C. E. DOTY & G. W. FLINT.

Extension Step-Ladder.

No. 210,018. Patented Nov. 19, 1878.

Fig. 1.

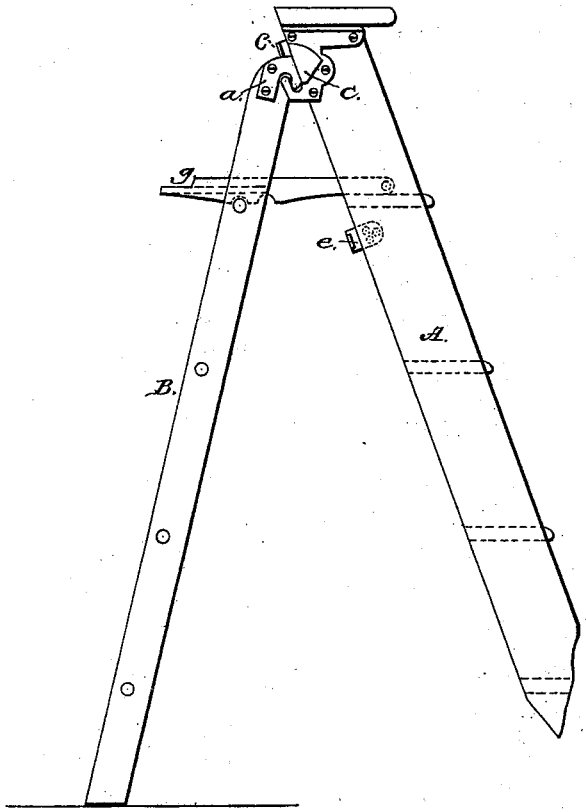


Fig. 2.

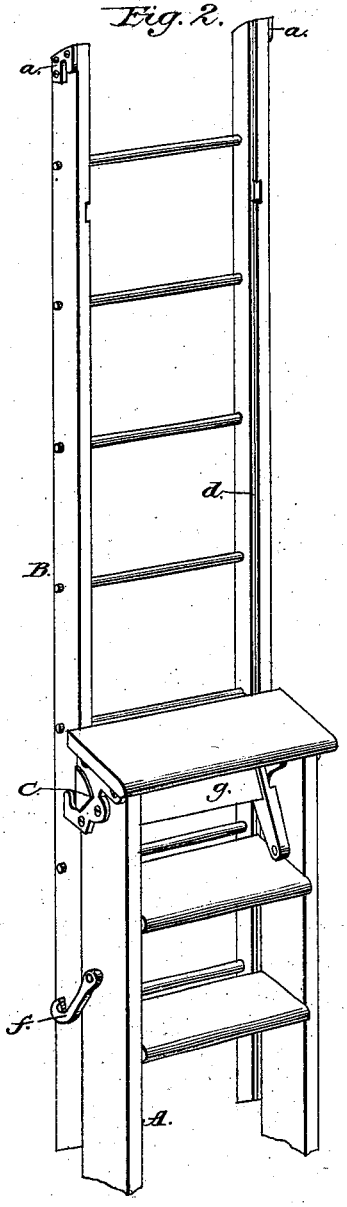
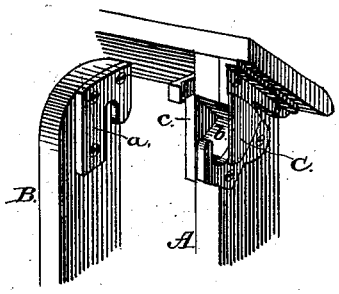


Fig. 3.



Witnesses:

John A. Ewing.

Jas. D. Patten.

Inventor:

Charles E. Doty

and

George W. Flint

Per Munahan & Ward, Attorneys.

UNITED STATES PATENT OFFICE.

CHARLES E. DOTY AND GEORGE W. FLINT, OF ROCK FALLS, ILLINOIS.

IMPROVEMENT IN EXTENSION STEP-LADDERS.

Specification forming part of Letters Patent No. **210,018**, dated November 19, 1878; application filed May 8, 1878.

To all whom it may concern:

Be it known that we, CHARLES E. DOTY and GEORGE W. FLINT, of the village of Rock Falls, in the county of Whiteside and State of Illinois, have invented certain new and useful Improvements in Sliding Extension Step-Ladders; and we do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

Our invention relates to that class of step-ladders in which the secondary or bracing section, being provided with rounds, can be further utilized, when desired, as a prolongation of the main section.

