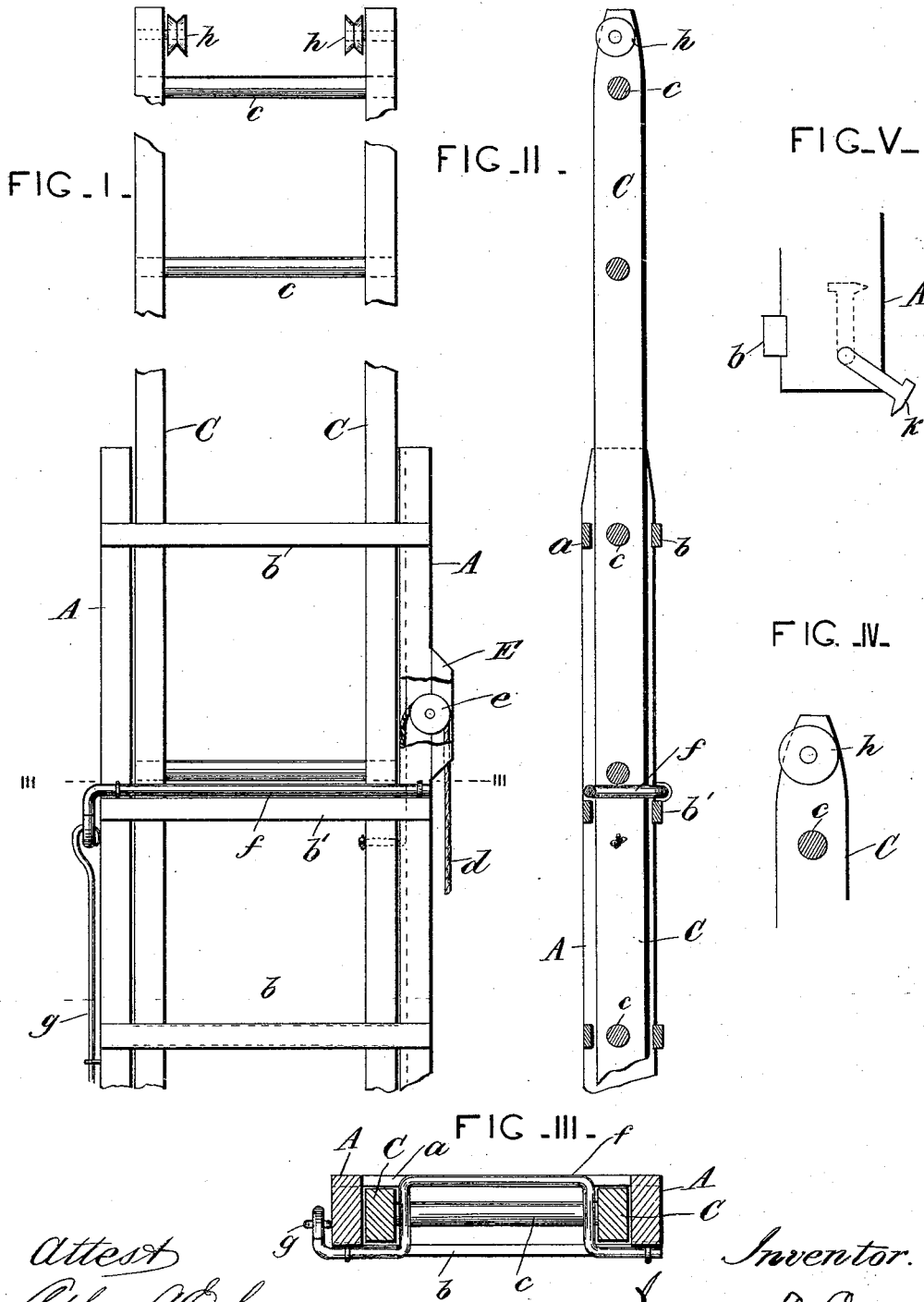


(No Model.)

I. T. CROSS.  
EXTENSION LADDER.

No. 494,270.

Patented Mar. 28, 1893.



Attest  
Arthur M. Cobb  
Per Lewis.

Inventor.  
Isaac T. Cross  
by Pollock Mauro  
his attorneys.

# UNITED STATES PATENT OFFICE.

ISAAC T. CROSS, OF WATERTOWN, NEW YORK, ASSIGNOR OF ONE-HALF TO  
VICTOR F. THOMAS, OF SAME PLACE.

## EXTENSION-LADDER.

SPECIFICATION forming part of Letters Patent No. 494,270, dated March 28, 1893.

Application filed September 9, 1892. Serial No. 445,394. (No model.)

*To all whom it may concern:*

Be it known that I, ISAAC T. CROSS, of Watertown, in the county of Jefferson and State of New York, have invented a new and useful  
5 Improvement in Extension-Ladders, which improvement is fully set forth in the following specification.

