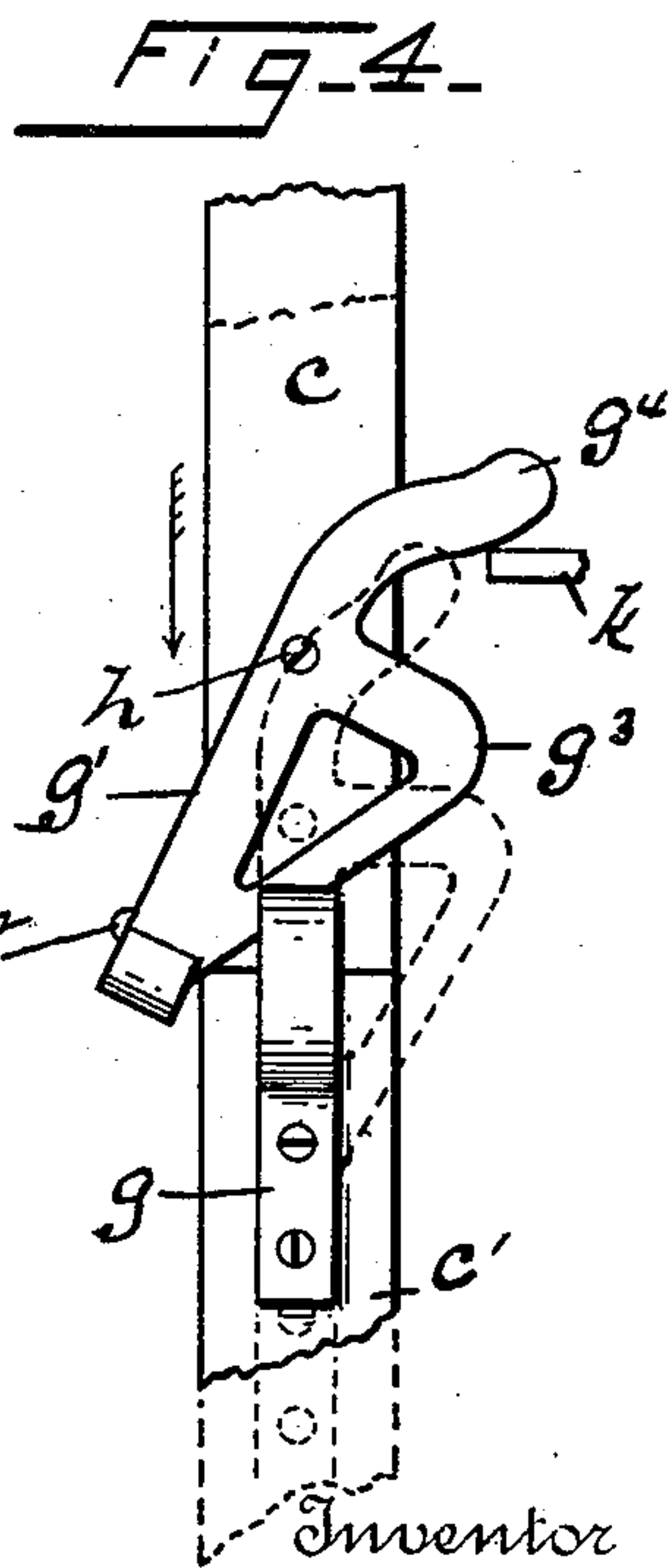
