(No Model.)

J. B. PARRY.

EXTENSIBLE LADDER.

No. 406,765. Patented July 9, 1889.

Fig. 1.

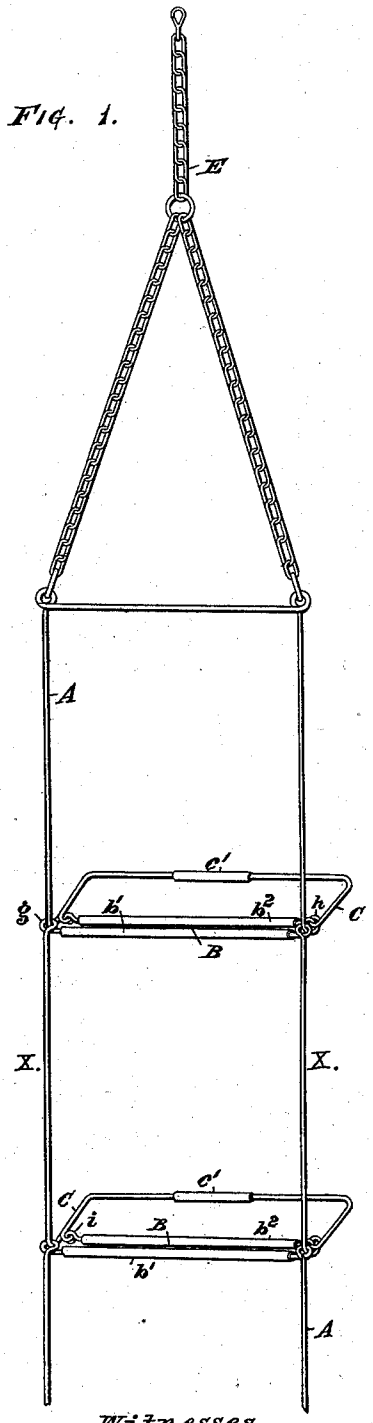


Fig. 3.

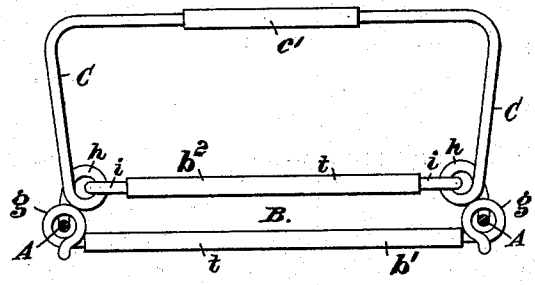


Fig. 4.

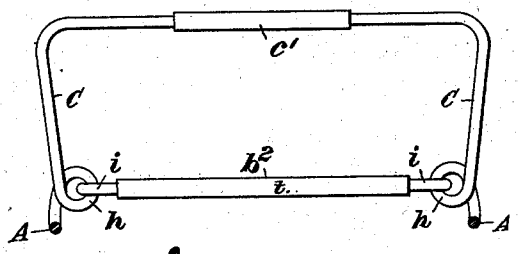
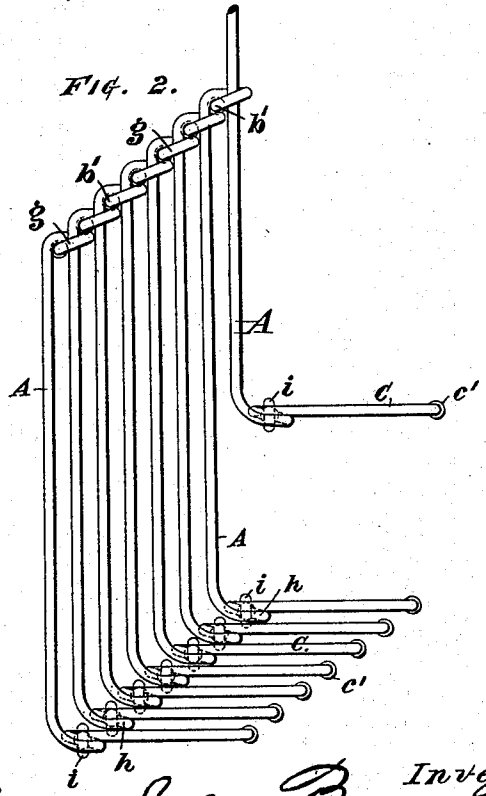


Fig. 2.



