

(No Model.)

2 Sheets—Sheet 1.

J. L. WOLF.
EXTENSION STEP LADDER.

No. 426,747.

Patented Apr. 29, 1890.

Fig: 1.

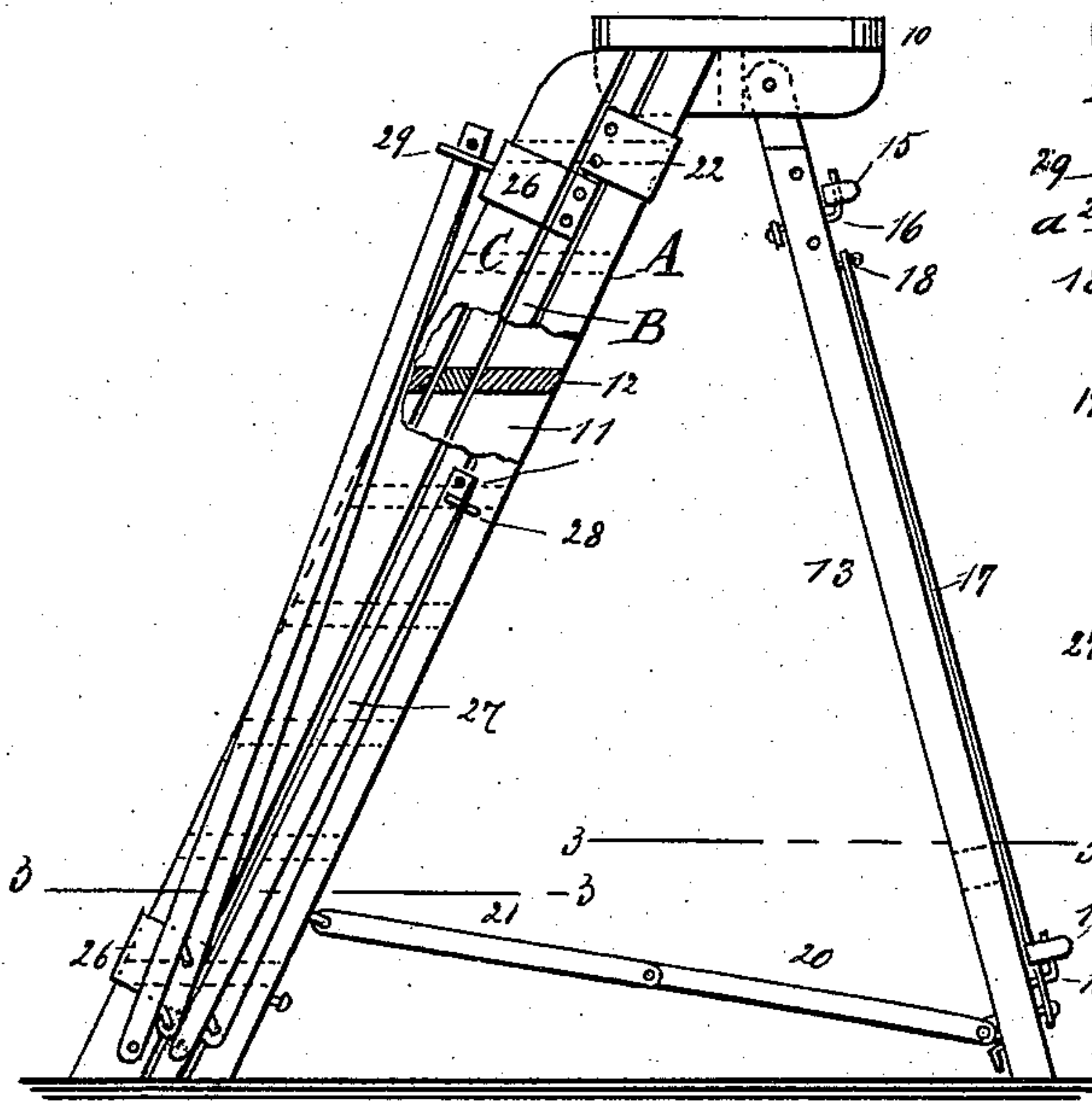


Fig: 2.

