(No Model.)

J. HARRIS.

FOLDING LADDER.

No. 363,634. Patented May 24, 1887.

Fig. 1.

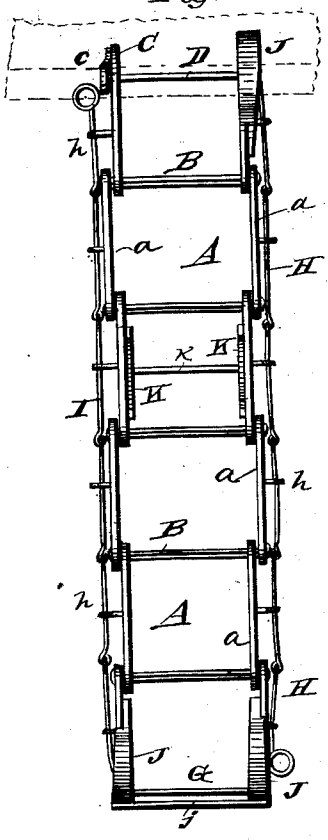


Fig. 2.

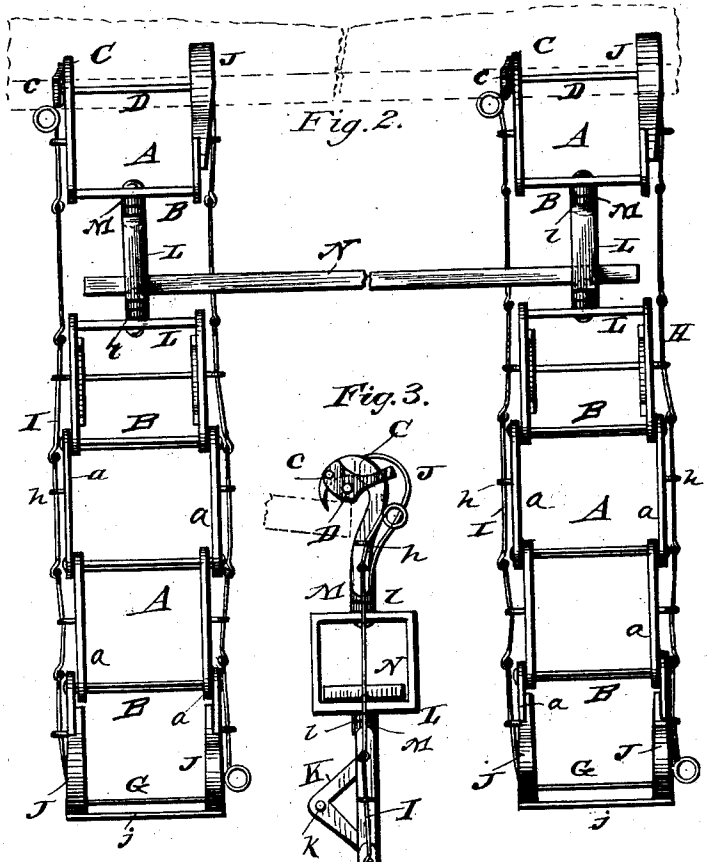


Fig. 3.

Fig. 4.

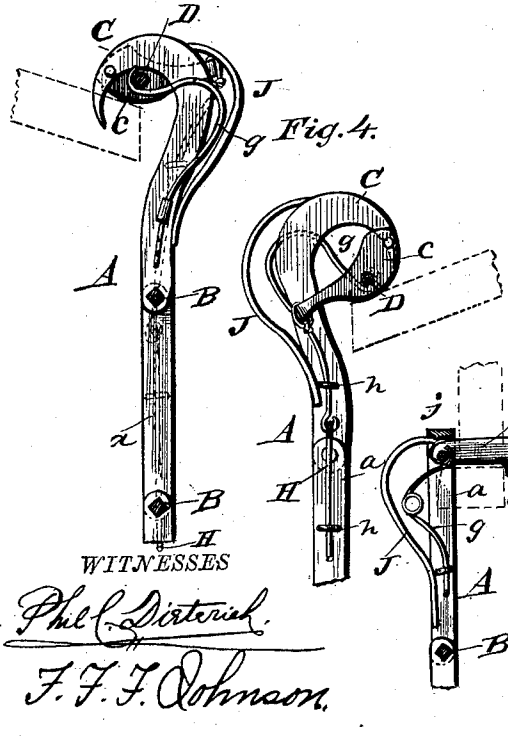
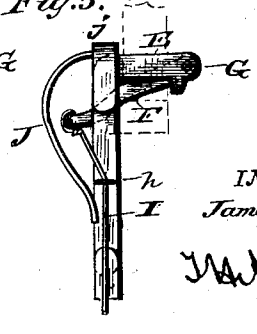


Fig. 5.



WITNESSES

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UNITED STATES PATENT OFFICE.

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FOLDING LADDER.

SPECIFICATION forming part of Letters Patent No. 363,634, dated May 24, 1887.

Application filed March 25, 1887. Serial No. 232,449. (No model.)

To all whom it may concern:

Be it known that I, JAMES HARRIS, of Xenia, in the county of Greene and State of Ohio, have invented certain new and useful Improvements in Folding Ladders; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification, in which—

Figure 1 is a front view of my improved ladder as applied in one position for use. Fig. 2 is a front view of two ladders employed for forming a scaffold. Fig. 3 is a side view of Fig. 2. Fig. 4 is a detail view of one of the grasping or fastening ends of the ladder. Fig. 5 is a similar view of the other fastening device.

This invention relates to improvements in portable folding ladders, and is especially designed for use as a fire-escape or a portable scaffolding-support for house-painters; and it has for its objects to provide a ladder which can be quickly and readily applied to or detached from the roof or window of a house by means of automatic retaining and disengaging devices, as will be hereinafter fully described, and particularly specified in the claims.

