

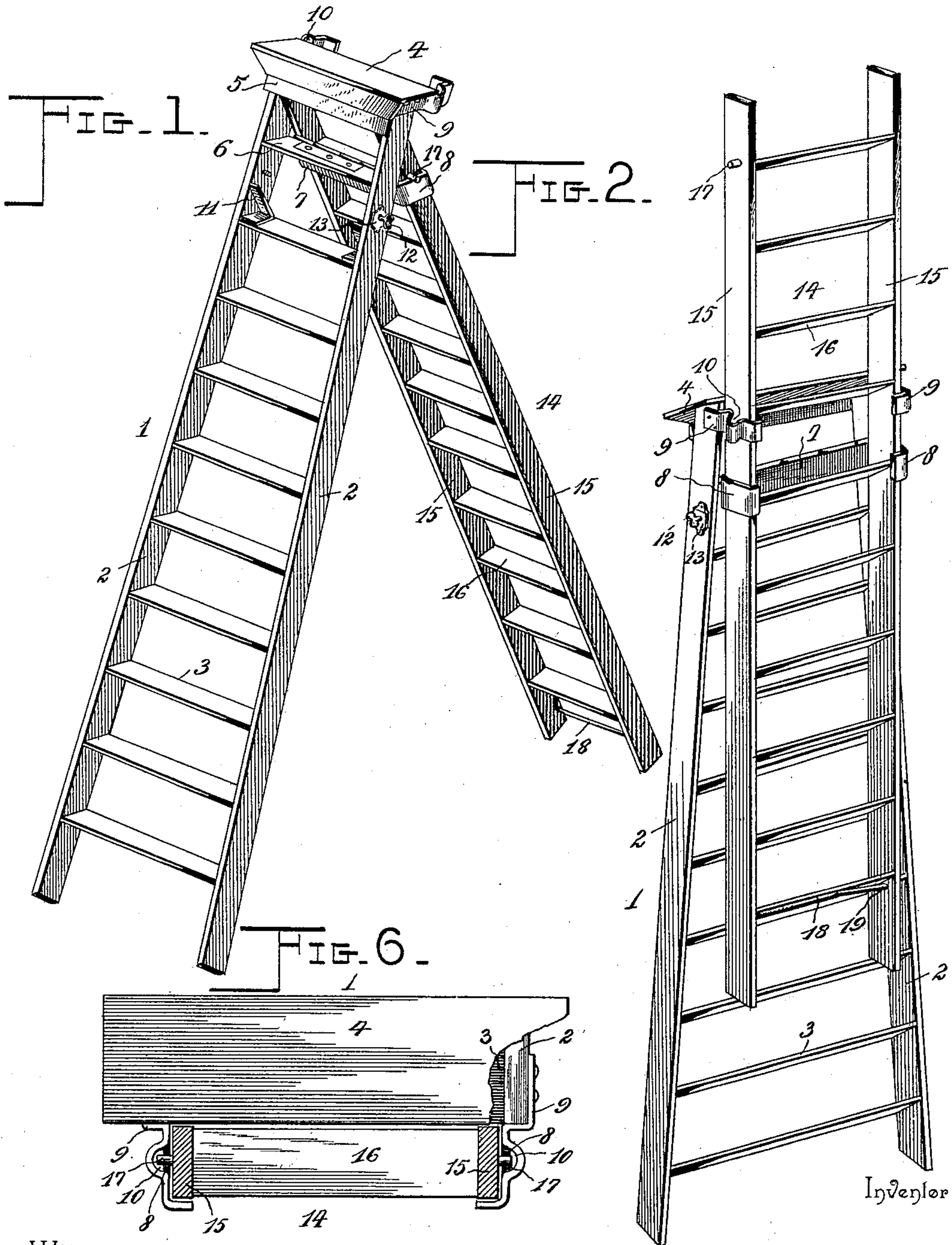
(No Model.)

2 Sheets—Sheet 1.

E. CARDARELLI.
COMBINED STEP AND EXTENSION LADDER.

No. 605,995.

Patented June 21, 1898.



Witnesses

John F. Deffenwerf
Edwin Cruise.

By *his* Attorneys,

Emilio Cardarelli.