In the drawings Figure 1 is a side elevation of our invention when used as a step-ladder proper. Fig. 2 is an illustration of its use as an extension-ladder. Fig. 3 is an enlarged view of the point of junction.

A and B are respectively the ordinary sections of a step-ladder, the rounds in B coinciding as to intervals with the steps of A. On the inner face of each leg of section B, and at a proper distance from the edge, is formed a groove, *d*, the entire length of the leg. The upper ends of the legs of B are rounded outwardly, and to the outside of such upper ends are fastened the metallic plates *a a*, which will be hereinafter more fully described.

Into the lower face and near the upper end of the sides of section A are cut the recesses *b b*, so shaped as to conform to and receive the upper ends of the legs of B.

Screwed to the sides of section A, and forming the inner walls of the recesses *b b*, are the metallic plates *c c*. The plates *c c*, which form the inner walls of the recesses *b b*, are provided, as shown, with a spur or tongue fitted to enter and traverse the grooves *d d* in the legs of section B.

The plates C C, which form the outer walls of the recesses *b b*, also extend below the sides of A, and serve as guides and lateral supports for the section B.

On the inner face of the sides of A, and below the second step thereof, are fastened the guides *e e*, having each a tongue to fit into and traverse the grooves *d d* before named.

To the outer face of the sides of A are pivoted the hooks *f f*, so placed as to engage the rounds of B when the latter is used to extend A, such rounds protruding through the legs of B sufficiently to permit of being thus engaged by the hooks *f f*.

The shelf *g* is pivoted, as shown, on the inner faces of the sides of A, and extends between the legs of B. The shelf *g* is intended to have a series of half-circular notches cut in the lower edge of its side plates, so as to drop upon and engage the rounds of B, and thus gage the relative distance of the sections when used as a step-ladder.

The operation of our ladder is as follows: The lower end of B is brought to the upper end of A and passed between the plates *c c* C C of the latter, care being taken that the tongue of the inner plates, *c c*, enter the grooves *d d*. The section B is then passed down and parallel with the lower face of the sides of A until the guides *e e* also enter the grooves *d d*. The section B can be set at any elevation by placing the hooks *f f* on the ends of the proper round of B. When it is desired to use the invention as a step-ladder the section B is passed sufficiently onto the section A to allow the downward hook of the metallic plates *a a* on section B to engage the upward hook of the outer metallic plates C C of section A. When this point is reached it will be observed that opposite the guides *e e* the outer wall of the grooves *d d* is cut away the width of the guides *e*, thus permitting the sections to swing apart on the joint or hinge formed by the plates *a a* and C C before named.

In order to a successful embodiment of the idea involved in our invention, it was necessary that the interconnection at the upper ends of the sections A and B should be such as to permit the separation of the sections when parallel, but in no other position. This has been accomplished in the joint shown.

When the hooks of the plates *a a* and C C engage and the sections are drawn apart the ends of the legs of B, together with the plates *a a*, enter the recesses *b b*, and, whatever the angle of junction of the sections, the backs of

the recesses *b b* rest respectively on the ends of the legs B.

The interlocking aforesaid of the hooks of *a a* and C C prevents the downward displacement of the sections, and there is therefore formed at the point of junction a perfect hinge, while, in order to slide the sections past each other, it is necessary only to bring their nearer sides into contact, when, the guides *c e* again entering the grooves *d d* by notches at adjacent points on the sections, the section B may be projected to the height desired.

As before mentioned, the rounds of B and steps of A having the same intervals, when the ladder is extended such rounds are opposite the steps, and the transition from A to B is regular.

The metallic plates and hooks referred to can be cheaply made by being cast of malleable iron.

Among the advantages claimed are cheapness and simplicity of construction, strength, and durability.

The sections can be readily separated and used for short ladders, if desired.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. In a step-ladder, the peculiar joint formed by the recesses *b b*, plates C C *c c*, and plates *a a*, constructed and arranged substantially as shown, and for the purpose mentioned.

2. The section B, provided with the grooves *d d*, in combination with the section A, having guides *c c e e*, hooks *f f*, and projections of the rounds, all arranged and operating substantially as and for the purpose specified.

In testimony that we claim the foregoing as our own we affix our signatures in presence of two witnesses.

CHARLES E. DOTY.
GEORGE W. FLINT.

Witnesses:
C. L. MANAHAN,
H. L. WARD.