No. 621,432. Patented Mar. 21, 1899.

C. E. SMITH.

STEP LADDER.

(Application filed May 5, 1898.)

(No Model.) 2 Sheets—Sheet 1.

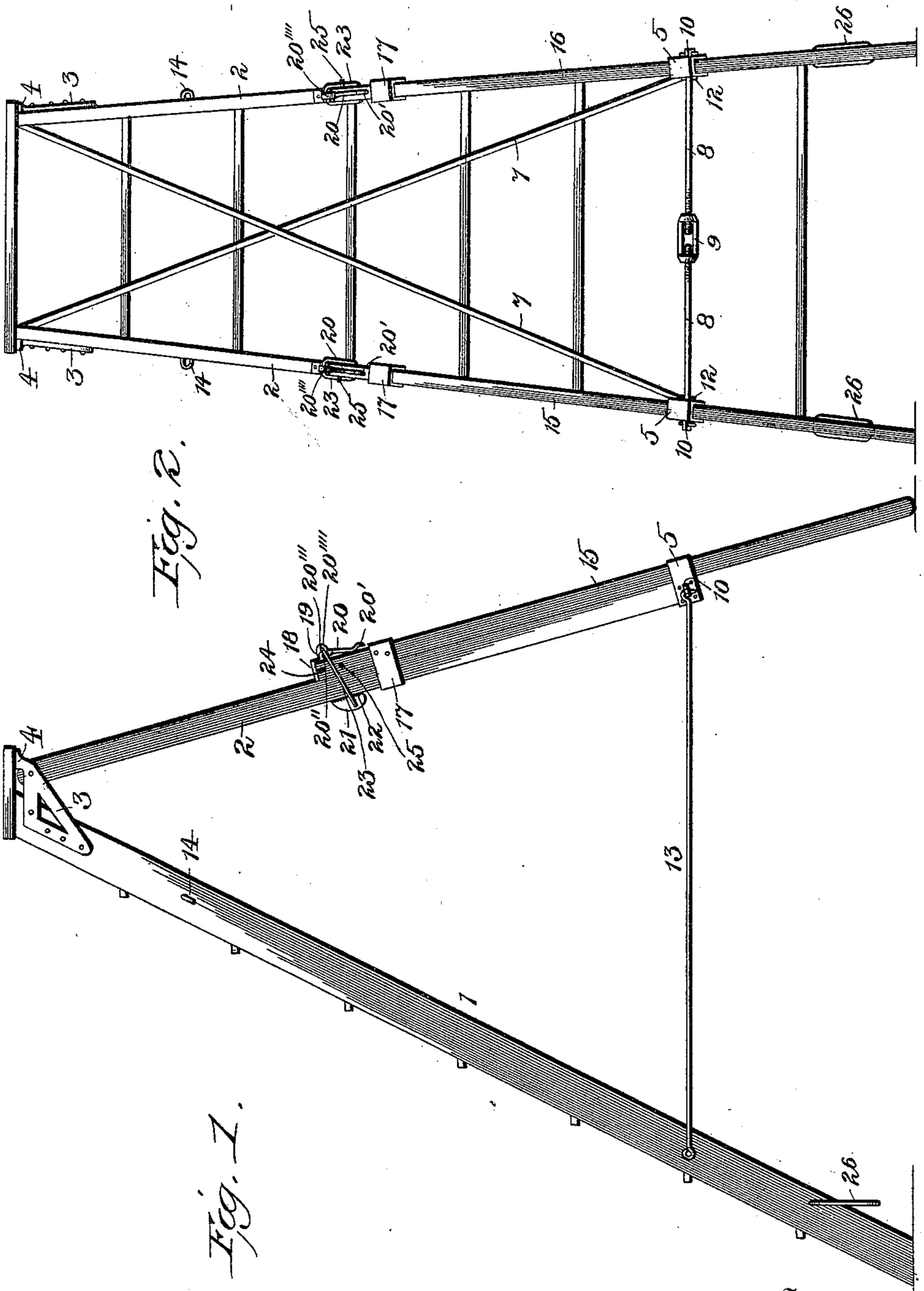

Fig. 2.

Fig. 1.

Witnesses
W. L. Goodwin.
A. D. Gilbert.