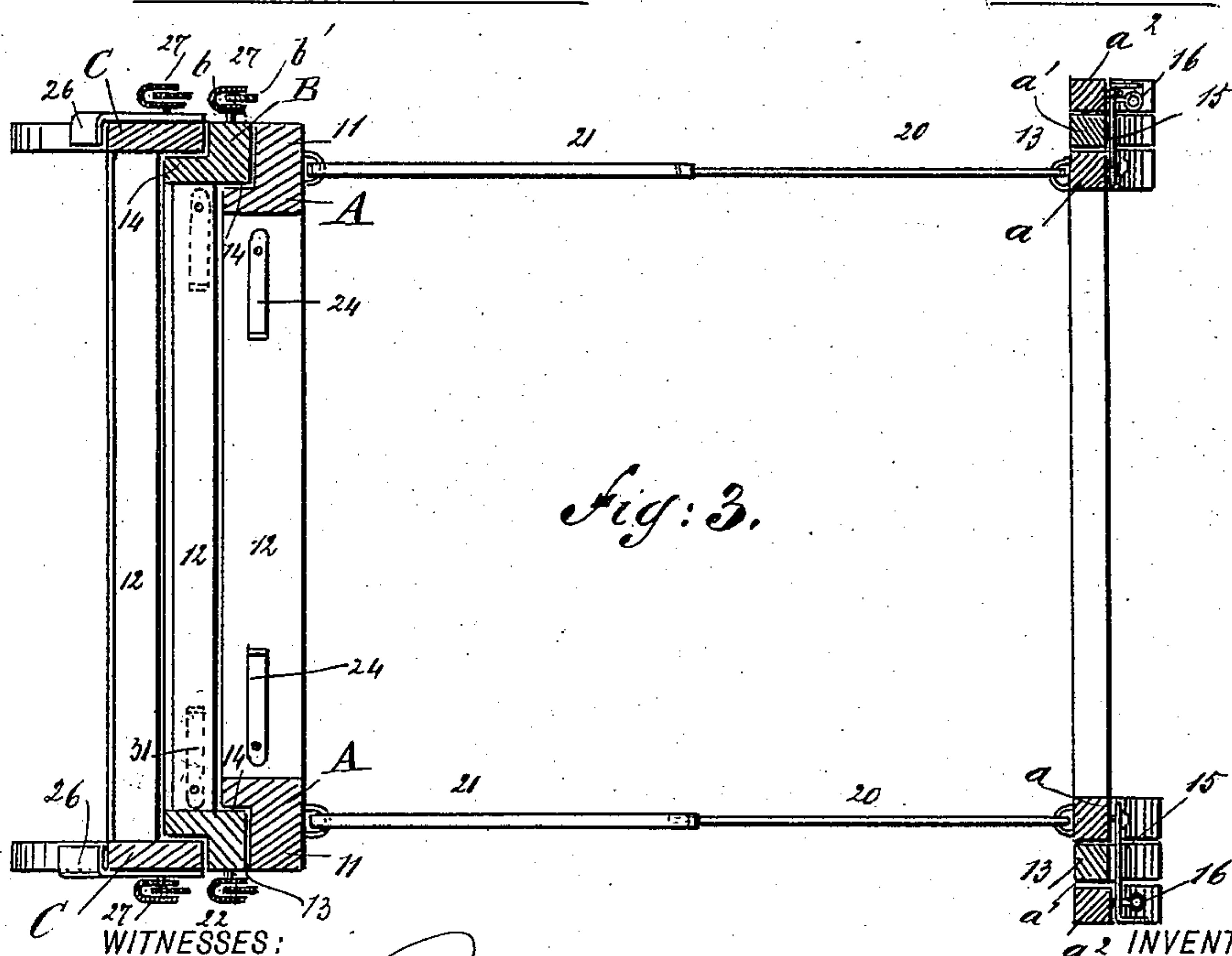