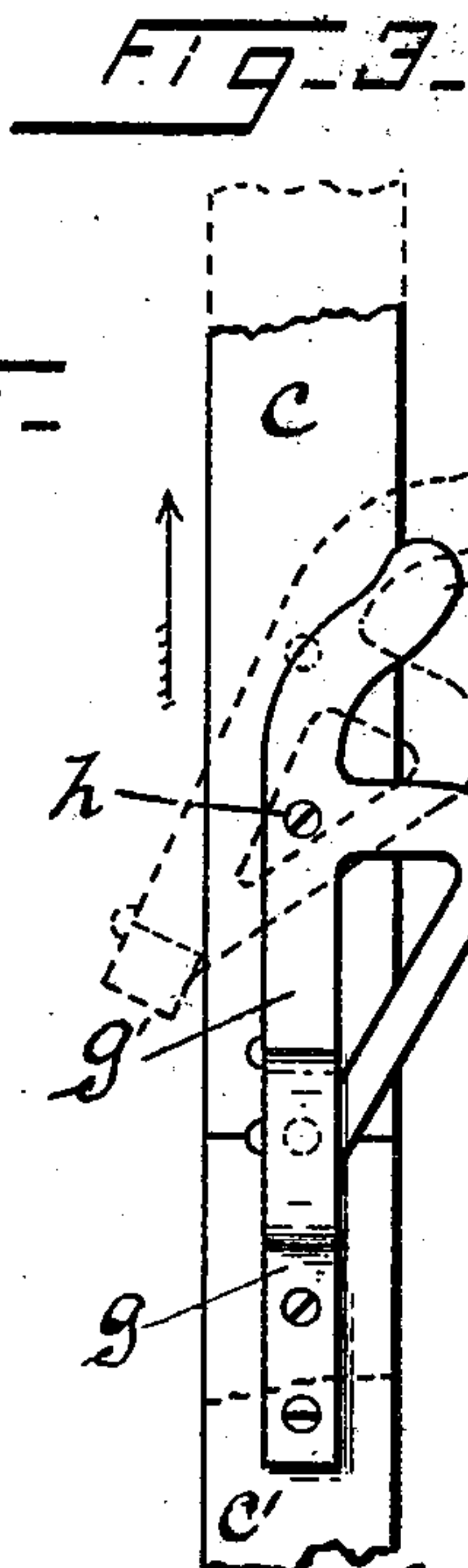
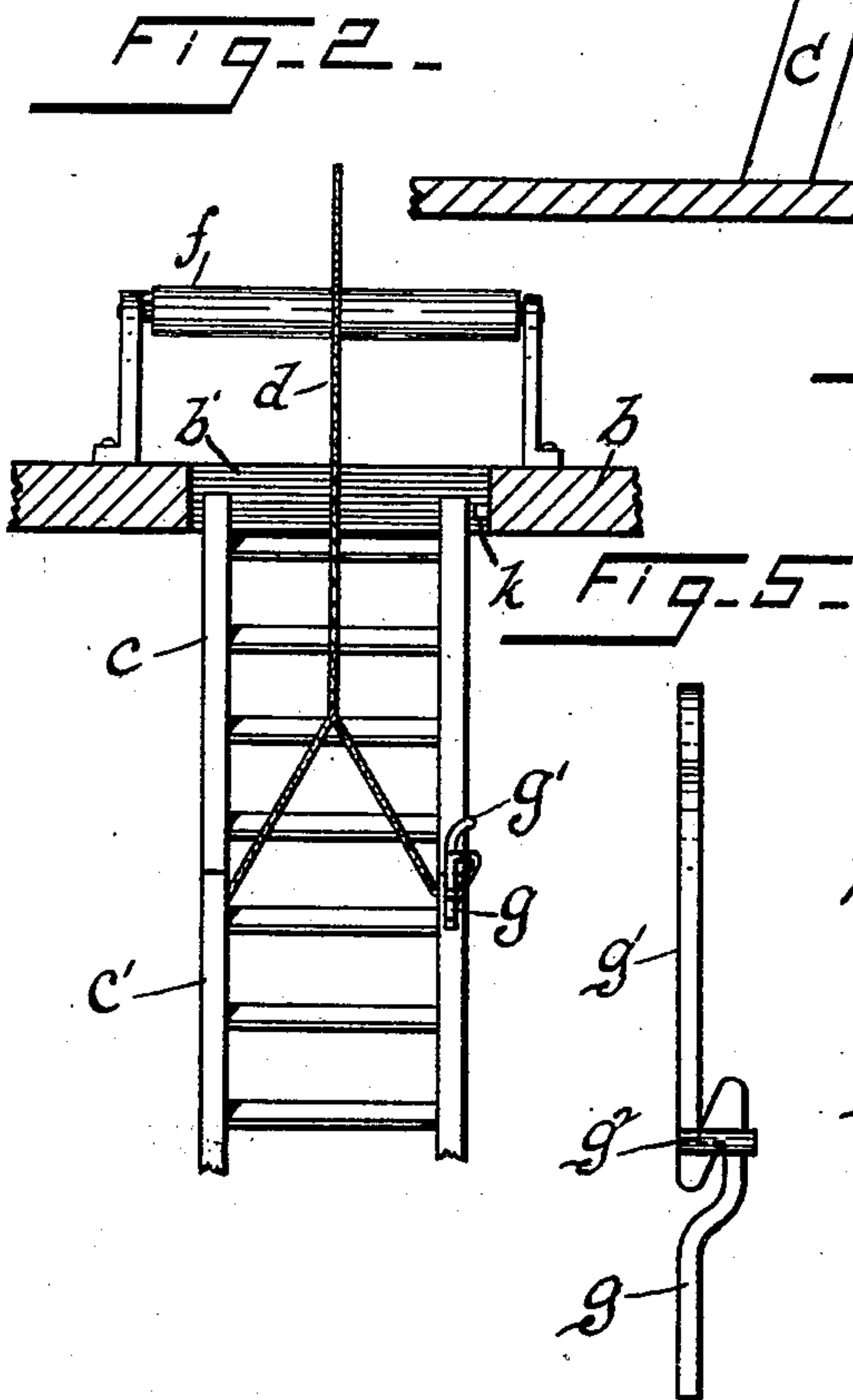
