

J. E. FORNDRAN.
LADDER.
APPLICATION FILED MAR. 18, 1911.

1,014,215.

Patented Jan. 9, 1912.

2 SHEETS—SHEET 1.

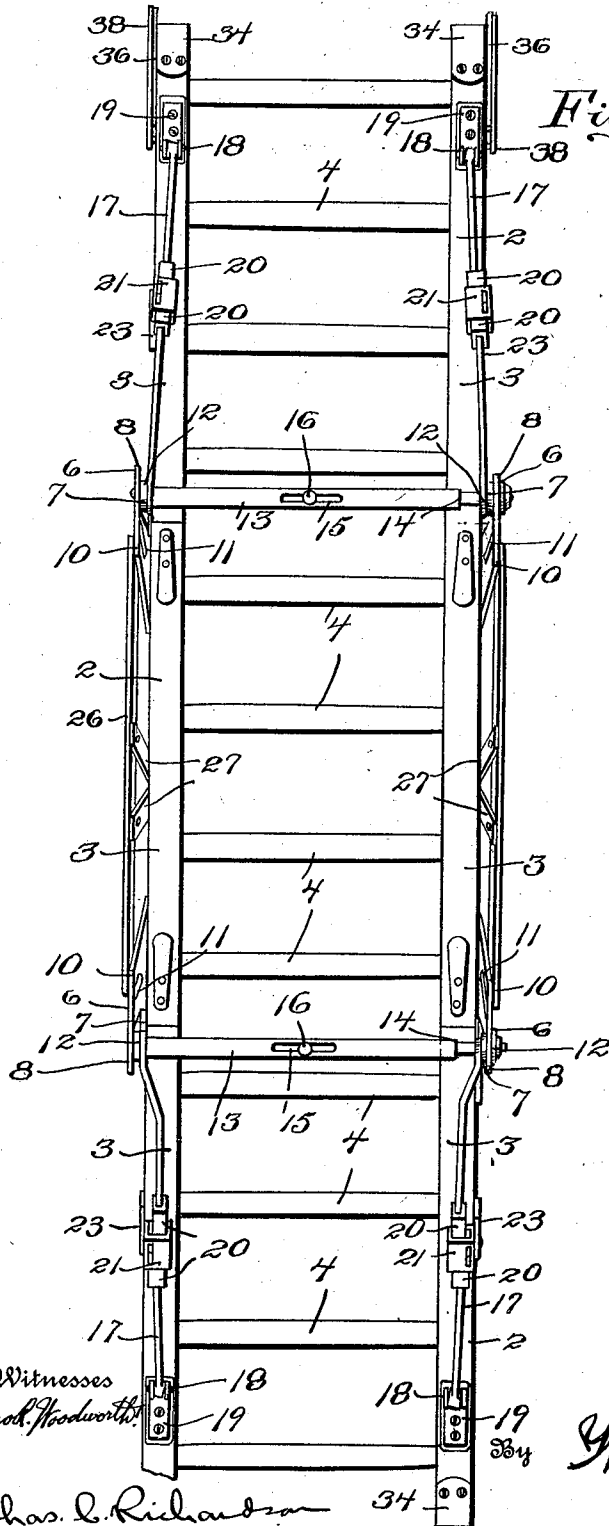


Fig. 1.

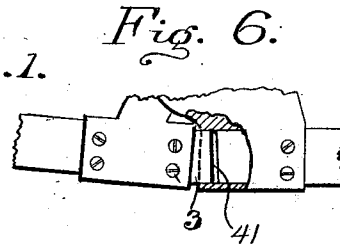


Fig. 6.

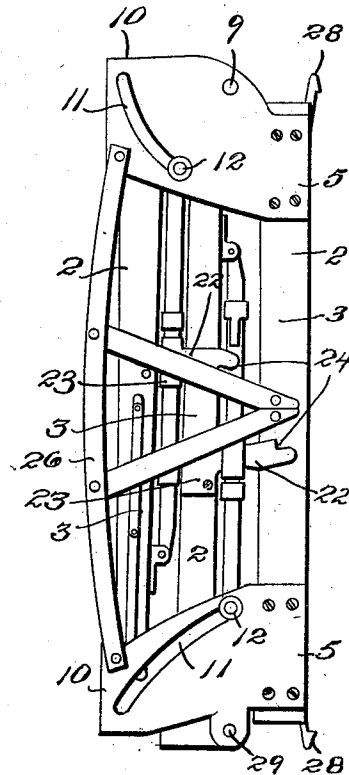


Fig. 2.