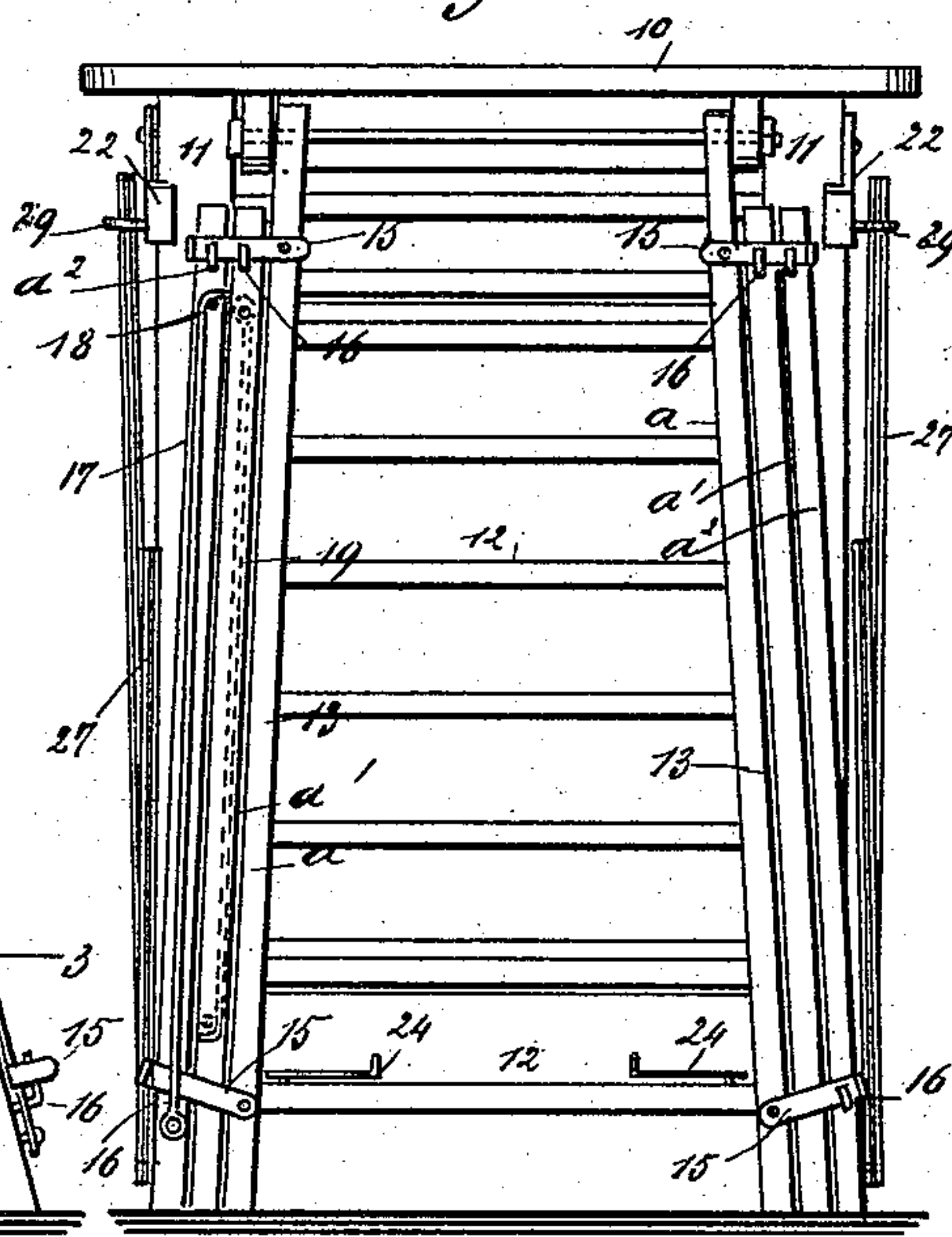