Witnesses.

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UNITED STATES PATENT OFFICE.

JOHN BEREY PARRY, OF LIVERPOOL, COUNTY OF LANCASTER, ENGLAND.

EXTENSIBLE LADDER.

SPECIFICATION forming part of Letters Patent No. 406,765, dated July 9, 1889.

Application filed February 7, 1889. Serial No. 298,978. (No model.)

To all whom it may concern:

Be it known that I, JOHN BEREY PARRY, a subject of the Queen of Great Britain and Ireland, residing at Liverpool, in the county of Lancaster, England, have invented new and useful Improvements in Extensible Ladders, of which the following is a specification.

This invention relates to that type of ladder in which the parts—namely, the rungs and side members—are constructed and arranged in such a manner that the ladder can be extended to its full length, or any part thereof, or closed or drawn up and rendered capable of being stowed or packed within a small space.

According to my invention, a ladder of the type above specified is so constructed that the stages of the ladder—a stage consisting of a rung and the two side members used to support that rung—are capable of being made to approach each other, and so closed up or parted from each other in the line of the length of the ladder at will, and without the introduction therein of working-joints, such as exist in the usual form of ladder of the above-specified type. I construct each stage of such a ladder of iron, steel, or equivalent malleable metal wire, and of a single piece of such wire so "worked" or formed or bent that the one stage is held by and slides upon another. As in most cases it is desirable to provide ladders of this type with means for keeping the rungs and side members from the wall or other surface against which they would or may come when in use, I use a portion of the wire forming a stage for this purpose. I do this by bending the wire in such a manner as to project at right angles to the line of length of the ladder, and at a point in this portion I connect together the two ends of the wire piece forming the stage. The connection by which one stage is fastened or secured to another is made by bending the wire into loops embracing the side members of the adjacent stage, whereby the side members of each stage form the support and slides for the loops of the next stage to slide and bear upon.

In the drawings, which serve to illustrate the invention above generally described, is given various views of a ladder, substantially as above described, formed of round steel wire.

Figure 1 is a perspective view showing the ladder in its extended state. Fig. 2 shows it in side elevation in a closed state. Fig. 3 is a cross-section in the horizontal plane of the ladder at the line x x, Fig. 1; and Fig. 4 is a cross-section in the horizontal plane of the bottom stage of a ladder.

With reference to the drawings, A designates the side members or bars of the ladder.

B are the rungs, and C the prop-bars which keep the ladder from the surface, against which it may come in use. A rung B is of a twin form, and composed of two bearers, one b' being the horizontal bar constituting the top bar of a stage, (hereinafter defined,) and the other b^2 being a bar supported by and connected to the prop-bars C.

E is a chain by which the ladder is to be suspended when in use.

A stage in the ladder illustrated is made of a single piece or length of wire of about a quarter of an inch in diameter, and comprises the top bar b', (which constitutes one of the bars of a rung B when the ladder is extended,) the loops g, adapted to allow the side bars A of the next or upper stage to pass through and move in, and the prop-bars C, which are bent at right angles to the bars B and provided with loops h, linked with and adapted to hold corresponding loops i, provided on the ends of the rung-bar b^2. It is preferred to so arrange the wire in making the ladder that the two ends meet in the center of the prop-bars C, and these ends in the example illustrated are inserted into the short tube c' and soldered or otherwise fixed therein.