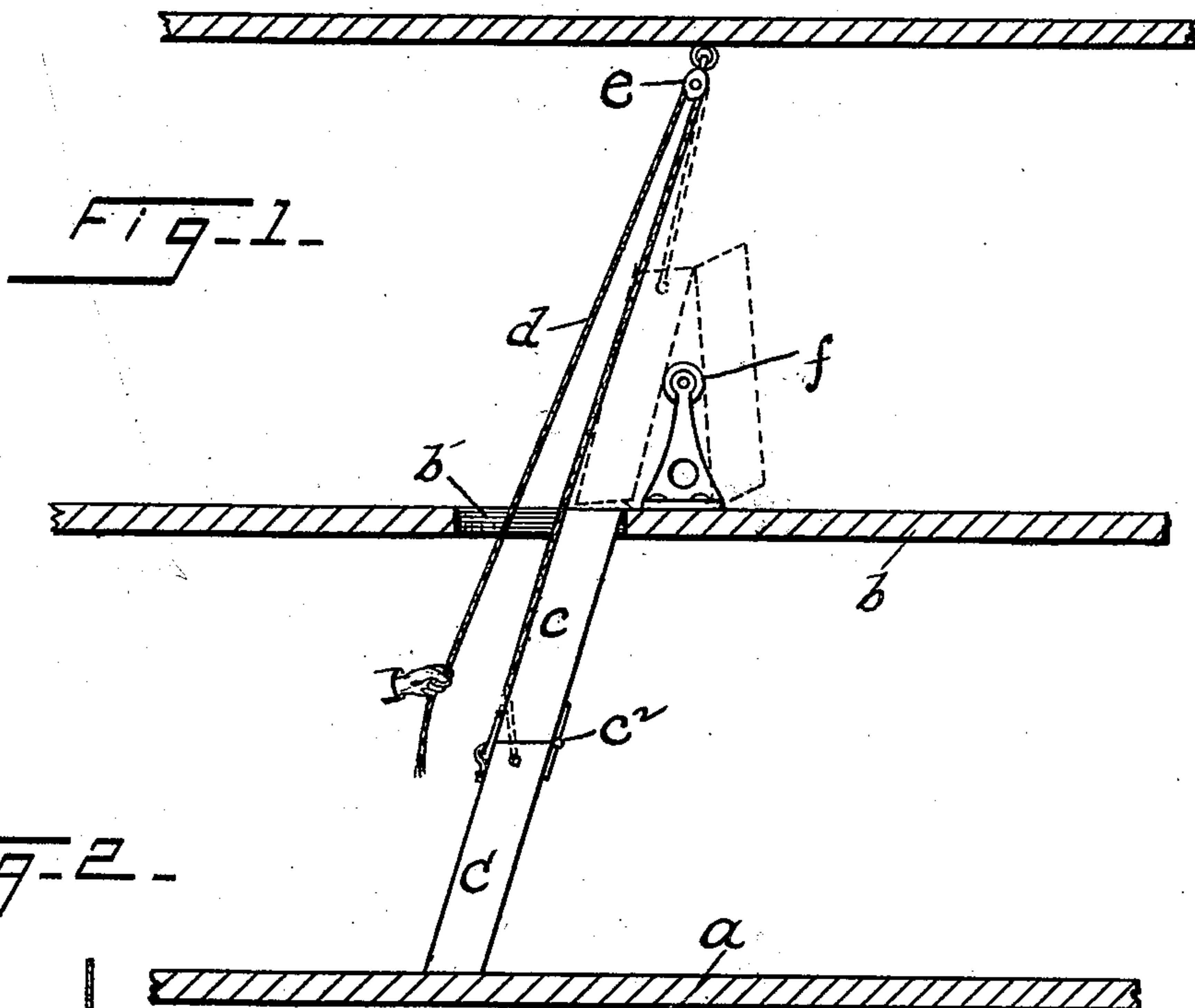