Fig: 3.

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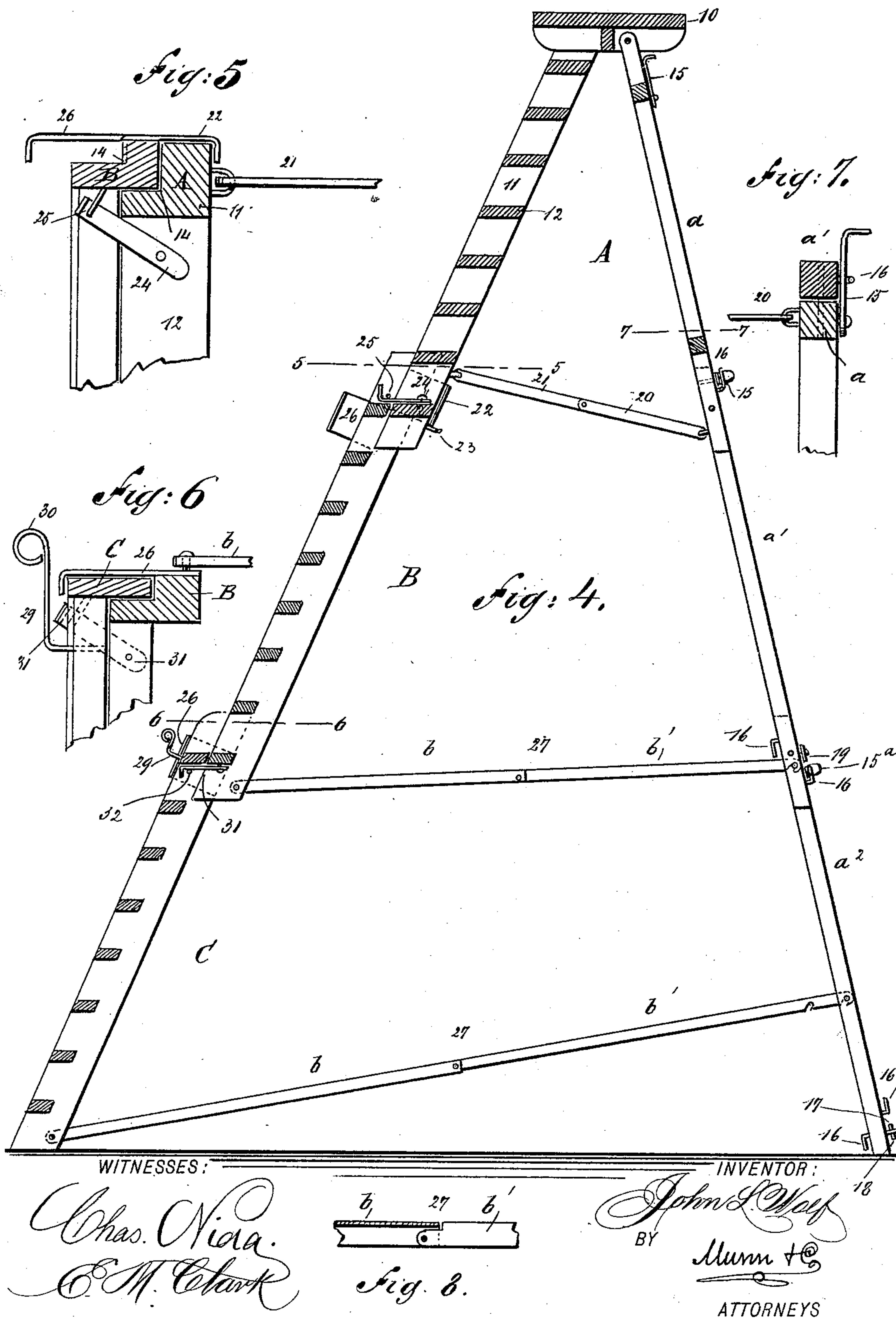
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2 Sheets—Sheet 2.

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EXTENSION STEP LADDER.

No. 426,747.

Patented Apr. 29, 1890.



UNITED STATES PATENT OFFICE.

JOHN L. WOLF, OF NEW YORK, N. Y.

EXTENSION STEP-LADDER.

SPECIFICATION forming part of Letters Patent No. 426,747, dated April 29, 1890.

Application filed February 6, 1890. Serial No. 339,434. (No model.)

To all whom it may concern:

Be it known that I, JOHN L. WOLF, of New York city, in the county and State of New York, have invented a new and useful Extension Step-Ladder, of which the following is a full, clear, and exact description.