Inventor
J. E. Forndran.

Witnesses
J. H. Woodworth

Chas. L. Richardson

Ym. C. W. Entine

Attorney

J. E. FORNDRAN.
LADDER.
APPLICATION FILED MAR. 18, 1911.

1,014,215.

Patented Jan. 9, 1912.

2 SHEETS—SHEET 2.

Fig. 3.

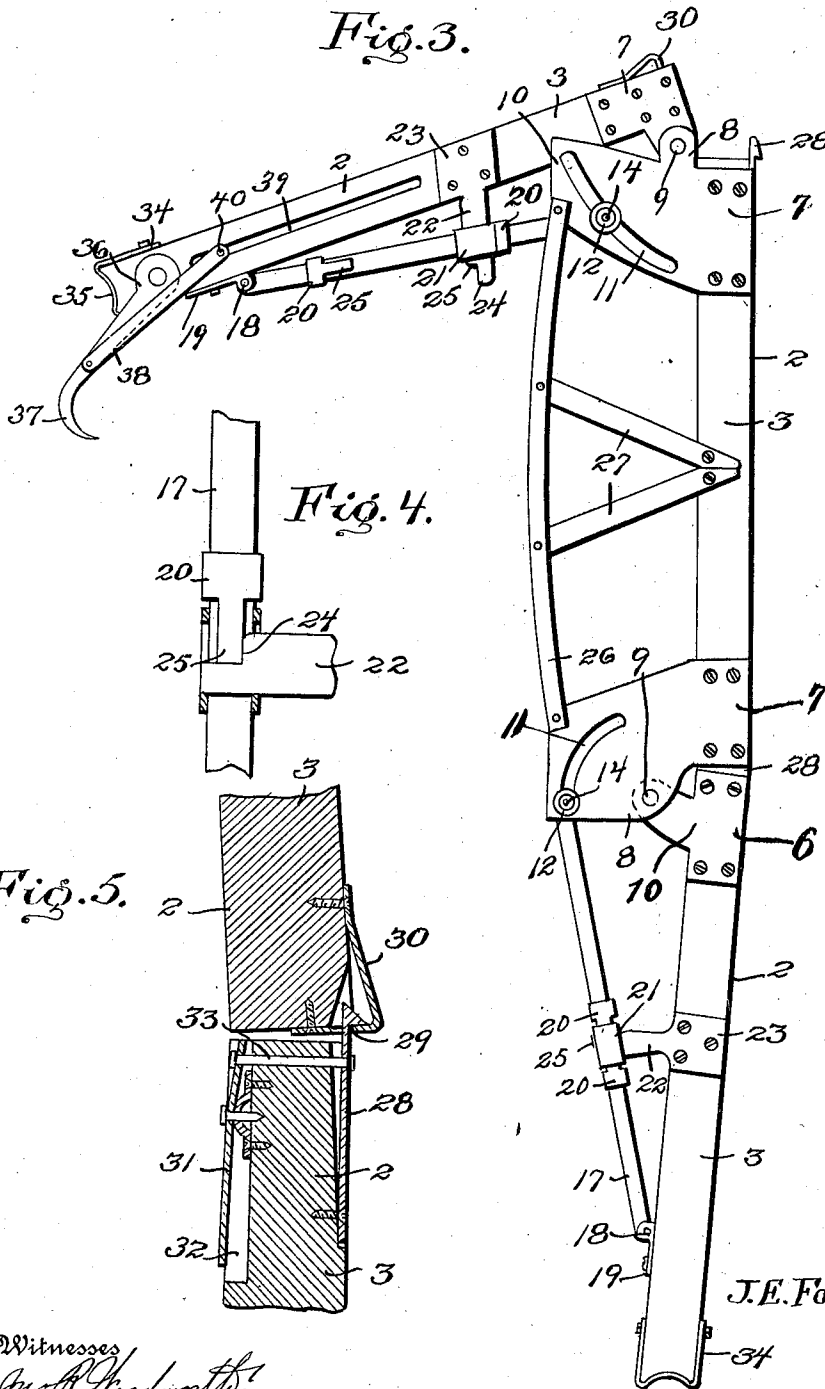


Fig. 4.

