No. 864,194. PATENTED AUG. 27, 1907.

L. P. REIMANN.

EXTENSION LADDER.

APPLICATION FILED MAY 11, 1907.

2 SHEETS—SHEET 1.

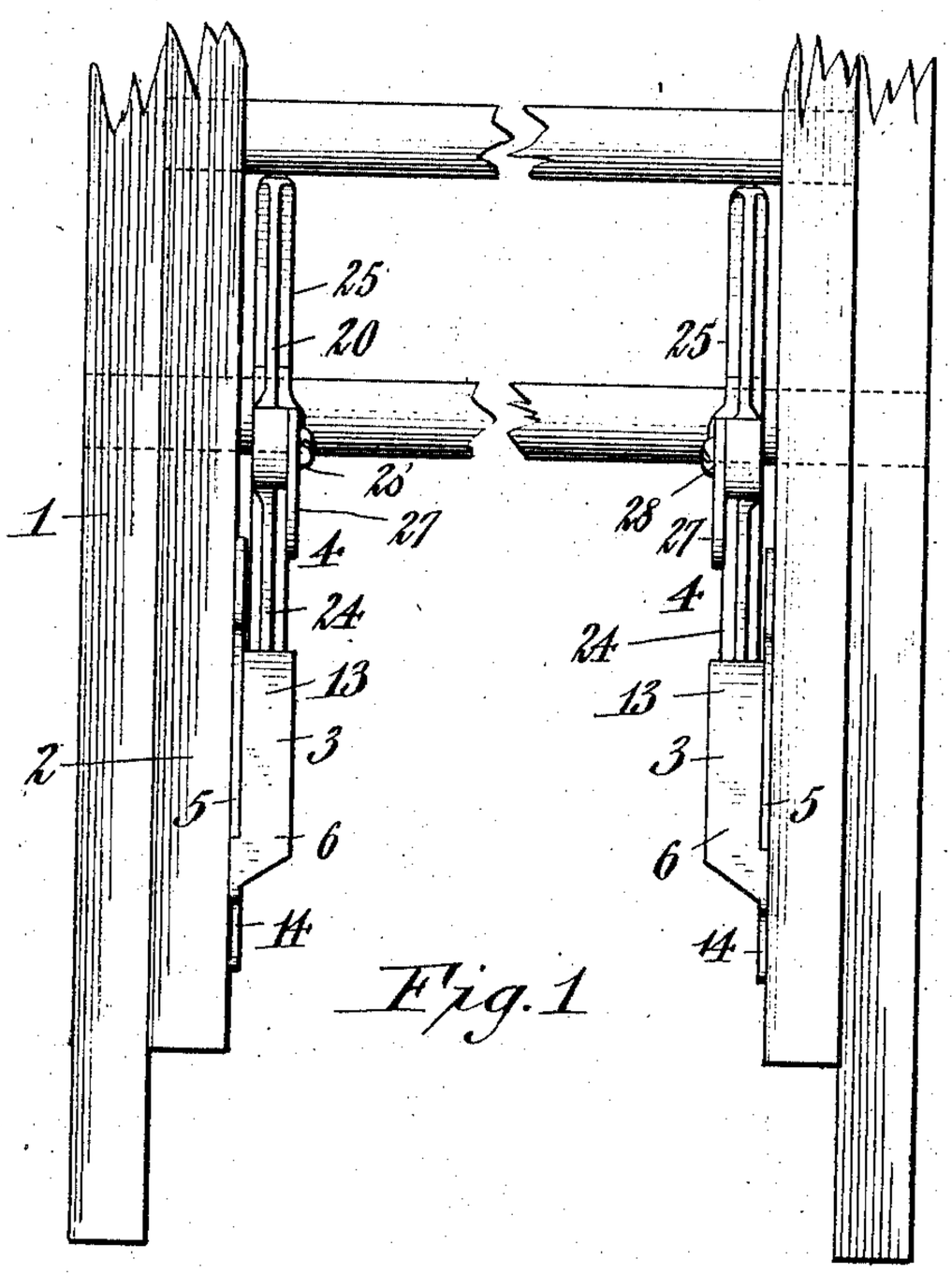


Fig. 1

Fig. 2.