Inventor
Charles Edward Smith
By Henry D. Cope
Attorney

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Fig. 3.

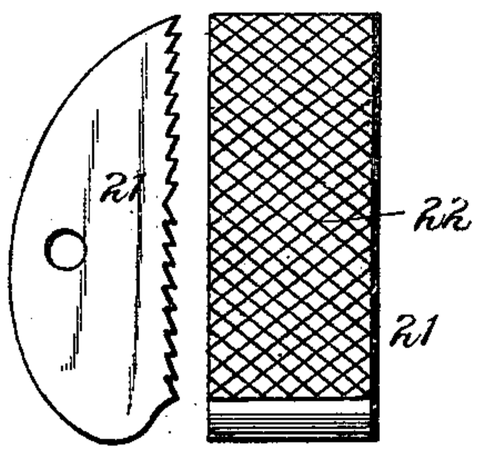


Fig. 4.

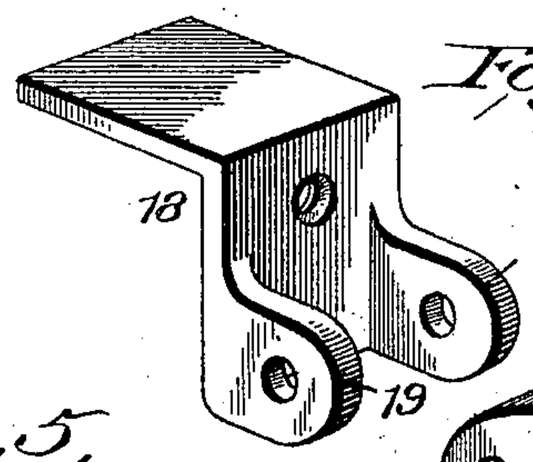


Fig. 5.

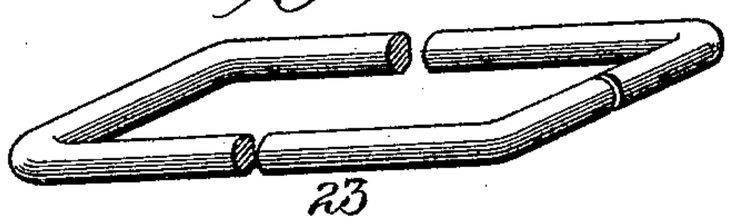


Fig. 6.

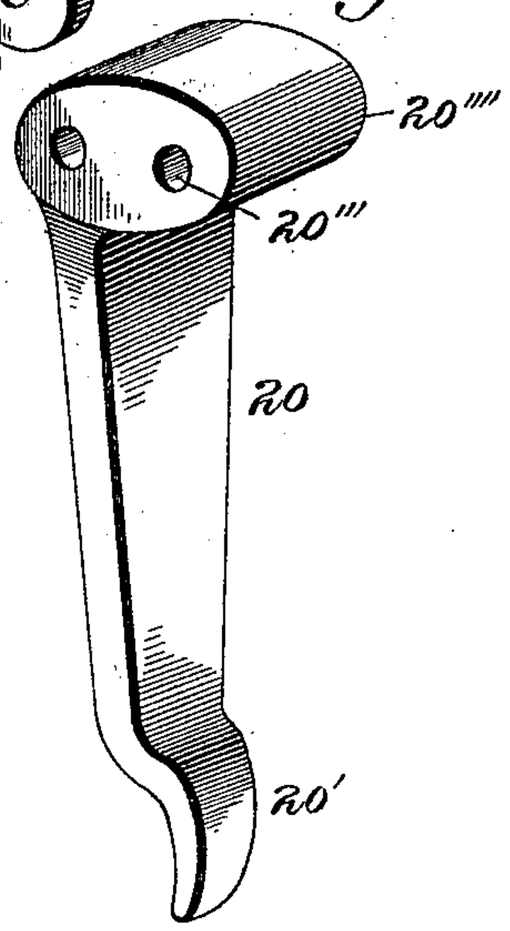


Fig. 7.