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SCUTTLE LADDER.

No. 512,322.

Patented Jan. 9, 1894.



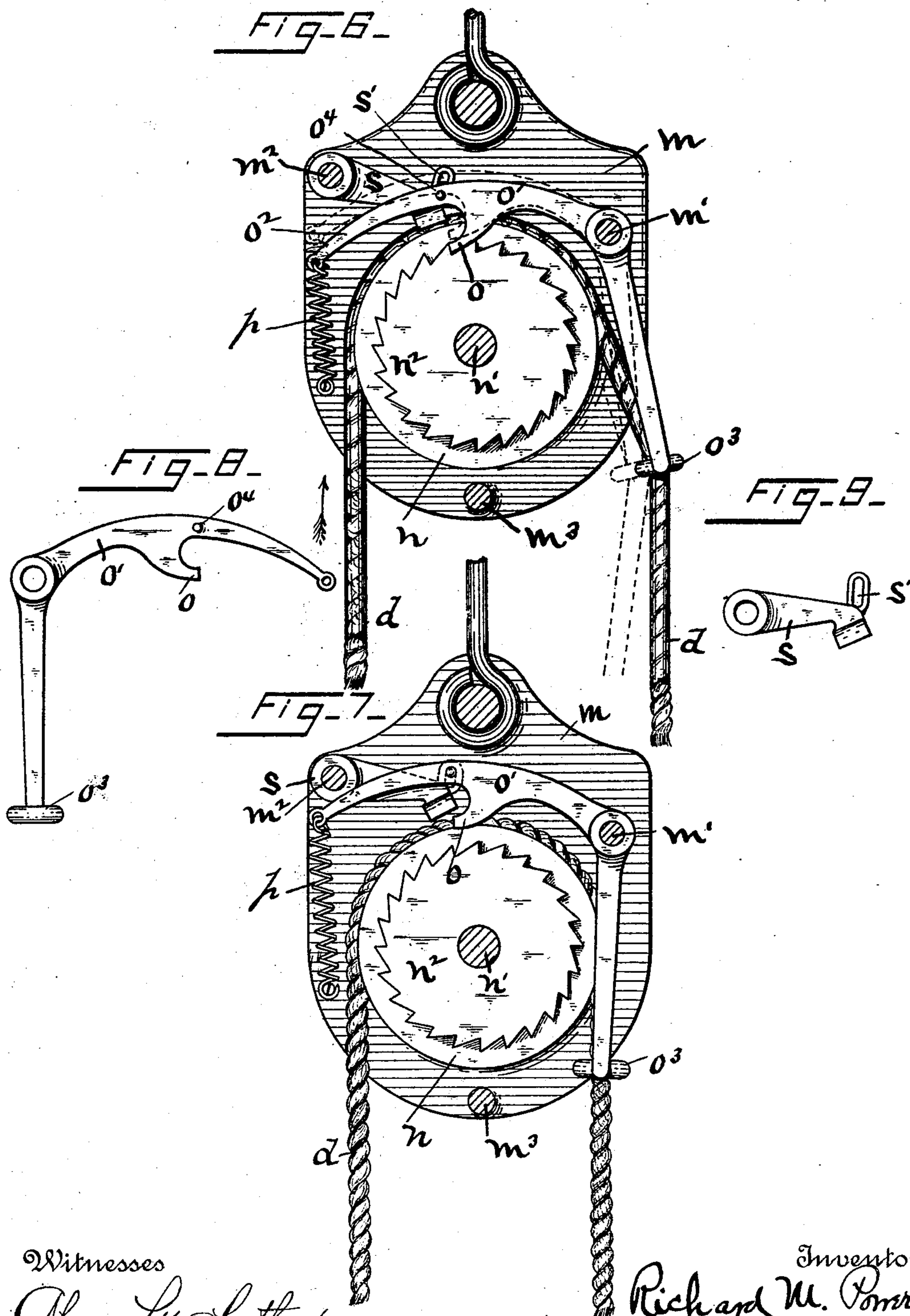
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# UNITED STATES PATENT OFFICE.

