J. R. GORDON.

COLLAPSIBLE EXTENSION LADDER.

APPLICATION FILED SEPT. 15, 1913.

1,100,823. Patented June 23, 1914.

Fig. 1.

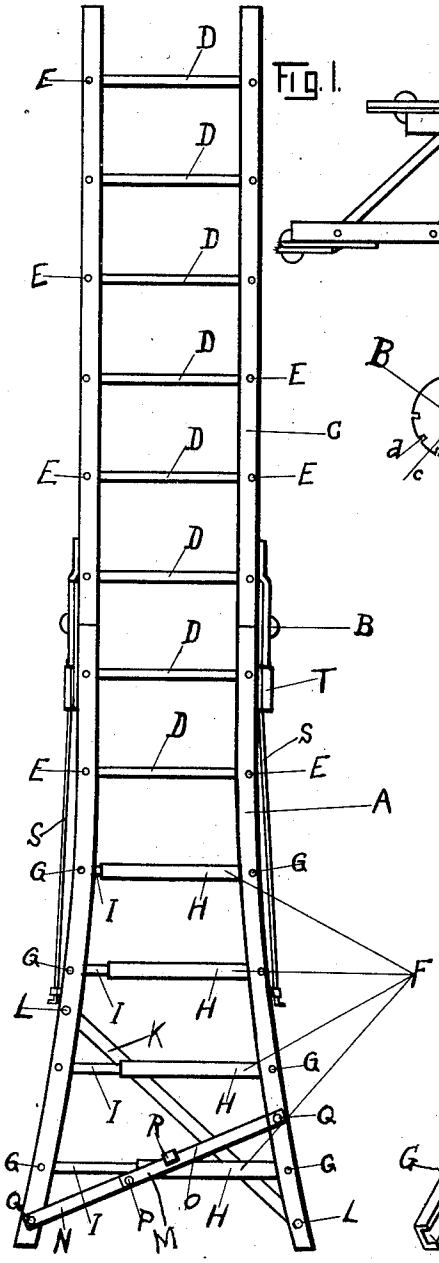


Fig. 2.

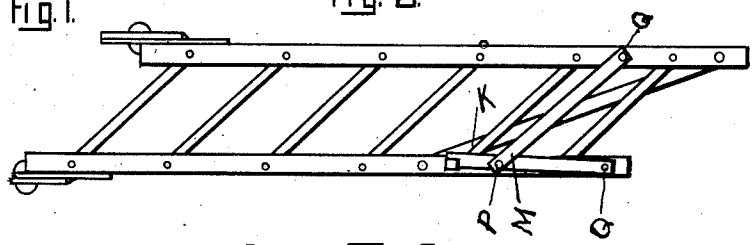


Fig. 3.

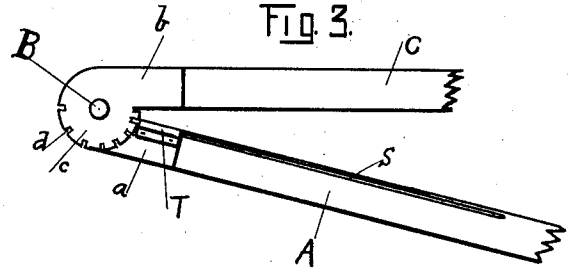
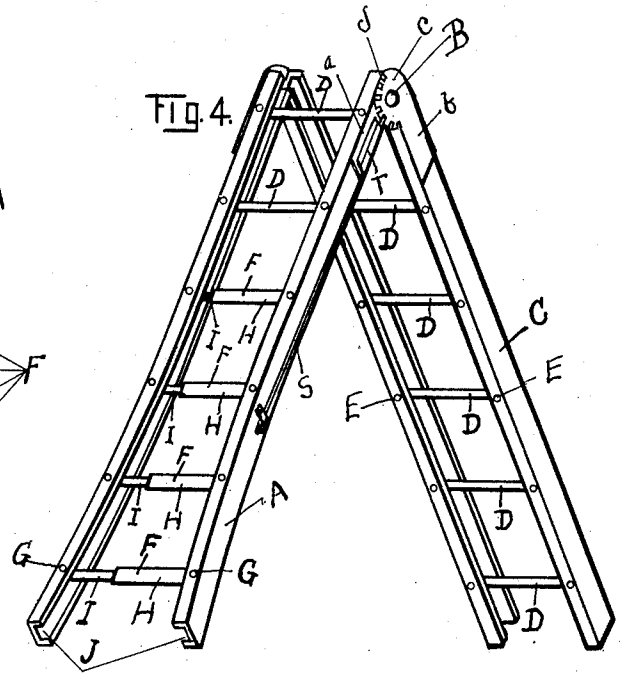


Fig. 4.



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COLLAPSIBLE EXTENSION-LADDER.

1,100,823. Specification of Letters Patent. Patented June 23, 1914.

Application filed September 15, 1913. Serial No. 789,871.

To all whom it may concern:

Be it known that I, JAMES ROBERTSON GORDON, a citizen of Canada, residing at Downey, in the county of Los Angeles and State of California, have invented new and useful Improvements in Collapsible Extension-Ladders, of which the following is a specification.

My invention relates to improvements in folding ladders, more particularly to that class of ladders commonly termed collapsible ladders, and is easily and readily convertible into a ladder of the ordinary straight type.

