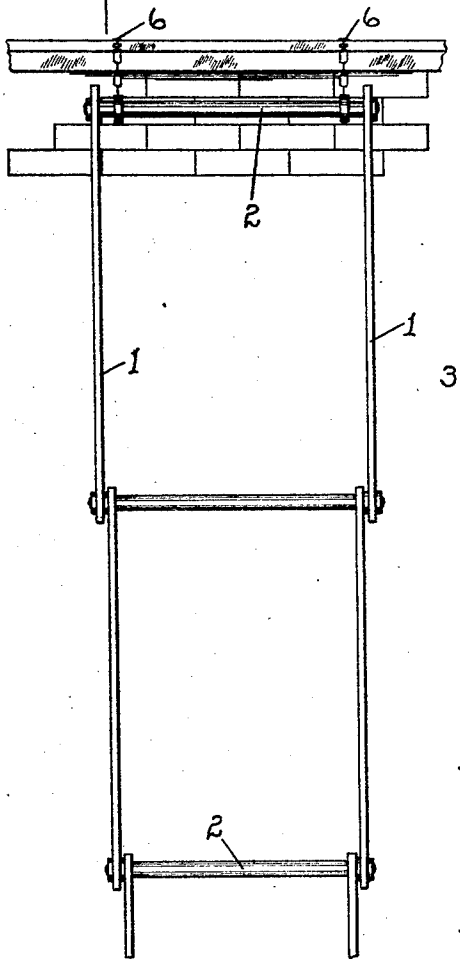


Fig 2

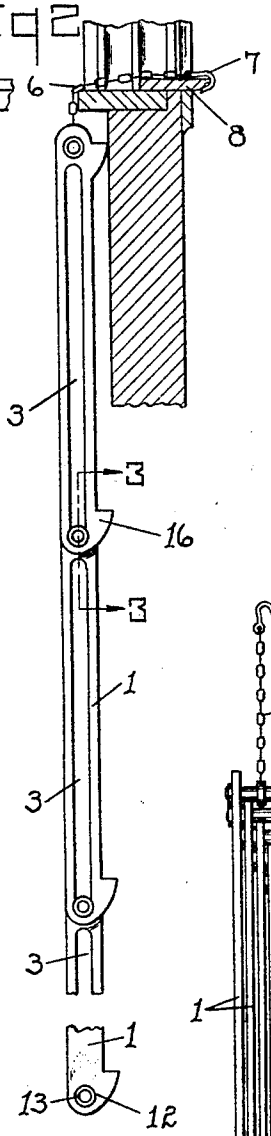


Fig 4

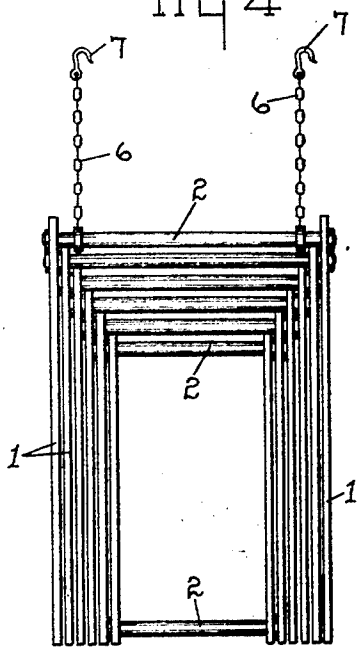
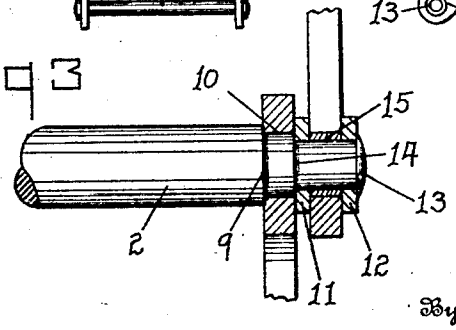


Fig 3



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Patented Dec. 29, 1925. 1,567,447

UNITED STATES PATENT OFFICE.

CHARLES C. McCRACKEN, OF BRADNER, OHIO.

FOLDING LADDER.

Application filed September 5, 1924. Serial No. 736,001.

To all whom it may concern:

Be it known that I, CHARLES C. McCRACKEN, a citizen of the United States, and a resident of Bradner, in the county of Wood and State of Ohio, have invented a new and useful Folding Ladder, which invention is fully described in the following specification.

My invention has for its object to provide a folding ladder that may be confined in a small volume when folded and which is so constructed that it may be readily unfolded. The ladder is a suspension ladder in that it is supported in position by being hung from the top. The ladder is of particular value for fire escapes in that it may be confined in a small bundle and at the time of fire it may be dropped in position at the side of a building and hung from a window sill or other part of a building.

The invention may be contained in ladders that vary in their details of construction. To illustrate a practical application of the invention, I have selected a ladder containing the invention which is a preferred embodiment of the invention. The ladder selected for purposes of illustration and as an example of ladders embodying the invention is shown in the accompanying drawings and will be described hereinafter.