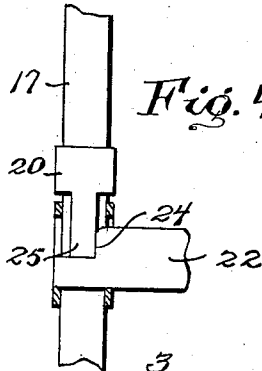
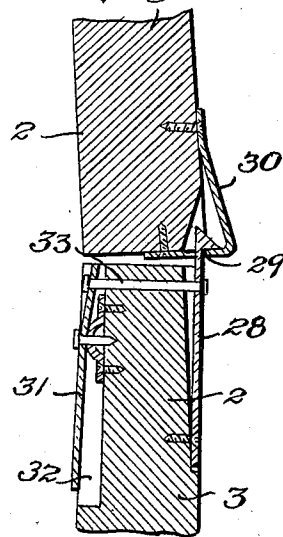


Fig. 5.



Inventor
J. E. Forndran.

Witnesses
J. R. Woodworth

Chas. B. Richardson

By

J. M. C. W. Squire Attorney

UNITED STATES PATENT OFFICE.

JOHN E. FORNDRAN, OF ROCK SPRINGS, WYOMING.

LADDER.

1,014,215.

Specification of Letters Patent.

Patented Jan. 9, 1912.

Application filed March 18, 1911. Serial No. 615,438.

To all whom it may concern:

Be it known that I, JOHN E. FORNDRAN, a citizen of the United States, residing at Rock Springs, in the county of Sweetwater and State of Wyoming, have invented certain new and useful Improvements in Ladders; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to new and useful improvements in ladders, and more particularly to that class generally known under the title of folding ladders.

An object of this invention is the provision of a ladder of this nature which can be folded so as to take up but little space and extended to provide a ladder of considerable length, so braced and locked in its extended position that there will be absolutely no danger of the parts becoming unlocked and collapsing.

Another object of this invention is to improve and simplify devices of this character, rendering them comparatively simple and inexpensive to manufacture, reliable and efficient in use, and readily operated.

With the above and other objects in view, this invention resides in the novel features of construction, formations, combinations and arrangements of parts to be hereinafter more particularly described, claimed and illustrated in the accompanying drawing, in which—

Figure 1 is a front elevation of my improved ladder; Fig. 2 is a side elevation thereof in folded position; Fig. 3 is a side elevation thereof, partly extended; Fig. 4 is a detail view of a portion of one of the truss bars, and Fig. 5 is a view illustrating the method of locking the side rails of the ladder, and Fig. 6 is a view illustrating a modified form of hinge.

Referring to the drawings by characters of reference, the numeral 1 designates generally my ladder, comprising a plurality of sections 2, each having opposite side rails 3, connected by transversely extending rounds 4 and hinged at their adjoining ends, as at 5, to provide means whereby the said ladder can be extended or folded at will. The hinges comprise a pair of rectangular-

shaped plates 6 and 7, the former of which is provided with outwardly curved portions 8, which are pivoted, as at 9, to an angularly extending arm 10 formed upon one edge of the securing plate 7. These outwardly curved portions 8 are provided with slots 11 formed upon an arc struck from the pivot point 9, and have located therein rollers 12 carried upon the opposite ends of telescoping rod sections 13 and 14, the latter of which is slotted, as at 15, and connected by means of a pin 16 to the former of the sections to allow the inward movement of the plates 10, yet limit the outward movement of the said plates, which might serve to injure the ladder.

To form suitable braces to prevent the ladder from swaying, I provide extensible truss bars 17, which are pivoted, as indicated at 18, in suitable brackets 19 located upon the rear faces of the rails 3, adjacent their upper ends, and are loosely connected at their forward ends to the opposite ends of the telescoping sections 13 and 14. The end portions of these extensible bars are provided with sleeves 20, which embrace the said rods to form a slidable connection between each of the sections comprised therein, while a sleeve 21 surrounds the said truss bars between the before-mentioned sleeves, and is of such diameter as to permit of the passage therethrough of the extensible truss bars.

To support the intermediate portions of the folded sections when in an open position, I provide suitable supports, each having a plate 23, which is bolted or otherwise secured to the outer edges of the side rails 3. This plate 23 is provided with an arm 22, which extends into a slot formed in the sleeve 21. The outer ends of the arms are cut away, as at 24, for engagement with a tongue 25 formed upon the outer sides of the end sleeves 20.