Referring to the accompanying drawings by letters, A designates the several sections of the ladder, each section being of general rectangular form, and composed of side rails, *a a*, and connecting cross-rods B, which also hinge the side bars of adjoining sections together, and which form the rounds of the ladder, as shown.

The upper section, A, as shown in Figs. 1 and 4, has its side rails, *a a*, formed with hooks C C at their upper ends, which are pointed, as shown, so that they will grasp and penetrate the wood of the coping or roof to which the ladder is hung and firmly support the ladder, so that it can be used for any desired purpose. The hooks C enable me to hang the ladder from the roof of a house; and in order to detach the ladder from the roof when so attached, I employ the crescent-shaped arms *c c*, which are pivoted at one end upon hooks C near their points, and the arms are rigidly connected by a bar, D, so that when one arm is depressed by means of a wire, H, attached to its outer end, and passing thence downward to the lower end of the ladder, the opposite arm *c* will be similarly attached through rod D. When so depressed, the convex surfaces of arms *c* engage the surface of the wood that hooks C C grasp, and by sufficiently depressing arms *c* the points of the hooks are forced out of engagement with the wood, and the ladder will move forward and fall down. The arms *c* are held normally raised by means of bent springs *d*, which are secured between the rails *a* of hooks C and the arms *c*, as shown.

The other end or lower section of the ladder is constructed for engaging the window-sills of buildings, and for that purpose has its side rails, *a a*, provided at their outer ends with arms E, standing at right angles to said rails and to the rounds B, as shown. These arms E are provided on their lower surfaces and near their ends with lugs *e*, which are adapted to engage the inner edge of a window-sill and prevent the escape of the ladder therefrom. I provide means for automatically disengaging the ladder when so supported, as follows:

F F designate arms similar in size to and parallel with arms E E, being pivoted at their outer ends on a rod, *f*, which also connects and braces the ends of arms E. The front ends of arms F are rigidly connected by a rod, G, so that when one arm F is depressed by means of a cord, I, similar to cord H, both arms will be actuated and the lugs *e* lifted out of engagement with the window-sill, and the ladder will fall, the operation of the attaching and detaching devices at both ends of the ladder being similar. The arms F are held up normally, so as not to interfere with the action of lugs *e*, by means of springs *g*, as shown.

J J designate shield-pieces, which may be secured on the rails *a a* of the end sections of the ladder, to protect the disengaging devices from injury.

j designates a cross bar uniting the upper ends of the rails *a*, which have the arms E, said bar being placed above the detaching-arms F F, so as not to interfere therewith, and forming the top round of the ladder when the same is supported by arms E E.

The wires H and I are preferably made up of suitably-jointed sections corresponding in length to the side rails, *a*, of the sections A, and are passed through eyes *h*, secured to the sev-

eral rails *a* of the ladder, so that the wires can be folded with the ladder.

K K designate angular arms standing inward from the side rails, *a*, of one or more sections A, and united by a suitable brace-rod *k*. By means of said arms the ladder is held out of contact with the walls of the building, so that there will be sufficient room between the rounds B and the wall for the hands and feet of a person using the ladder.

In order to adapt the ladder for use as a movable scaffolding-support, I make one or more sections A, preferably the two next the attaching-section, independent of each other—that is, I provide their adjoining ends with separate rounds, L L, dispensing with the hinge-round B, and firmly unite their side rails by said rounds L. I then employ a swivel joint, M, consisting of a bolt and nut, for connecting the rounds L, having a suitable washer, *l*, interposed between said rounds, as shown, so that when the ladder is attached, as described, the lower portion of the ladder can be turned around by reason of swivel M and stand at right angles to the wall instead of parallel therewith. Then by employing two ladders similarly arranged I can support a board, N, upon the rounds B of the ladders, and have a secure adjustable scaffolding, thus affording a very convenient and cheap portable hanging scaffolding for use by painters and others.

I prefer constructing the entire ladder of metal, so that it will have sufficient strength for use as described without being cumbersome.

Having described my invention, I claim—

1. In a ladder, the combination, with suitable supporting hooks or arms formed on its ends for hanging the ladder, of pivoted spring-controlled arms secured to the supporting-hooks, and means for actuating said arms and causing the disengagement of the hooks and fall of the ladder, all constructed and arranged to operate substantially as specified.

2. The combination, in a sectional folding ladder, of an end section having supporting or hanging arms, substantially as described, and suitable spring-controlled arms pivoted to the supporting-arms of the ladder, and rigidly connected together, and adapted, when depressed by a proper wire, to lift the supporting-arms out of engagement and let the ladder fall, all substantially as specified.

3. The combination, in a portable ladder composed of sections A, as described, of the end sections having proper engaging and disengaging devices for attaching the ladder to a house, substantially as described, and a swivel-joint, M, uniting two of the ladder-sections, all substantially as and for the purpose specified.

4. The combination, in a ladder, of the sections A, composed of side rails, *a a*, and connecting-rounds B, substantially as described, the attaching and spring-controlled releasing devices on the end sections of the ladder, suitable wires for actuating said devices, and suitable arms, K, for holding the ladder out from the wall of the house, all constructed substantially as and for the purpose specified.

5. The combination, in a ladder, of the sections A, composed of side rails, *a a*, and connecting-rounds B, the two end sections having attaching and spring-controlled releasing devices for supporting and lowering the ladder, as set forth, and the two intermediate sections, A, having rounds L, united by a swivel, M, and interposed washer *l* between said rounds, all constructed and arranged substantially in the manner and for the purpose specified.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

JAMES HARRIS.

Witnesses:
JEREMIAH PARKHILL,
JAMES KYLE.