My invention relates to an improved extension step-ladder, and has for its object to construct a simple, strong, and durable ladder in two or more sections, the extension sections of which are capable of closing upon the main or upper section to form a ladder of moderate length, or of sliding out from the main section together or singly to increase the height of the ladder.

A further object of the invention is to provide means for effectively bracing the sections when opened out, and of securing the braces when two sections or the main section only is used.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters and figures of reference indicate corresponding parts in all the views.

Figure 1 is a side elevation of the ladder, the sections being closed one upon the other, a portion of the step-sections being broken away. Fig. 2 is a rear elevation of the ladder when in the shape illustrated in Fig. 1. Fig. 3 is a transverse section on line 3 3 of Fig. 1. Fig. 4 is a central vertical section through the ladder when at its greatest height. Fig. 5 is a transverse section on line 5 5 of Fig. 4. Fig. 6 is a similar section on line 6 6 of Fig. 4. Fig. 7 is a transverse section on line 7 7 of Fig. 4, and Fig. 8 is a detail view of a portion of a brace-bar.

The ladder, as shown, is constructed in three sections A, B, and C; but a greater or a less number of sections may be employed, if desired.

The section A consists of a top board or plate 10, forward side rails 11, rigidly secured to the under side of the top board at their upper ends and connected by a series of rungs or steps 12 and rear legs 13, united by suit-

able cross-bars, which legs are hinged or pivoted to the under face of the top board in any suitable or approved manner. Each of the fixed side rails 11 has a longitudinal angular recess produced in the front face at the outer side, forming a slideway 14, and each rear leg 13 is constructed of a series of sections a , a' , and a^2 , the sections of the legs being made to correspond in number with the step-sections of the ladder.

The leg-sections a , a' , and a^2 lie normally in contact with each other, the sections a' and a^2 having a position parallel with each other and the main section a outside of the latter. The bottoms of the leg-sections a' are pivoted to the bottom of the main leg-sections a , and the upper ends of the leg-sections a^2 are pivotally attached to the corresponding portion of the sections a' , and all three sections are rigidly held in their normal position by a lock-latch 15, pivoted upon the main sections a at the top and bottom, the said latches being carried transversely across the other sections to a contact with angular keepers 16, one of which is secured in horizontal alignment to each section a' and a^2 near the top and one to the outer section a^2 near the bottom, as shown in Fig. 2. One set of legs is also provided with two brace-rods, one of which brace-rods 17 is pivoted or hinged to the outer section a^2 at or near its bottom upon the rear face. The said rod normally extends upward and is held in contact with the section by having its upper end bent to hook shape and carried to an engagement with a pin 18, as shown in Fig. 2. The other brace-rod 19 is hinged or pivoted at or near its upper end to the center section a' , and is held normally to place by engagement with a pin near the bottom of said section in similar manner to the brace-rod 17, as is illustrated in dotted lines, Fig. 2.

Jointed brace-rods comprising two sections 20 and 21 pivotally connect the lower ends of the main leg-sections a with the side rails of the main step-section A, the section 21 of the brace-rod being U-shaped in cross-section and the section 20 a bar capable of passing between the members of the U-section when the latter is folded up.

The step-section A has its side rails pro-

vided with an angular rabbet or channel 14, and the second step-section B has its side rails also provided with an angular channel 14, and the said step-section B is adapted to slide in the channel of the main section A, being guided in its vertical movement by angle guide-plates 22, one of which is secured to each side near the top, and one member of said guide-plates is bent to contact with and slide upon the rear face of the rails of the main step-section A, and when the second section B is drawn down to lengthen the ladder it is prevented from leaving the main section by the angle-plates contacting with pins 23 upon the latter, as shown in Fig. 4.

When the step-section B has been carried to the farthest downward point, it is held firmly to place by lock-latches 24, pivoted upon the lower step of the main section, which latches are carried over the top step of the second section B beneath pins 25, secured in the inner face of its side rails, as illustrated in Fig. 5. The second step-section B is also provided near the top and bottom of each side rail with an upwardly-extending angle-plate 26, to constitute guides for the third step-section C; and in order to connect the rear leg-sections a' and a^2 with the second step-section B, the former being folded down when the step-section is lowered, brace-bars 27 are employed, comprising two members b and b' . The members b are U-shaped in cross-section and pivoted to the lower ends of the side rails, the members b' , which are in the form of a bar, being pivoted to the members b and provided at their opposite ends with a hook adapted to engage with pins upon the legs, as shown in Fig. 4. When these brace-bars 27 are not needed, one member is folded in the other and both members against the side rail, to which they are pivoted, being held to place by an angle-keeper 28, as shown in Fig. 1.