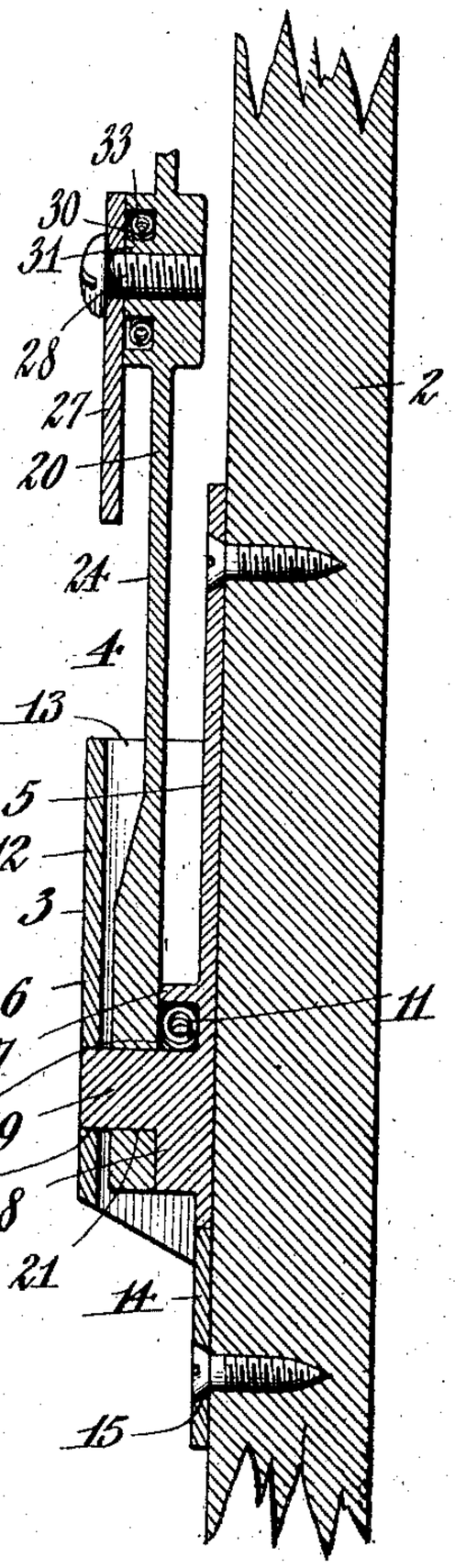
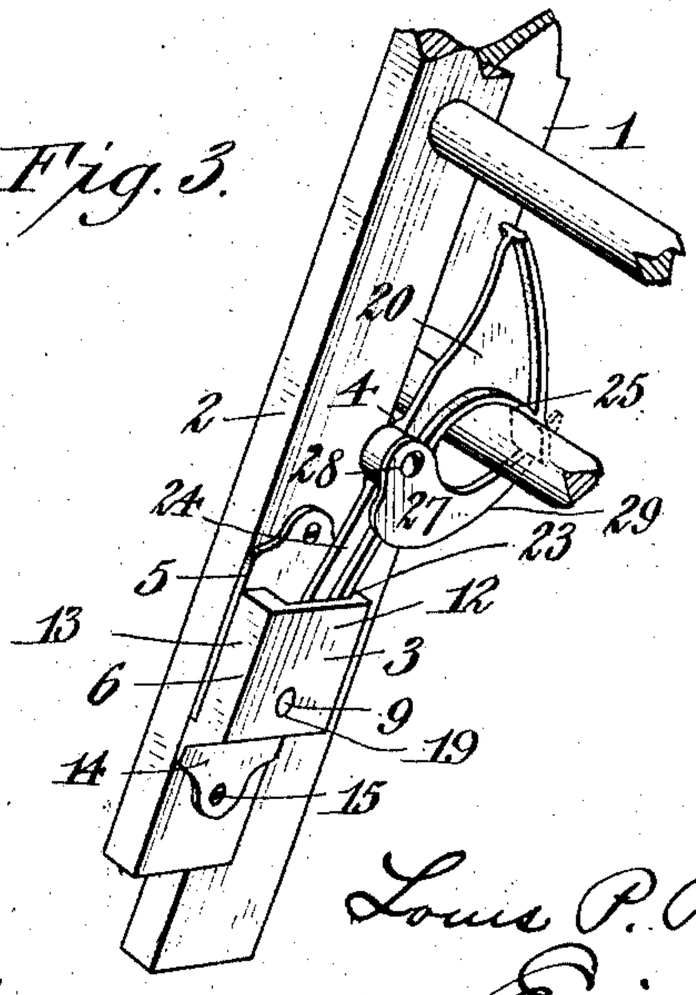