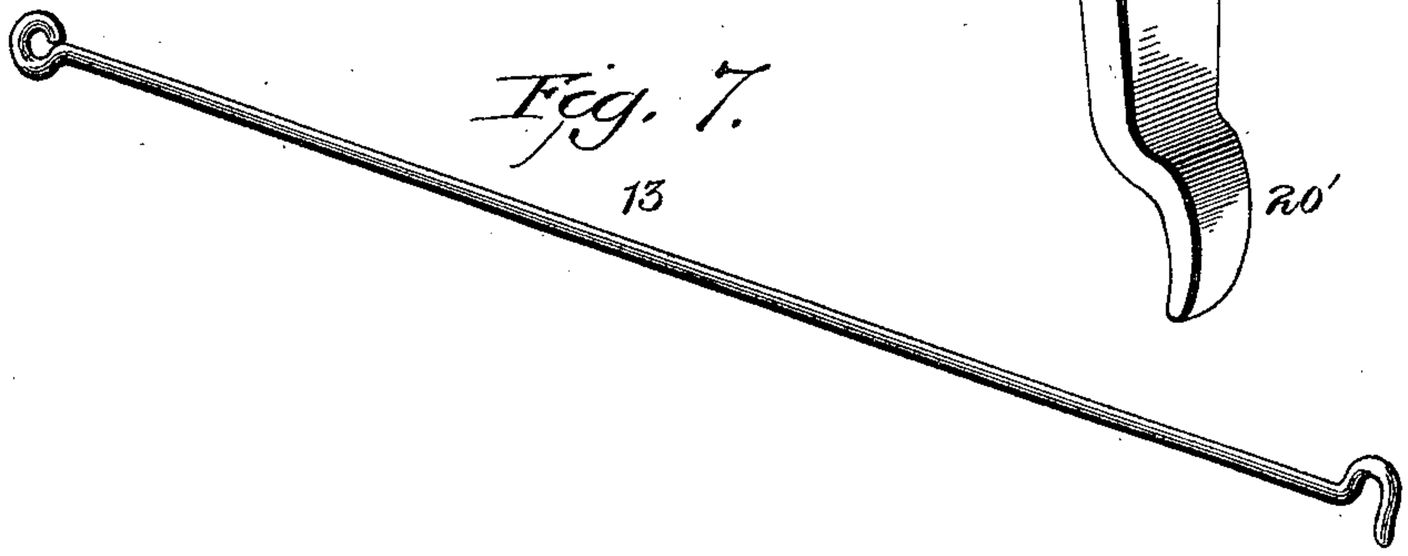


Fig. 8.

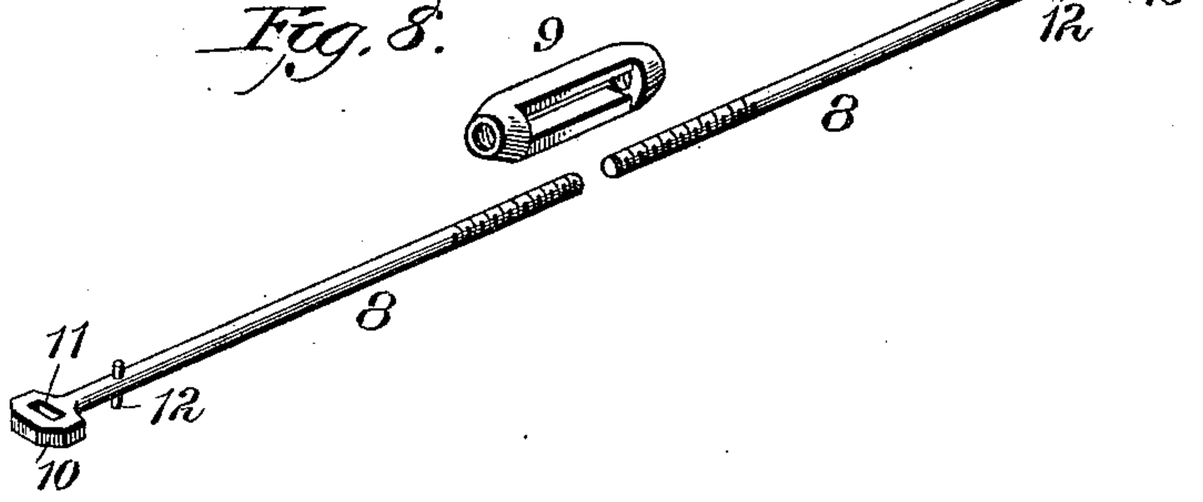
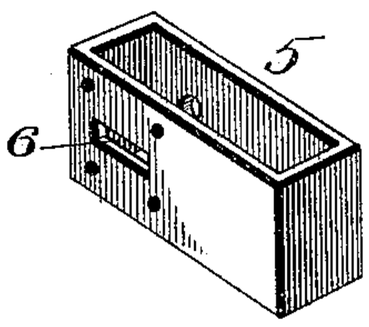


Fig. 9.



