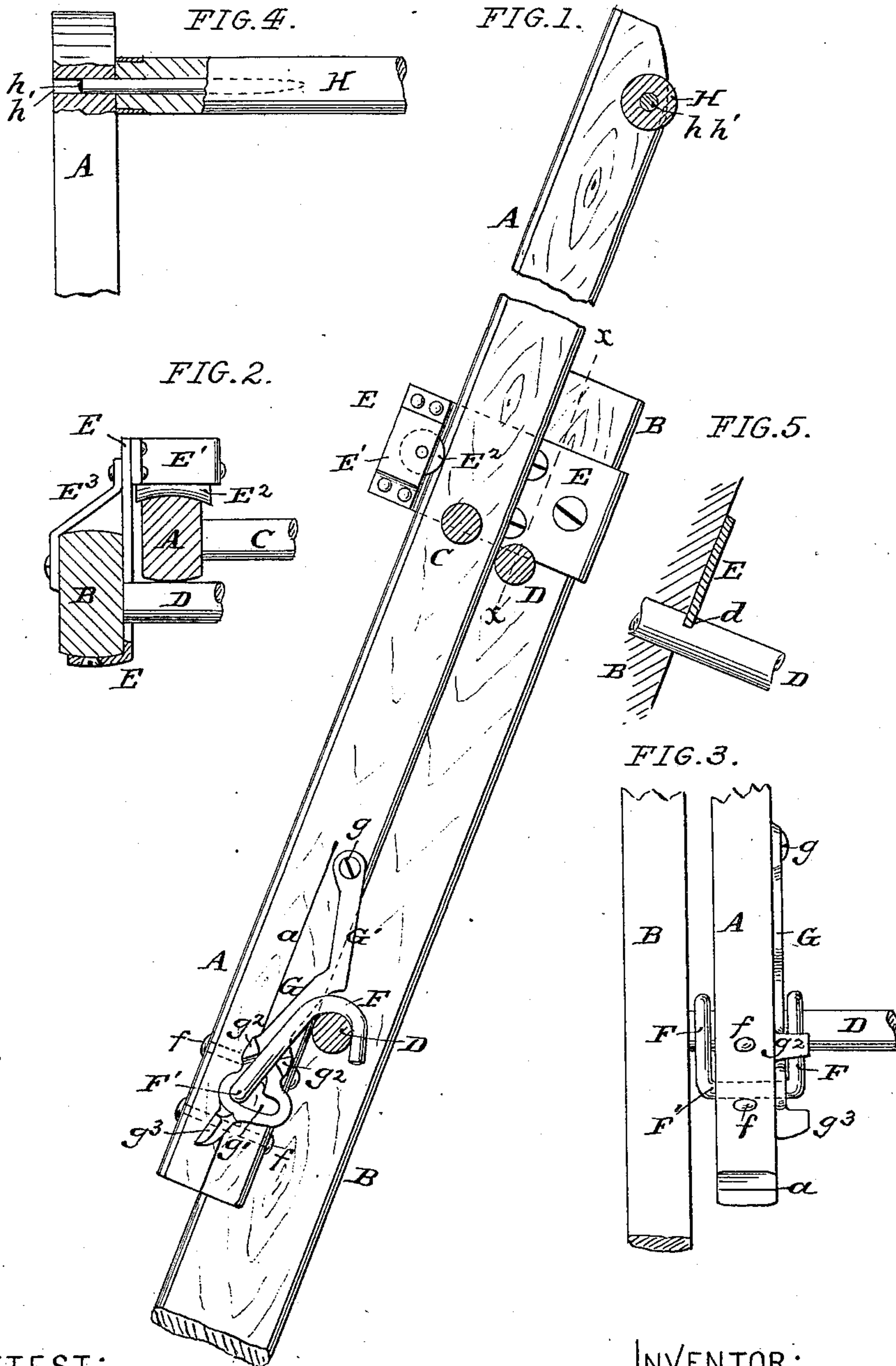


(No Model.)

V. HOLMQVIST.
EXTENSION LADDER.

No. 427,992.

Patented May 13, 1890.



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VICTOR HOLMQVIST, OF CHICAGO, ILLINOIS.

EXTENSION-LADDER.

SPECIFICATION forming part of Letters Patent No. 427,992, dated May 13, 1890.

Application filed December 12, 1889. Serial No. 333,523. (No model.)

To all whom it may concern:

Be it known that I, VICTOR HOLMQVIST, a subject of the King of Sweden and Norway, but having declared my intention of becoming a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Extension-Ladders, of which the following is a specification.

10 This invention relates to that type of extension-ladders in which a supplementary section is made vertically adjustable on a main or lower section, and is secured at the desired adjustment by holding-hooks upon 15 the one engaging the proper round of the other; and the present improvement has for its object to provide an improved construction for such type of ladders embodying the features of a cheap and durable means for 20 operating the holding-hooks of the upper ladder-section, a simple and effective manner of attaching such hooks in place, a strong and durable construction of roller-bracket at the top of the main ladder-section for guiding and 25 confining the movable ladder-section in its movement on the main ladder-section, and a frictionless bearing-surface at the top of the movable section, so that the movement of the same up the side of a wall, &c., in the adjustment of the ladder-sections, can be easily 30 and readily effected. I attain such object by the construction and arrangement of parts illustrated in the accompanying drawings, in which—

35 Figure 1 is a detail vertical section of an extension-ladder embodying my present invention; Fig. 2, a detail cross-section of the same, illustrating my improved form of roller-bearing; Fig. 3, a detail elevation illustrating 40 the arrangement of holder-hooks for the movable ladder-section; Fig. 4, an elevation, partly sectionized, of the upper end of the movable ladder-section, illustrating my improved construction of bearing-roller for the 45 ladder-top; and Fig. 5, a detail section at line *x x*, Fig. 1.