Fig. 3.



Witnesses:
Christ Feinde.
Harry D. Rapp.

Louis P. Reimann, Inventor.
By Emil Neukark
Attorney.

No. 864,194. PATENTED AUG. 27, 1907.

L. P. REIMANN.

EXTENSION LADDER.

APPLICATION FILED MAY 11, 1907.

2 SHEETS—SHEET 2.

Fig. 4.

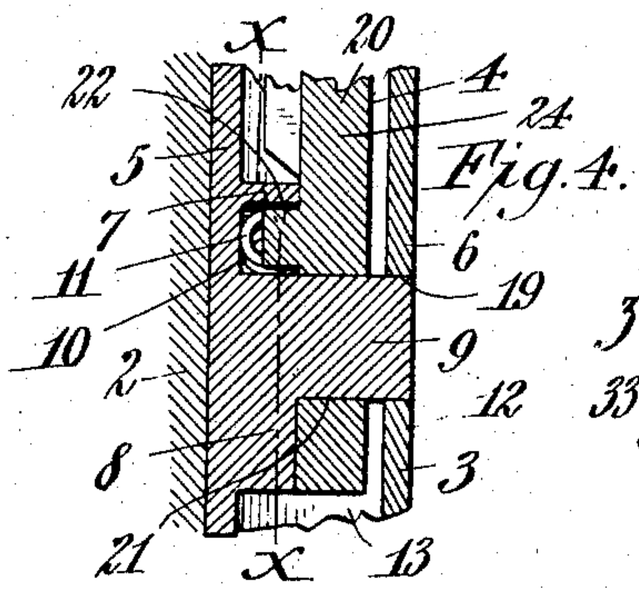


Fig. 6.

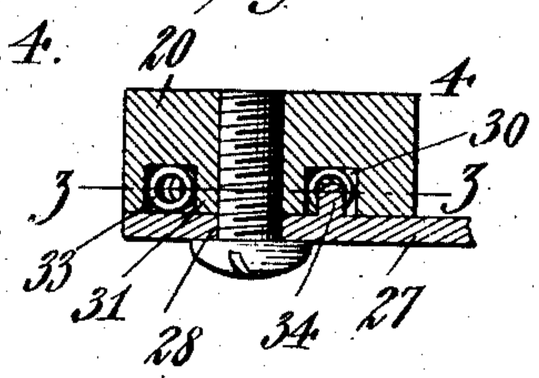


Fig. 7.