C. A. Snow & Co.

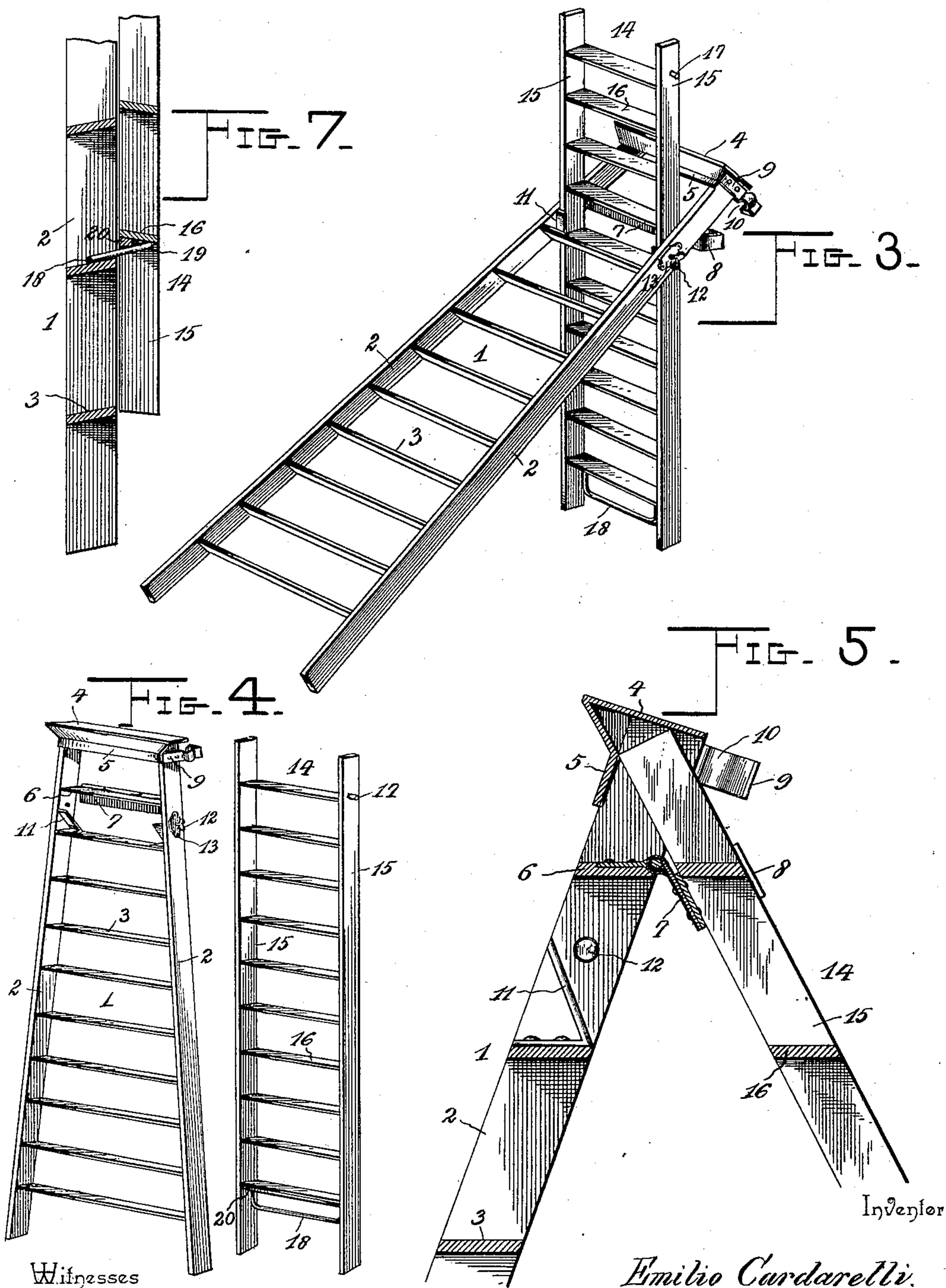
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UNITED STATES PATENT OFFICE.

EMILIO CARDARELLI, OF BOSTON, MASSACHUSETTS.

COMBINED STEP AND EXTENSION LADDER.

SPECIFICATION forming part of Letters Patent No. 605,995, dated June 21, 1898.

Application filed October 18, 1897. Serial No. 655,579. (No model.)

To all whom it may concern:

Be it known that I, EMILIO CARDARELLI, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Combined Step and Extension Ladder, of which the following is a specification.

This invention relates to combined step and extension ladders, its objects being to improve the construction of these devices, whereby the sections may be easily adjusted to occupy different positions relatively to each other and be securely locked or held in their adjusted positions.

With these objects in view the invention consists of the several details of construction, combination, and arrangement of parts, as will be hereinafter fully described, and particularly pointed out in the claims.

In the drawings, Figure 1 is a perspective view of a ladder made in accordance with my invention when used as a step-ladder. Fig. 2 is a similar view of the ladder when extended. Fig. 3 is a similar view showing still another adjustment of the two sections. Fig. 4 shows the two sections separate. Fig. 5 is a vertical section of the upper part of the ladder in the position indicated in Fig. 1. Fig. 6 is a top plan view, partly in section. Fig. 7 is a sectional detail of the device to support the supplementary section when extended.

Similar reference-numerals indicate similar parts in the several figures.

The main section of the ladder is indicated by 1 and consists of the side rails 2 and the steps 3, secured to the side rails in any approved manner. Preferably the side rails of this section will converge toward their upper ends in the usual manner. The upper step 4 of this section will be firmly secured on the upper ends of the side rails and project in front thereof and be provided with a downwardly-extending flange 5, engaging the outer edges of the rails and preferably secured thereto in any suitable manner. This flange may be integral with the step or be a separate piece secured to it.