Figure 1 illustrates a part of the ladder suspended in position from the sill of the window. Figure 2 is an edge view of the part of the ladder shown in Figure 1. Figure 3 is a sectional view taken on the line 3—3 indicated in Figure 2. Figure 4 illustrates a side view of the ladder when the same has been folded.

The ladder is formed of a plurality of pairs of links 1 that are connected together at their ends by means of the rungs or rods 2. Each pair of links except the lower has its upper ends connected by a single rung 2, while the lower pair of links have their lower ends as well as their upper ends connected by rungs 2. The body portion of each of the links is provided with a slot 3 that extends substantially throughout the length of the link. Thus the links may be formed of sheet metal that may be die-stamped and cut to form the slots 3. In the form of construction shown, the ends of the rungs 2 connect adjoining pairs of links together, the ends of each rung being located in the slots of the pair of links that adjoin the links of each pair that are connected by the rung, and which are located above the links of the pair that is connected by the rung. Thus all of the links, except the lower pair are slotted and when the upper pair of links is secured and the remaining links are released, the pairs of links slide relative to each other and the ladder will thus be opened and suspended. The upper pair of links may be secured to the building by any suitable means such as by means of the chains 6 that are connected to the upper rung 2 of the ladder and the hooks 7 that may be secured to any suitable part of the building. In Figure 2, the hooks 7 are shown connected to the sill 8 of a window. When the upper rung 2 of the ladder is secured, a person may step through the window and pass down the ladder, stepping from rung to rung.

In order to interconnect adjoining pairs of links and also permit free and rapid movement of the links relative to each other when the ladder is to be opened, the ends of the rungs 2 are provided with shoulders 9 formed by cutting portions of the ends to a smaller diameter than the body portions of the links. One end of each link is provided with an opening 10 that fits the reduced cross sectional area of the rung 2. The ends of the links are secured in position by means of the washers 11 that are located intermediate the ends of the adjoining links and the washers 12 that are located on the outer sides of the adjoining links having the slots 3 in which the ends of the rungs 2 are located. The ends of the rungs 2 are riveted to form the rivet heads 13 that securely connect the parts together. The ends of the rungs 2 are also provided with shoulders 14 formed by further reduction of the diameter of the body portions of the rungs 2. Thus when the rivet heads 13 are formed on the ends of the rungs, the washers 11 are pressed against the shoulders 14 and securely hold the links that are located against the shoulders 9 in position. The washers 11 and 12 have a diameter sufficiently great that they will extend across the slots 3 and bushings 15 are located between the washers 11 and 12. The bushings 15 may have a length slightly greater than the thickness of the links and consequently the bushings 15 will hold the washers 11 and 12 in such spaced relation

that the links may readily slide between the washers and thus the ladder will be readily opened. The bushings 15 thus provide means for preventing any binding between the links. This prevents the ladder from being caught at a time of emergency when the ladder will be hurriedly dropped. This provides an exceedingly safe and reliable ladder that may be used at a time of fire or other emergency.

In order to enable the easy descent of the user of the ladder, that is, in order to enable the user's hands and feet to grip and be securely retained on the rungs of the ladder, the links are provided with projecting cam-shaped lugs or wings 16 that extend from the edges of the end portions of the links. Preferably only the lower ends of each pair of links are provided with the wings that space the ladder from the side of the building, except the upper pair of links, which may be provided with wings at both ends of each link of that pair. The wings 16 are preferably made cam-shaped, the sloping surface or edge of the wing extending obliquely upwards from the ends of the links to prevent the ladder from engaging on some part of the building when the lower portions of the ladder are dropped in order to open the ladder. The cam-shaped edges will slide over any projecting parts of the building and not engage with them. Thus the ladder will not only be spaced from the building so that the person using the ladder may descend safely and with ease, but also the opening of the ladder will be assured notwithstanding the spacing means.

I claim:—

In a folding ladder, a plurality of pairs of links, each link having an opening at one end and each link except those of the lowermost pair having a slot extending substantially the length of the link, the ends of the rungs of the ladder secured in the said openings and extending through the said slots whereby the links of each pair are secured together by the rungs, the ends of the rungs slidably located in the slots, washers located on opposite sides of the links and bushings located in the slots for spacing the washers, whereby adjoining pairs of links are slidably connected together, a lug projecting from the end of each link other than the end in which the said opening is located whereby each rung is sustained a short distance from a plane extending through the ends of the lugs, means for connecting the pair of links at one end of the ladder to a part of the building, the said pair of links forming the upper end of the ladder, each pair of links having its upper ends disposed between the pair above whereby the thickness of the folded ladder will be the same as the width of the links and the ladder will be opened by its own weight, each pair of links sliding between the pair that is located above it when the ladder is opened.

In testimony whereof I have hereunto signed my name to this specification.

CHARLES C. McCRACKEN.