This invention relates to the construction of extension-ladders, and particularly to ladders of the type described in Letters Patent No. 478,969, granted July 12, 1892. As described in said patent the outer section had a double set of rungs between which the inner, or movable section was normally inclosed, being adapted to slide in and out, and being retained in place and guided by the rungs. The latter were allowed to project a certain distance beyond the side supports, so as to allow room between for the play of the movable section. It is found in practical use that the projection of these rungs interferes with the convenient manipulation of the ladder when any corner or projecting portion of a building is encountered in setting the ladder up.  
15 At the same time, to insert the rungs to their full thickness in the side supports would both impair greatly the strength of the latter, and also diminish the space for receiving the movable section. I have improved the construction at the same time avoiding the above defect, by letting the rungs into the supports on one side to their full thickness, moving the opposite rungs outward a distance to compensate for the change. This results in a perfectly flush surface on the side of the ladder that is to be turned in use toward the building, without lessening either the strength, or the space in which the movable section slides. In the patent referred to, a curved or U-shaped latch was pivoted near the upper end of the lower or relatively stationary section, into which any rung of the movable section dropped, and by which the movable section was sustained in its raised position. This  
45 latch presents some difficulties in manufacturing, on account of its shape, and moreover, is liable to catch the rungs of the movable section on its descent. I make the latch with straight instead of curved holding sides, and  
50 make the distance between the rung upon

which this latch rests and the one next below, less than the usual distance, by any amount equal to the thickness of the latch. This makes the spaces between all the rungs uniform when the ladder is extended. To the upper end of the movable section are pivoted two small rollers with sharp edges, which both serve to facilitate the extension of the ladder, and also by biting into the surface upon which it rests, diminish the danger of slipping sidewise. I also pivot to the lower section at its bottom, two dogs or holding devices, which can be pushed into the ground, and when not in use turned back so as not to catch the hands or clothing of the users.

The improvements will be better understood from the following detailed description, in which reference is made to the accompanying drawings, forming part of this specification.

In said drawings Figure I, is a front view of a portion of the ladder when extended. Fig. II is a vertical section thereof. Fig. III, is a cross-section on line III, and Figs. IV and V are detail views.

The lower section is composed of side supports or uprights A, and rungs *a, b* arranged in pairs, so as to form with said supports, a space of sufficient width to receive the upper or movable section. The rungs *a* are inserted in grooves in supports A, the grooves being of such depth that the surfaces of the rungs are flush with the edges of the supports. This side of the ladder is, in use, to be turned toward the building, and it will be seen that the rungs are clear of any obstruction which may be encountered in setting up the ladder. The opposite rungs *b*, on the other hand, project almost their entire thickness beyond the supports A. Thus the strength of the latter is not impaired by the arrangement of the rungs *a* as described nor is the space for the movable section diminished. The movable section is made in the usual way, of supports C and rungs *c*, and is raised, as heretofore by means of a cord *d* running over a pulley *e* in a slot in support A and attached to the lower end of the movable section. To protect this pulley a block E is attached to the outside of the support A. This also permits the use of

a larger pulley, and consequently less force is required to raise the movable section. When raised it is supported by one of its rungs which rests upon the pivoted holding latch *f*, which in turn rests upon the pair of rungs *b'*, which are the next to the top rungs of the lower section. This latch, as shown in Fig. III, has straight supporting sides. It follows that the rung *c*, which rests upon it is raised some-what above the level of rungs *b'*. To make the distance uniform, the rungs *b'* are set nearer to the rungs beneath and farther from those next above. Holding latch *f* is manipulated, as heretofore, by a rod *g*, extending down the side of the lower section.

In extending the upper section by means of the cord *d*, considerable resistance is encountered if the ladder be inclined against the side of a building. This is greatly diminished by the small anti-friction rollers *h* pivoted at the top of the section, (Fig. IV.) These rollers are on the inside of the supports *C*, and project a very slight distance beyond them, and the width of these supports being diminished at their ends, permits the rollers to project far enough to perform their office without interfering with the sliding of the upper section in the lower. These rollers are grooved to present edges sufficiently sharp to take a hold upon the surface against which the ladder rests, and prevent lateral slipping. As a further precaution against slipping two dogs or catches *k* (Fig. V) having a tooth or

point at the free end, are pivoted to the supports *A* near the bottom thereof. In use these dogs are turned so that their teeth engage in or against the surface upon which the ladder is placed, and tend to prevent slipping either laterally or in a direction away from the building. When not in use the dogs or catches are turned to the position indicated in dotted lines.

I claim as my invention—

In an extension ladder the combination of a section having rungs arranged in pairs attached to opposite sides of uprights or supports, a movable section adapted to slide in and out between the said rungs and uprights, and a holding latch pivoted to the lower section above and adjacent to one of the rungs of the lower section and comprising a frame with straight holding sides adapted to extend across to the opposite rung of the pair, and form a support for a rung of the upper section when extended, and which is turned up to a position parallel with the supports or sides of the ladder when the upper section is being lowered substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

ISAAC T. CROSS.

Witnesses:

FRED WENZEL,  
N. D. TERRILL.