Witnesses
Wm. F. Speedey.
A. D. Gilbert.

Inventor
Charles Edward Smith
By Henry A. Copp
Attorney

UNITED STATES PATENT OFFICE.

CHARLES EDWARD SMITH, OF LAKE GROVE, NEW YORK.

STEP-LADDER.

SPECIFICATION forming part of Letters Patent No. 621,432, dated March 21, 1899.

Application filed May 5, 1898. Serial No. 679,745. (No model.)

To all whom it may concern:

Be it known that I, CHARLES EDWARD SMITH, a citizen of the United States, residing at Lake Grove, in the county of Suffolk and State of New York, have invented certain new and useful Improvements in Step-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.

My invention relates generally to step-ladders, and particularly to those of the extension-leg type.

The object of the present invention is the provision in a step-ladder of improved means for locking the sections of the extensible legs, whereby rapid and easy adjustments may be effected and slipping of the parts prevented.

A further object is to provide novel means for bracing and connecting the legs of the ladder to prevent any spreading or springing thereof.

A still further object is the provision of a ladder of the class described which will be of strong and durable construction and capable of being produced at relatively small cost.

Having the foregoing and other objects in view, the invention comprises certain improved features and novel combinations of parts more fully set forth hereinafter.

In the accompanying drawings, Figure 1 is a side elevation of the complete invention, showing the legs spread; Fig. 2, a rear view; Figs. 3, 4, 5, and 6, details of the device for clamping the extensible leg-sections together, and Figs. 7, 8, and 9 details of the connection between the horizontal brace and the legs.

The main legs of the ladder are shown at 1 and 2, the former having the usual steps and top and the two being connected by angle-irons 3, of triangular shape, and provided with supports 4, which are fastened to said top.

At the lower ends of the members of leg 2 are located metallic guide-boxes 5, which have elongated or rectangular slots 6 and are fastened to said members. The usual crossed braces 7 are employed, the same being fastened in a suitable manner at their upper ends to the members of leg 2 and being bolted to the guide-boxes at the other end. I employ an additional and improved horizontal brace for connecting the members of leg 2, so as to insure against any spreading thereof. This brace consists of two screw-threaded eyebolts 8 and a turnbuckle 9, connecting them and affording means for their adjustment. The eyes 10 at the ends of the bolts are flat and the openings 11 rectangular. The flat eyes fit snugly in the slots 6 and the openings lie just beyond the faces of the guide-boxes. Small pins 12, passed through the bolts, lie against the inner faces of the guide-boxes and prevent the flat eyes 10 from leaving slots 6 should the members of leg 2 have any tendency to spring toward each other. The eye bolts are prevented from turning, and hence becoming loosened, by reason of the eyes being locked in the slots. There are two brace-rods 13, having hooks on one end, which are pivoted to the members of leg 1, the hooks being received in the openings 11. When the ladder is closed, the hooks are received in eyes 14 on the leg 1.

There are two extensible leg-sections 15 and 16, which are adapted to slide against the members of the leg 2 and through the guide-boxes 5. Guide-boxes 17 are secured to these leg-sections near their upper ends and loosely receive the members of leg 2. Each extensible leg-section carries my improved clamping device, and as these are of similar construction a description of one will suffice.

An angular cap-plate 18 is secured to the upper end of the section, it being provided on its depending portion with integral and parallel ears 19.