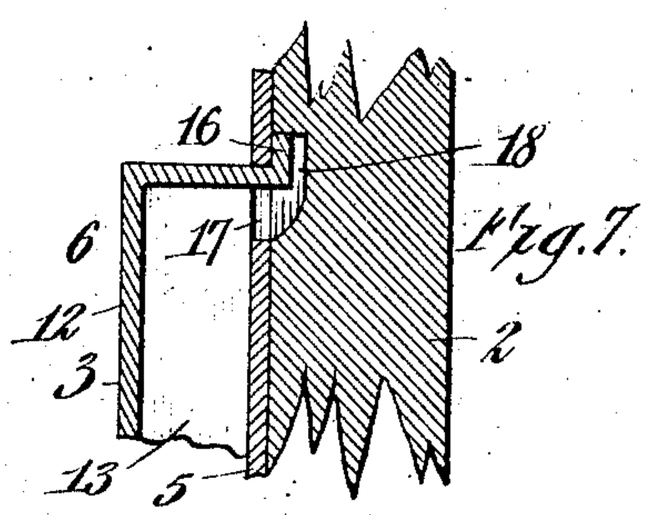


Fig. 5

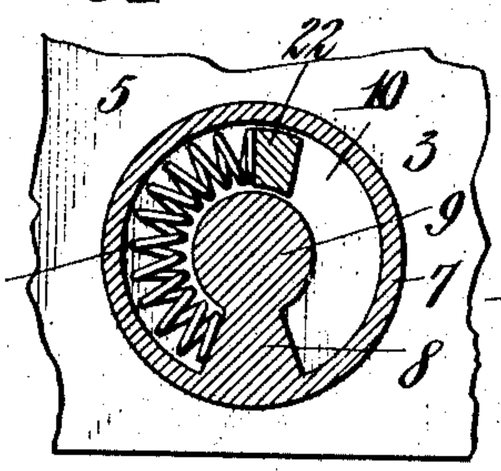


Fig. 8.

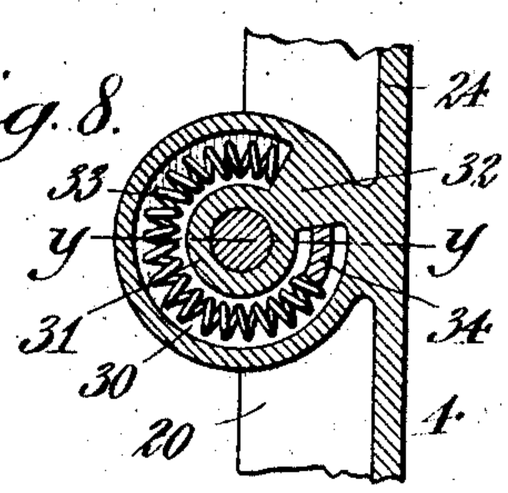


Fig. 9.

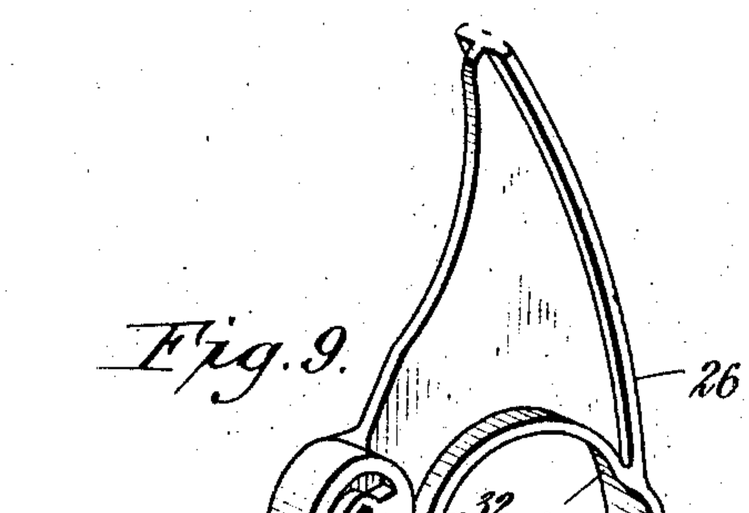


Fig. 10.

Fig 11.