The third step-section C is provided with straight side rails, which slide in the angular channels of the intermediate or second section B beneath the guide-plates 26. This section C may, if desired, be entirely removed from the other sections, as there are no stops interposed to prevent its detachment.

The step-section C is provided with brace-bars 27, constructed in like manner with the brace-bars of the second section, and when the members of the brace-bars are folded up they are held to place by a latch-bar 29, one of said bars being pivoted to the upper step near each side rail and made to terminate in loops 30, which loops are passed over the upper or pivotally-connected ends of the brace-bar members, as shown in Fig. 2.

To lengthen the ladder as much as possible, the second step-section B is drawn down upon the main step-section until the guide-plate 22 contacts with the pins 23, and the lower section C is thereupon drawn downward, and the latch-bars 31, which are pivoted beneath the lower step of the intermediate section, are carried beneath the upper step of the lower

section to an engagement with supporting-pins 32. Thus each step-section is held in its place. The leg-sections are then folded down one from the other and carried out to the position illustrated in Fig. 4, whereupon the lower lock-latch 15 upon the main leg-section is carried over and made to contact with the angle-keepers upon the second leg-section a' , and a similar latch-bar 15^a , which is attached to the lower end of the intermediate leg-section a' , is carried over and made to contact with the angle-keeper 16 upon the upper end of the third leg-section a^2 . The brace-bars are thereupon folded out and made to engage with pins upon the leg-sections, and the brace-bars 17 and 19 are folded over at the rear of the leg-sections transversely of the same, one at the bottom and the other at the joint above, and the hooked extremities of the said brace-bars are made to enter pins in the leg-sections opposite to those to which they are pivoted.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In an extension step-ladder, the combination, with a main step-section having a longitudinal channel produced in its side rails, a second step-section provided with guide-plates and capable of sliding in the channels of the main section, and legs hinged to the main step-section, of auxiliary leg-sections pivoted to the lower ends of the main leg-sections and capable of folding upon said main leg-sections, and brace-bars pivoted at the lower ends of the second step-section, the said bars comprising two members, one U-shaped in cross-section and the other in bar form, adapted to close in the U member and contact with the sides of the step-section, substantially as shown and described.

2. In an extension step-ladder, the combination, with a main step-section having a longitudinal channel produced in its side rails, an intermediate step-section held to slide in the channels of the main step-section, and also provided with channels in its side rails, guide-plates secured to the side rails of the intermediate step-section, projecting forward and rearward therefrom, and a third step-section capable of sliding upon the intermediate step-section, of leg-sections pivoted to the main step-section, and two pivotally-connected auxiliary leg-sections pivoted to the lower end of each of the main leg-sections, and means, substantially as shown and described, for locking the leg-sections to place when folded and unfolded, as and for the purpose specified.

3. In an extension-ladder, the combination, with a main step-section having a longitudinal channel produced in its side rails, an intermediate step-section held to slide in the channels of the main step-section, and also provided with channels in its side rails, guide-plates secured to the side rails of the intermediate step-section, projecting forward and rearward therefrom, and a third step-section

capable of sliding upon the intermediate step-
section, of leg-sections pivoted to the main
step-section, and pivotally-connected auxil-
iary leg-sections pivotally attached to the
5 main leg-sections, brace-bars pivoted to the
side rails of the intermediate and outer step-
sections, each brace-bar comprising two piv-
otally-connected members, one being U-
shaped in cross-section and the other rect-
10 angular, and lock-latches pivoted to several

of the leg-sections, adapted to contact with
keepers secured upon others of the leg-sec-
tions, whereby said sections are held rigidly
in a folded or an unfolded position, substan-
tially as described, and for the purpose speci- 15
fied.

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Witnesses:

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