The numeral 20 represents a locking-lever which is of substantially right-angular shape, having one of its arms provided with a finger-hold 20′ and fitting in between the ears and pivoted thereto on a bolt 20″. There is a clamping-block 21, of substantially semicircular shape, which has a flat face provided with points or sharpened projections 22, formed by intersecting grooves or furrows. A bail 23 passes through the clamping-block and through an opening 20‴ in the arm 20⁗ of the locking-lever, said bail straddling the sections of the leg member 2. Above and below the bail are stops 24 and 25, which project from the extensible leg-section. The bail is of only sufficient width at the point of con-

nection with the clamping-block to admit the latter, and hence it can have no side play. When the locking-lever is swung upwardly, the point of connection 20''' is made to approach the extensible leg and the clamping-block is disengaged from the leg 2, so that the extensible leg can be shifted as desired. The lower stop 25 will support the bail and prevent the clamping-block from touching the leg. When the locking-lever is swung downwardly, the point of connection 20''' is moved away from the leg-section, so that the clamping-block is drawn against the leg, and upon the said point of connection passing the pivotal point 20'' of the locking-lever the teeth are made to enter the leg 2, and said leg and the extensible leg-section are securely locked together both by reason of the frictional contact between said parts and because of the rigid connection thus afforded between them. The upper stop 24 by engaging with the bail would prevent the clamping-block from being lifted and made to engage the leg during the downward movement of the locking-lever should the pivotal connection 20''' not work smoothly.

A bail 26 is pivoted to the leg 1 and is employed to receive the extensible leg-sections and lock the parts together when the ladder is closed.

My improved ladder is adapted for use in different positions on stairs or on an uneven base, and its construction is such that all necessary adjustments can be had, and the parts are properly braced at all times.

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

1. In a step-ladder, the combination with relatively-extensible leg-sections, of a locking-lever carried by one of the leg-sections and movable independently of, and relatively to, both leg-sections, a clamping-block adapted to engage the other leg-section, and an operative connection between the lever and block whereby said block may be made to engage the leg-section.

2. In a step-ladder, the combination with relatively-extensible leg-sections, of a locking-lever pivoted to one leg-section and movable independently of, and relatively to, both leg-sections; a clamping-block adapted to engage the other leg-section, and a bail connected to the block and pivoted to the lever at a point offset from the longitudinal axis of the lever whereby said block may be made to engage the leg-section.

3. In a step-ladder, the combination with relatively-extensible leg-sections, of a locking-lever on one section, a clamping-block adapted to engage with the other leg-section, a bail connecting the block to the lever, and a stop on one of the leg-sections which is adapted to engage and support the bail when the block is out of engagement with the leg-section and prevent its engagement therewith.

4. In a step-ladder, the combination with relatively-extensible leg-sections, of a locking-lever having two arms disposed at an angle to each other and pivoted to one leg-section at their angle, a clamping-block adapted to engage the other leg-section, and a bail pivotally connecting the clamping-block with one of the arms of the lever, said parts being so disposed and related that when the point of connection of the bail and lever is on one side of the pivotal point of the lever, the clamping-block will be out of engagement with the leg-section and when located on the opposite side of said pivotal point said block will be locked in engagement with the leg-section.

5. In a step-ladder, the combination with relatively-extensible leg-sections, of a clamping-block having teeth or projections on one face adjacent to one of said leg-sections and movable independently of, and relatively to, both leg-sections, and a locking device carried by the other leg-section which is connected to the clamping-block and is adapted for drawing it in engagement with the first-named leg-section to lock the leg-sections together.

6. In a step-ladder, the combination with relatively-extensible leg-sections, of a clamping-block adapted to engage one of the sections and movable independently of, and relatively to, both leg-sections, a locking-lever carried by the other section, a bail connecting the lever with the clamping-block, and stops projecting from one of the leg-sections above and below the bail and adapted to engage therewith.

7. In a step-ladder, the combination with members comprising one of the legs thereof, of boxes connected to the members and having slots therein, bolts having flattened eyes at their ends which are received in the slots, an adjustable connection between the bolts, and members passed through the eyes.

8. In a step-ladder, the combination with members comprising one of the legs thereof, of boxes secured to the members and having slots, a brace composed of bolts having flattened eyes at their ends which are snugly received in the slots, pins passed through the bolts on one side of the boxes, members passed through the eyes on the other side of the boxes, and an adjustable connection between the bolts.

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

CHARLES EDWARD SMITH.

Witnesses:
E. M. SMITH,
THEO. W. SMITH.