The object of my invention is to provide first, a straight ladder which may be used in the ordinary manner; second, a step-ladder which may be readily adjusted at different angles; and, third to provide a ladder which may be folded and collapsed into a compact form when not in use, or when it is desired to transport it from place to place. I attain these objects by the mechanism illustrated in the accompanying drawings in which—

Figure 1 is an elevation of my improved ladder as it appears when in use as a straight ladder; Fig. 2, a front elevation of my ladder with the side-rails folded upon themselves, and the further operation of collapsing the side-rails against each other partially completed. Fig. 3, is a detail of the side-rail hinge joint, and also illustrates the manner in which the side-rails are folded upon themselves; Fig. 4, is a view of my device when employed as a step-ladder.

Similar letters refer to similar parts in each of the views.

The side-rails are each composed of the part A, hinge joint B, and the part C. The rungs D, are pivoted at each end to the side-rails as shown at E. The rungs F, are also pivoted to the side-rails at G. The rungs F, are constructed of two parts H, and I, the part H, being tubular in cross section, and adapted to slide freely over the part I. The side-rails are each grooved or channeled as shown at J, to receive and inclose the rungs when the side-rails are collapsed together. A brace-member K, is pivoted to the side-rails at L, and serves the purpose of a brace, and further in conjunction with the spreader-bar M, when occupying its straightened position serves as a stop to limit the movement of the side-rails and hold them rigidly in their predetermined and separated positions.

The spreader-bar M, is composed of the parts N, and O, pivoted together at P, and the free end of each pivoted to the side-rails at Q. A lug R, is formed integral with the part N, and is adapted to engage with the part O, and serve as a stop to limit the movement of the parts N, and O, when straightened out in the operation of separating the free ends of said side-rails, A.

The hinge joint B, is composed of two parts, *a*, and *b*, the part *a*, being secured to the side-rail portion A, and the part *b*, secured to the side-rail portion C. The portion *b*, of the hinge joint B, is formed into a circular plate *c*, which is provided with notches *d*, upon its periphery, the object of which will be apparent later.

Rods or bolts S, are mounted upon the side-rail portions A, in any approved manner, preferably by the use of housings T, which fit the rods or bolts so closely that they are retained in any desired position by reason of frictional contact, and are adapted to engage the notches *d*, of plate *c*, for the purpose of locking the sections in predetermined positions. It will be understood that springs or other means may be employed in the operation of the rods or bolts P.

The side-rails may be formed of wood or metal as desired, and the same may be said in relation to the rungs. The rungs F, are preferably formed of metal, tubular in cross section, especially the portion H.

It will be readily understood with reference to Figs. 1, and 4, of the drawings, that the rungs D, D, of section A, are fixed in so far as longitudinal movement is concerned, and therefore holds the side-rails parallel at this point, but the rungs F, of this same section are arranged to lengthen automatically, (by reason of their telescopic construction), when the side-rails are separated or sprung apart by the action of extending the spreader-bar M. This spreading of the side-rails A, as described, results in widening the supporting base of the ladder, the advantage of which is well understood by those skilled in the manufacture and use of ladders, and especially ladders of the extension type.

The operation of the device is as follows:—Referring to Fig. 1, when it is desirable to fold the ladder for storage or transportation from place to place, the

spreader-bar M, is first raised to allow the side-rails to assume their normal positions, the rods or bolts S, are next withdrawn from the notches *d*, and the portions A, and C, are next folded upon each other. Fig. 3, is a detail showing the side-rail nearly folded, and fully illustrates the manner in which the operation is accomplished. Fig. 2, shows the first fold completed and the operation of collapsing partially completed.

As will be readily understood the grooves or channels J, shown in Fig. 4, serve to envelop the rungs entirely within the side-rails when they are collapsed together, which is made possible by reason of the pivoted rungs.

The object of the notched plate *c*, having the notches *d*, and the locking bolt or rod S, adapted to engage the plate *c*, is to lock the side-rails together in predetermined positions to form a step-ladder of different heights and angles one such position being shown in Fig. 4. The object of the strut K, is to serve the double purpose of a brace and stop or limit to the outward movement of the side-rails when the spreader-bar is brought into action by being straightened out so as to spread the bottom portion of the side-bars apart to form a wide base support for this end of the ladder.

It will be observed that the rungs D, are of one piece and therefore hold the side-rails practically parallel throughout the length of their connection, but the rungs F, being constructed so as to telescope allows the side-rails to be sprung or spread apart near the bottom of the ladder so as to form a wider base as hereinbefore alluded to.

I am aware that ladders with pivoted rungs adapted to fold together have been constructed heretofore and therefore I do not broadly claim such construction, but

What I do claim is—

A collapsible extension ladder having hinge-jointed side-rails adapted to fold over against themselves and collapse against each other, rungs pivotally connecting said side-rails, a portion of said rungs being of definite length and adapted to limit the outward movement of said side-rails and hold them in predetermined positions relative to each other when the ladder is opened, and other telescoping rungs arranged to permit of spreading the supporting ends of said side-rails, a brace-member pivotally connecting said side-rails near their supporting ends and extending diagonally from one to the other when occupying their separated positions, and adapted to limit their outward movement when spread, a jointed spreader-bar pivotally connecting said side-rails near their supporting ends and adapted to force the supporting ends of said side-rails outwardly beyond their normal spread positions to form a wide supporting base all arranged and operating as described and for the purpose set forth.

In testimony whereof, I have hereunto set my hand at Downey, California this 6th day of Sept. 1913.

JAMES ROBERTSON GORDON.

In presence of—
A. L. DARBY,
ELLEN H. TRABANT.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."