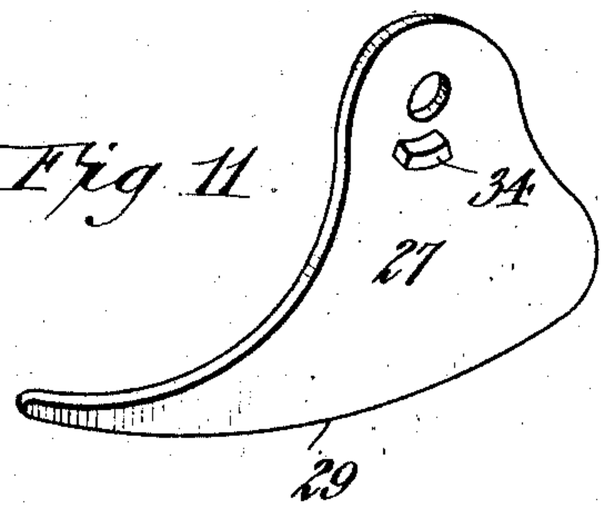
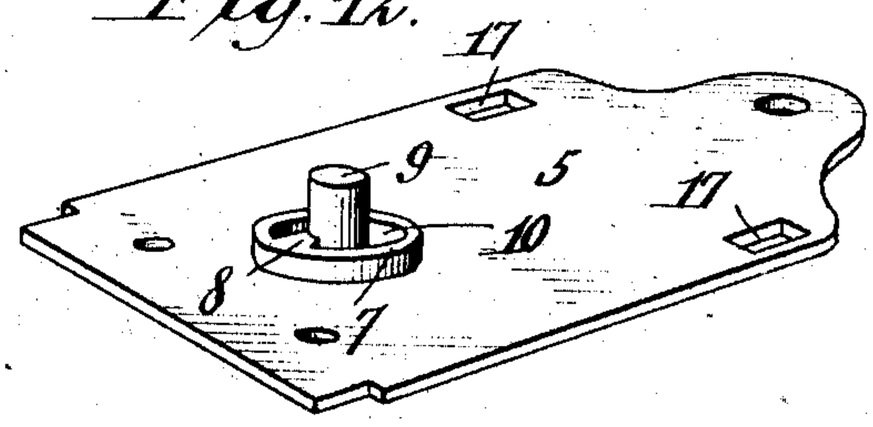


Fig. 12.



Louis P. Reimann, Inventor.

By Emil Neukart,

Attorney.

Christ Feinle
Harry D. Rapp, } Witnesses:

UNITED STATES PATENT OFFICE.

LOUIS P. REIMANN, OF BUFFALO, NEW YORK.

EXTENSION-LADDER.

No. 864,194. Specification of Letters Patent. Patented Aug. 27, 1907.

Application filed May 11, 1907. Serial No. 373,191.

To all whom it may concern:

Be it known that I, LOUIS P. REIMANN, a citizen of the United States, and a resident of Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Extension-Ladders, of which the following is a specification.

My invention relates to improvements in extension ladders, and more particularly to extension-ladder hooks whereby the slidable section of the ladder is retained in an extended position with reference to the stationary section thereof.

The objects of this invention are, the production of a simple, durable and inexpensive ladder-hook which will positively engage any desired rung of the stationary section and retain the slidable section of the ladder in extended position to any degree desired; to provide improved means for maintaining the outer end of the rider or dog in contact with the free end of the suspension-hook; to provide improved means for maintaining the free end of the suspension-hook in line with the rungs of the stationary section of the ladder; and to otherwise improve on extension-ladder hooks so that the several parts may act freely, and whereby a durable ladder is produced which can be conveniently and easily adjusted to any height within certain limits.

The invention consists in the construction, arrangement, and combination of parts to be hereinafter described and particularly pointed out in the appended claims.