Similar letters of reference indicate like parts in the several views.

50 Referring to the drawings, the ladder consists of an upper and lower section composed of side bars or stiles A B, connected together in the usual manner by cross-rods or rounds

C D, the side bars or stiles A of the upper section being arranged to slide upon the rounds of the lower ladder-section, as shown, 55 and are held in contact with the same by means of roller-brackets E, secured to the upper ends of the side bars or stiles B of the lower ladder-section. In the present invention this roller-bracket consists of a plate E, bent at 60 one end to embrace the under edge of the stile and at its other end having a laterally-projecting stirrup or U-shaped plate E', riveted in place and extending parallel with the stile to form a housing for the anti-friction roller 65 E², the pivot-pin of which passes through said stirrup and the upper end of the plate E, as illustrated in Figs. 1 and 2. The bracket-plate E is screwed to the inside face of its stile B, as shown, and its portion projecting 70 above the stile is strengthened by an inclined brace-plate E³, extending to the outside of the stile, as illustrated in Fig. 2. In the present invention the bracket-plate E is also utilized to tie the top of the lower ladder-section together by being set in a saw-cut or gain *d* 75 near each end of the top round D, as shown in Figs. 1 and 5.

The holding-hook for the movable ladder-section consists of counterpart hooks F F, 80 united together by a cross rod or stem F', which passes through the stile A, to form a journal or pivot for the hooks, the hooks F and the uniting-rod F' being formed integrally by bending a rod of iron into the re- 85 quired shape. In the present invention the holder-hooks F are inserted into place in the lower ends of the stiles A in the following manner: A longitudinal saw-slit *a* is first made in the lower end of the stile. The parts 90 are then pressed together and a cross orifice or hole for the pivot-rod F' is then bored, after which the parts are sprung apart for the introduction into place of the holder-hook, after which the parts are brought together 95 and secured by cross rivets or screws *f*, as clearly illustrated in Figs. 1 and 3.

To attain an easy and convenient manipulation of the holder-hooks F, I employ the following improved construction: G is a lever 100 pivoted at *g* to the inside of the stile and extending along the same, its lower end being slotted, so as to engage around the cross-rod F' of the holder-hooks; and such slot *g'* is of

an elongated form so as to admit of the proper movement of the lower end of the lever G on such cross-rod. A short distance above the slot g' are lugs g^2 on the side of the lever G, between which the shank of the holder-hook is received, so that a movement of said lever will impart a movement in a reverse direction to the hooks, and by this means, owing to the ready accessibility to the lower end g^3 of the lever of the thumb of the operator, the ready operation of the holder-hook is easily effected. In the upward movement of the ladder-section the movement of the holder-hooks will be automatic, the lever G being provided with an inclined portion G' , which rides over the rounds of the lower ladder-section to move the hooks up out of the path of the same. At top the movable section is provided with a bearing-roller II, extending the width of the ladder, and provided with journal-pins h , that turn in orifices h' in the upper ends of the stiles A, as shown, the corners of the stiles being beveled off, as shown in Fig. 1, to admit of the proper action of the bearing-roll II at all times.

By the above provision of the bearing-roller extending the width of the ladder the following advantages are attained over the ordinary roller arranged in or at the sides of the ladder-stiles: first, it furnishes perfect means for adjusting the ladder up the side of a post or column or the corner of a wall; second, it affords wide bearing-surface, so as not to be affected by irregular depressions, &c., in the wall, &c., upon which an adjustment is effected.

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

1. The combination, with the stationary and movable sections of an extension-ladder, of the roller-bracket plate E, secured to the inside of the stile B, the laterally-projecting U-shaped or stirrup plate E' , secured to the plate E, and roller E^2 , journaled in the same, as described, and for the purpose set forth.

2. The combination, with the stationary

and movable sections of an extension-ladder, of the roller-bracket plate E, secured to the inside of the stile B, the laterally-projecting U-shaped or stirrup plate E' , secured to the plate E, the roller E^2 , journaled in the same, and the inclined brace-plate E^3 , secured to the plate E and extending to the outside of the stile, as and for the purpose set forth.

3. The combination, with the stationary and movable sections of an extension-ladder, of the bracket-plate E, secured to the inside of the stile B and engaging in a gain d in the top round of the lower ladder-section, as described, and for the purpose set forth.

4. The combination, with the stationary and movable sections of an extension-ladder, of the double holder-hooks F, journaled in the stile A, and the pivoted lever G, formed with lugs g^2 , and a transverse elongated slot g' , as described, and for the purpose set forth.

5. The combination, with the stationary and movable sections of an extension-ladder, of the double holder-hooks F, journaled in the stile A, and the pivoted lever G, formed with an inclined portion G' , counterpart lugs g^2 , and transversely-extending elongated slot g' , as described, and for the purpose set forth.

6. In an extension-ladder, the combination of the holder-hooks F F, formed double and connected together by a cross rod or stem F' , with the stile A, formed with a longitudinal slit a , a pivot-hole for the rod or stem F' , and the confining screws or rivets f , as described, and for the purpose set forth.

7. The combination, in an extension-ladder, of the movable ladder-section having the upper ends of its stiles beveled off, with the bearing-roller II, journaled in said upper ends and extending the width of the ladder-section, as described, and for the purpose set forth.

In testimony whereof witness my hand this 7th day of December, 1889.

VICTOR HOLMQVIST.

In presence of—

ROBERT BURNS,
GEO. H. ARTHUR.