The angular plates 10 are connected at their upper edges by means of bracing rods 26, which are connected at intervals throughout their lengths to the side rails of the ladder by means of angular braces 27. The opposite ends of the middle section of the ladder have secured thereto, by bolts or other suitable means, spring pawls 28, which are adapted to engage apertures 29

located in spring catches 30, secured to the inner ends of the outer of the sections 2. These spring pawls 28 may be either disengaged from the apertures 29 by pressing upon the under side thereof adjacent the said spring catches, or by pressing upon the opposite ends of operating fingers 31 located in recesses 32 formed upon the rear edges of the side rails 3, and connected to the forward ends of the spring pawls 28 by means of links 33. The opposite ends of the side rails 3, at the upper and lower ends of the ladder, are provided with metal reinforcing plates 34, and are concaved, as at 35 to fit in the concavity formed in the ends of the ladder, which are adapted to engage in the ground or any other object upon which the ladder is rested, and to prevent the material composed in the said rails from becoming worn. The side rails at the upper end of the ladder have pivoted thereto arms 36, provided with hooked outer terminals 37, which are connected by means of a link 38 to a slot 39 located in the side rails 3 of the ladder. The upward movement of the hook 37, and downward movement thereof, is limited by means of a suitable stop or pin 40, which engages the before-mentioned groove 39. In very heavy ladders the hinges are formed with sockets 41, adapted to engage the ends of the rails 3 and support them in hinged relation to each other, as shown in Fig. 6 of the drawing.

The foregoing disclosures apply to my invention when used as a scaling ladder, but it is to be understood that I am not to be limited to this use alone, but can apply the same arrangement of truss bars, etc., to a step-ladder, or in fact any other type of ladder when desired.

From the foregoing disclosures, taken in connection with the accompanying drawings, it will be manifest that a ladder of the nature described is provided for which will answer all of the necessary requirements of such a device.

Having thus fully described this invention, what I claim as new and desire to secure by Letters Patent is:

1. The combination in a ladder provided with a series of foldable sections, of hinges connecting the adjoining ends of the said sections, the portion of said hinges mounted on the central section being provided with angularly extending plates, extensible truss bars connecting said plates with the sections of the ladder, and telescoping bars connecting the plates upon the opposite sides of the ladder, substantially as and for the purposes set forth.

2. The combination of a ladder having a series of foldable sections, hinges connect-

ing the said sections, plates extending angularly from the portion of the hinges mounted on the central section, extensible truss bars connecting the plates with the sections of the ladder, and arms engaging the extensible sections for supporting the intermediate portions of the foldable sections, and telescoping bars connecting the plates upon the opposite sides of the ladder, substantially as and for the purposes set forth.

3. A ladder comprising a series of foldable sections, hinges connecting the adjacent ends of the said foldable sections, plates extending from the portion of the hinge mounted on the central section, bars connecting the plates upon each side of the central section of the ladder, telescoping sections connecting the plates upon the opposite sides of the ladder, truss bars connecting the telescoping sections with the sections of the ladder, sleeves located upon the truss bars, and arms engaging the sleeves for supporting the intermediate portion of said foldable sections, substantially as and for the purposes set forth.

4. The combination in a ladder comprising a series of collapsible sections, hinges connecting the adjacent ends of the said foldable sections, plates extending angularly from the portion of the hinge secured to the central section, and having curved slots formed therein connecting the plates upon one side of the ladder, telescoping sections, the ends of which are adapted to slide within curved slots formed in the plates upon the opposite sides of the ladder, truss bars connecting the telescoping sections with the end sections of the ladder, sleeves located upon the truss bars, arms carried by the sections of the ladder for engagement with the sleeves for supporting the intermediate portion of said sections, and catches formed upon the adjacent ends of the sections for preventing the same from collapsing when extended, substantially as and for the purposes set forth.

5. A ladder such as described comprising a series of foldable sections, hinges connecting the adjacent ends of the said sections, plates extending angularly from the portion of the hinge secured to the central section, bars connecting the plates upon the sides of the central section, telescoping rods connecting the plates upon opposite sides of the ladder, extensible truss bars connecting the telescoping rods with the ends of the foldable sections, the inner ends of said extensible truss bars being provided with sleeves embracing the said truss bars, sleeves located upon the said truss bars between the before-mentioned sleeves, arms extending from the opposite sides of the foldable sec-

tions and engaging slots formed in the sleeves located between the first mentioned sleeves, shoulders formed upon these arms for engaging said sleeves, tongues formed
5 upon the outer of the sleeves for engaging the shoulder for supporting the foldable sections upon the said truss bars, and catches formed upon the adjacent ends of

the ladder sections, substantially as and for the purposes set forth.

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

JOHN E. FORNDRAN.

Witnesses:

W. B. DUNTON,
AMANDA HOLMES.

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