In the accompanying drawings, in which, similar numerals of reference refer to similar parts,—Figure 1 is a front elevation of parts of the ladder sections and the ladder-hooks on the slidable section. Fig. 2 is an enlarged longitudinal section through one of the ladder-hooks and the rail to which it is secured. Fig. 3 is a perspective view of a portion of each ladder section and one of the ladder-hooks on the slidable section engaging a rung on the stationary section. Fig. 4 is a vertical section through the retainer-housing and the lower end of the suspension-hook, showing the latter engaging the end of the expansion-spring. Fig. 5 is a transverse vertical section on line *x*—*x*, Fig. 4. Fig. 6 is a transverse section taken on line *y*—*y*, Fig. 8. Fig. 7 is a vertical section through the upper portion of the retainer-housing and the rail to which it is secured, showing the manner of detachably connecting the cover to the back-plate thereof. Fig. 8 is a vertical transverse section through the suspension-hook taken on line *z*—*z*, Fig. 6. Fig. 9 is a detached perspective view of the suspension-hook. Fig. 10 is a face view of the lower end of the hook, showing the face opposite that shown in Fig. 9. Fig. 11 is a detached perspective view of the rider or dog. Fig. 12 is a detached perspective view of the back plate of the housing.

The ladder comprises two sections, one being the stationary or lower section 1, and the other the slidable or upper section 2 adapted to be elevated on the stationary section for adjusting the ladder to any height desired within certain limits. The sections may be held together in any ordinary or approved manner. Secured to the side-rails of the slidable sections are metallic retainer-housings 3 in which the lower ends of ladder hooks 4 are pivotally secured. Each of said housings comprise two parts,—one a back-plate 5 secured to the inner face of a side rail, and the other a cover 6. Each back plate has a circular flange 7 cast integrally therewith, a stud 8 whose axis is coincident with that of said flange and whose outer end extends beyond the edge of the latter, and a web 9 connecting the stud with said flange and serving as an abutment, as will presently appear. In this manner, a parti-circular or segmental pocket 10 is formed between said stud and flange, in which is located a spiral spring 11 abutting with one end against the said abutment.

The cover of the retainer-housing comprises a front wall 12 and side walls 13 which bear with their inner edges against the back-plate, and a tail-piece 14 in a plane beyond the inner edges of the side walls, so that when the cover is applied, the said tail-piece bears against the inner side of the rail to which the housing is applied. Said tail-piece is therefore in line with the back-plate and has a screw-hole 15 through which is passed a screw that enters the side rail and securely fastens the lower end of the cover. The upper end of each cover is secured by means of hooks 16 that protrude from the inner edges of the side-walls thereof at their upper ends, and said hooks are passed through apertures 17 in the back plate and enter sockets 18 in the side rail formed by gouging out the latter in rear of the apertures in said plate; said sockets being extended upward on the rails a short distance above said apertures, so that the outer extremities of the hooks may engage the plate directly above the apertures therein. Each cover is also provided with an aperture 19, arranged at a point to receive the outer end of the stud 9 of the coöperating back-plate, so that the studs, which sustain the weight of the slidable section of the ladder, are held against distortion or breakage.

The suspension-hooks are designated by the numeral 20, each having an aperture 21 at its inner end into which fits the stud of the coöperating back-plate and a lug 22 on its inner side which enters the segmental pocket in said back plate, between which lug and the abutment 8, the spiral spring 11 is interposed. By means of these springs, the outer or upper ends of the suspension-hooks are maintained in a position to contact with the rungs of the stationary section of the ladder when the slidable section is being elevated, and the inner edges of said hooks strike against the upper

ends of the inner side walls, as shown at 23, Fig. 3. In this manner, the extent to which the hooks are forced inward by the springs 11 is limited. Each suspension hook comprises a shank 24, a hook portion 25 opening downward, and a cam-face 26 inclined upwardly and forwardly from the outer end of said hook-portion. By reason of the shank 24 of the hooks bearing against the inner side walls of the housings, the cam-faces are positioned to engage the rungs of the stationary section of the ladder when the slidable section is being elevated and thus cause forward deflection of the hooks against the actions of the springs 11.