To the inner edge of the second step 6 from the top of the section 1 a plate 7 is hinged to swing vertically, and the end portions of this plate are first bent at a right angle to the

main portion of the plate and then again inwardly toward each other to form the clips 8, for a purpose to be hereinafter referred to. Another pair of clips 9 are rigidly secured, respectively, to the side rails just below the top step to be in substantially the same vertical plane as the clips 8 when the latter are in their normal positions. The sides of the clips 9 which extend parallel with the sides of the rails are bent outwardly to form vertically-disposed grooves or recesses 10, the purpose of which will be referred to hereinafter.

Between the second and the third steps from the top of section 1 inclined shoulders 11 are formed on the inner faces of the side rails 2, and these shoulders incline downwardly from the outer to the inner edges of the rails. Just above the shoulders set-screws 12 are mounted in the side rails and in metal blocks 13, provided with threaded openings, said blocks being secured to the outer faces of the side rails in any suitable manner. The function of these shoulders and set-screws will be referred to hereinafter.

The supplementary section 14 of the ladder is formed of two parallel side rails 15 and the steps 16, secured to the rails in any suitable manner.

17 indicates pins projecting from the outer faces of the side rails 15 near their upper ends.

18 indicates a loop, preferably rectangular and having its ends bent outwardly at substantially a right angle to its sides to form journals 19, which are mounted in the side rails 15 near their outer edges and just below the lower step. A bar 20 will preferably be secured in the side rails 15 adjacent to their inner edges to engage the sides of the loop when the latter is in substantially a horizontal plane, and the loop will project beyond the inner plane of the supplementary section to engage either of the steps of the main section, as may be desired, when the ladder is extended. When not in use, the loop will be free to swing down between the side rails out of the way.

In the foregoing description when I refer to the "inner edges" of the respective sections I mean the edges which normally oppose each other.

In order to connect the two sections together, either for the purpose of forming a step-ladder or an extension-ladder, the supplementary section will be inserted at its lower end through the clips 8 and 9 and slip therethrough until the pins 17 engage the upper edges of the clips 8, and when in this position the clips will slidably support the upper end of the supplementary section and the pins 17 will prevent the section from slipping through the clips 8. The sections can therefore be folded together and conveniently moved about.

When used as a step-ladder, the lower ends of the two sections will be spread apart and the clips 8 will turn on their hinge and throw the upper end of the supplementary section below the top step, with its inner corners engaging the flange 5. The flange 5 will limit the inward movement of the upper end of the supplementary section, and the top step will engage the upper ends of the section and prevent the main section from sliding down upon the supplementary section.

In order to extend the ladder, the supplementary section will be moved in close to and parallel with the main section, when it can be easily slid upwardly through the clips 8 and 9, the vertical grooves 10 in the latter permitting the pins to pass through them, and when the supplementary section has been extended a sufficient distance the loop 18 will be caused to engage one of the steps of the main section and will effectually support the supplementary section against downward movement.

When it is desired to use the two sections in the manner illustrated in Fig. 3, the supplementary section must be disengaged entirely from the clips, and it can then be inserted between the side rails of the main section to engage the inclined shoulders 11, and when the main section has been arranged at the desired angle the set-screws will be caused to engage the side rails of the supplementary section and lock the two sections together. In this manner the inclination of the main section can be adjusted to any desired angle as may be necessary.

It will be understood that changes in the form, proportion, and the minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of this invention.

Having thus described the invention, what I claim is—

1. In a ladder, the combination of a main section having a step secured upon the upper ends of its side rails, clips hinged to the main section below the top step, a supplementary section slidably supported between the clips, and its upper end engaging the lower face of said upper step when the lower ends of the sections are spread apart, and means to limit the inward movement of the upper end of the supplementary section, substantially as described.

2. In a ladder, the combination of a main section having a step secured upon the upper ends of its side rails, and provided with a downwardly-extending flange, clips hinged to the main section below the top step, and a supplementary section slidably supported between the clips, and its upper end engaging the said upper step and flange when the lower ends of the sections are spread apart, substantially as described.

3. In a ladder, the combination of a main section, clips hinged thereto near its upper end, clips rigidly secured thereto above the hinged clips and having vertically-disposed grooves, a supplementary section slidably supported by the said clips, pins projecting from the side rails of the supplementary section near its upper end and adapted to engage the hinged clips and to pass through the grooves in the fixed clips, and a catch on the lower end of the supplementary section adapted to engage the step on the main section, when the ladder is extended, substantially as described.

4. In a ladder, the combination of a main section having inclined shoulders on the inner faces of the side rails between two steps near its upper end, a supplementary section adapted to pass between the rails of the first section and be supported on said shoulders, and set-screws in the rails of the main section above said shoulders adapted to engage the rails of the supplementary section, substantially as and for the purpose specified.

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

EMILIO CARDARELLI.

Witnesses:

HIRAM M. BURTON,
JOSEPH E. DOHERTY.