It will be observed that when the stages are in their extended position and the ladder suspended from its top stage each stage hangs by its loops g, which surround the bar of and rest upon the stage next above it at the right angle at the point at which the bars B and C ramify, and it will also be observed that the loops g are free to slide up and down the bars B, or, conversely, the bars B are free to move through the loops g in either direction.

The bars b' and b^2 are incased in a piece of metallic tube t. These tubes are provided to render the bearing-surface for the hand or foot of the user larger and more agreeable to use. As a fire-escape, this provision is particularly serviceable, as, the diameter of the

bar being only about a quarter of an inch, the effect of such a small area, due to such diameter, upon the bare foot, or even if the foot be covered with a stocking, would in most cases be painful. The bar b^2 is provided chiefly to help to mitigate this effect, and, both bars b' and b^2 being incased by the tubes t, a considerable bearing-surface for the foot is afforded.

When the ladder is closed up, it assumes the form shown in Fig. 2, all the top bars b' of the stages coming close together at the top and the bars b^2 coming close together at the bottom.

It will be evident that in making the stages illustrated and described the tubes t of the top bars b' must be first slipped over the length of wire from which it is to be formed and arranged in the center. The loops g are then formed by twisting the two ends of the wire and the ends bent at right angles to said bar. Then the wires are bent again at right angles to form the prop-bars C. At this point the loops h are formed, the rung-bars b^2 first having been slipped onto the free ends of the wire and the loops i of these bars caught in the loops h. The bars C are then bent into the form shown and the free ends fastened together, as described, or caught together by loops. The mode of carrying out the bending of the wire and manufacturing the stages is well known to those skilled in the art of wire-working, and therefore I have deemed it unnecessary to describe it more than generally.

In opening the ladder when closed it is suspended from the top by a chain—such as E—or by other means, the bottom being free, whereupon the stages below the one held fall *seriatim*, the loops g of each stage as they arrive at the bottom of the bars A, on which they slide, being stopped and held. In this way the ladder will in a very small space of time become fully extended—that is, if the distance between the point of suspension and the ground or other surface below that point be equal to or greater than the length of the ladder when extended.

Having now fully and exactly described the nature of my invention and the manner in which it is to be performed and carried into effect, I declare that what I claim in respect of the herein-described invention is—

1. An extensible ladder consisting of a plurality of stages, each comprising the side members A, having at the top portion the top loops g, connected by the stationary rung-bar b', and in which connected loops the vertical parts of the stage next above slide, said side members of each stage having their lower portions extended at right angles through the top loops of the stage next below, and thence bent laterally around at the rear into the rectilinear stay-bar C, substantially as described.

2. An extensible ladder consisting of a plurality of stages, each comprising the side members A, having loops g at their upper ends, connected by a stationary top bar b', in which loops the vertical parts of the stage next above slide, said side members of each stage having their lower portions extended at right angles through the top loops of the stage next below into the stay-bar C, having the connecting bottom rung-bar b^2, which, when the ladder is extended, moves beside the rung-bar connecting the top loops of the stage next below, substantially as described.

3. In an extensible ladder composed of a plurality of stages, as described, the stages herein set forth, consisting of a top b', loops g, side members A, rung-bar b^2, and prop-bars C, substantially as described.

4. The combination, in an extensible ladder composed of a plurality of stages, as described, of the bars b' and b^2, constituting the rungs of the ladder when extended, the bar b' being the top bar of the said stage, and connected to the side members A thereof, the bar b^2 being connected to the lower end of the said side members and adapted to lie parallel and in the same horizontal plane as the bar b' when the ladder is extended, substantially as described.

5. In an extensible ladder composed of a plurality of stages, as described, the combination of side members A of said stages, loops g, and top bar b', said top bar of a stage being adapted to serve as the rung or part of the rung between said stages, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN BEREY PARRY.

Witnesses:
FREDERICK JOHN CHEESBROUGH,
ERNEST R. ROYSTON,
Both of 15 *Water Street, Liverpool.*