In order that the slidable section of the ladder may be lowered without the suspension-hooks thereon engaging the rungs of the stationary section, each hook has a rider or dog 27 pivotally attached thereto between its hook-portion and its pivotal point, as at 28. The outer or free ends of these riders or dogs extend upward beyond the lower ends of the cam faces on the hooks, so that when the slidable section of the ladder is being elevated, they are engaged by the rungs of the stationary section to permit the hooks to be engaged with any desired rung of the last named section, in a manner common to ladders of this type; and upon lowering the slidable section on the stationary section, the outer curved edges 29 of said riders or dogs serve to deflect the hooks so as to pass over the rungs without engaging them.

At the points of connection of the riders or dogs with the shanks of the suspension-hooks, I increase the thickness of the shanks, and in each form a parti-circular or segmental pocket or depression 30, a boss 31 arranged centrally in said pocket or depression and connected with the outer defining walls of the pocket or depression by a web 32 which serves as an abutment for one end of a spiral spring 33 situated in said pocket and having its other end engaged by a lug 34 extending into said pocket from the inner side of the coöperating rider or dog. The springs in the depressions of both hooks act against the lugs 34 of the dogs to hold the outer free ends of the latter in contact with the ends of the hook-portions of the suspension-hooks, and upon the said dogs being depressed when the ends thereof engage a rung of the stationary ladder, said springs yield and recover themselves as soon as the dogs clear said rung, thereby forcing the ends of the dogs in contact with the hooks to be engaged by the next rung.

The operation of ladders of this type is apparent to any one skilled in the art, and the operation and purpose of my improvements are clear from the foregoing description.

Having thus described my invention, what I claim is,—

1. In an extension ladder, the combination with a stationary section and a slidable section, of means for supporting said slidable section in an extended position on the stationary section comprising suspension-hooks, and retainer-housings in which said hooks are pivotally secured, said housings consisting of apertured plates secured to the rails of the slidable section, covers having each a hook at one end which extend through the aperture of the coöperating plate and engage behind the latter, and means for securing the opposite ends of the covers to said rails.

2. A device of the kind described comprising a plate adapted to be secured to a rail of a ladder and having a segmental pocket, a stud arranged axially with reference to said pocket, a suspension-hook pivotally held on said stud and having a lug extending into said pocket, and a spiral spring within said pocket between one end thereof and the lug on said hook.

3. A device of the kind described comprising a housing consisting of a plate adapted to be secured to a rail of a ladder and having a stud projecting therefrom and an abutment adjacent said stud, and a cover having an opening to receive the end of said stud, a suspension-hook pivotally held to said cover and having its free end projecting from said housing, said hook having also a lug in a plane with the abutment on said plate, and a spiral spring curved around said stud and abutting with opposite ends against said abutment and lug, respectively.

4. A device of the kind described comprising a suspension-hook adapted to be pivotally secured at one end to a rail of a ladder and having a hook portion at its other end and a segmental pocket at a point between its pivoted end and said hook-portion, a dog pivotally secured to said hook and having its pivotal point coincident with the axis of said pocket and a lug thereon extending into said pocket, and a spiral spring within said pocket abutting with opposite ends against one end of said pocket and the said lug, respectively.

5. A device of the kind described comprising a plate adapted to be secured to a rail of a ladder and having a circular flange, a stud surrounded by said flange and extending beyond the edge of the latter, a web connecting said stud and flange, a cover having an opening receiving the end of said stud, a suspension hook on said stud between said cover and the edge of said flange and having a lug extending into the space between said flange and stud, and a spiral spring in said space between said lug and the said web.

In testimony whereof, I have affixed my signature in the presence of two subscribing witnesses.

LOUIS P. REIMANN.

Witnesses:
EMIL NEUHART,
ELLA C. PLUECKHAHN.