RICHARD M. POWERS, OF NORWICH, CONNECTICUT.

## SCUTTLE-LADDER.

SPECIFICATION forming part of Letters Patent No. 512,322, dated January 9, 1894.

Application filed April 24, 1893. Serial No. 471,541. (No model.)

*To all whom it may concern:*

Be it known that I, RICHARD M. POWERS, a citizen of the United States, residing at Norwich, in the county of New London and State of Connecticut, have invented certain new and useful Improvements in Scuttle-Ladders, which improvements are fully set forth and described in the following specification, reference being had to the accompanying two  
10 sheets of drawings.

On the 2d day of June, 1891, Letters Patent No. 453,294 were issued to me for certain improvements in ladders especially adapted for use with scuttles in houses having low attics, the ladders being counter-balanced by weights  
15 in such manner that they may be readily pushed upward through the scuttle, into the attic, and stored there when not required for use. In one form of my invention, therein illustrated and described, the ladder is made of two parts hinged together in such manner that when the ladder is passed upward through the scuttle it doubles upon itself and may thus be stowed away in much less space than  
25 a ladder of the same length with solid sides.

My present invention has for its object to provide a substitute for the heavy weights required in my said earlier patent and also to provide a locking device by means of which  
30 the two sections of the ladder are securely fastened together when in use and become practically an ordinary ladder.

My present improvements are clearly shown in the annexed drawings, Figure 1 being a  
35 side view of the two-part ladder embodying a portion of my invention, and also showing properly connected with said ladder a pulley-block of peculiar construction which is substituted for the weight of my earlier form. Fig. 2 is a front view of the hinged portions  
40 of the ladder showing, in section, the floor and scuttle-hole. Figs. 3 and 4 illustrate, considerably enlarged, those portions of the ladder adjacent to the hinge, having attached thereto the locking device which forms a particular feature of my present invention. In  
45 Fig. 3 the ladder is shown, as in the act of passing upward through the scuttle hole, the movable locking section being shown as just

about to engage a stud *k* secured within the  
50 scuttle by means of which the locking parts are disengaged to allow the ladder to double upon itself after passing upward. In Fig. 4 the ladder is shown as passing downward through the scuttle, the tail of the movable  
55 locking section being shown as just about to engage said stud to swing said section into its normal (closed) position. Fig. 5 is an edge view of said locking parts looking toward the left hand side of Fig. 3. Figs. 6 and  
60 7 are enlarged views of my improved pulley-block, with the front case removed, and Figs. 8 and 9 are detached views of two levers that form elementary features of said pulley  
65 block.

In these drawings the letters *a* and *b* indicate two floors of a dwelling, the latter named floor having a scuttle hole *b'* through which access is had to the attic above.

*c-c'* indicate the two sections of my improved ladder, hinged at *c*<sup>2</sup> and adapted to fold as seen in dotted lines in Fig. 1.

Secured to the upper end of ladder section *c'* is a rope or cable *d* which passes upward, through a pulley block *e* secured to a rafter, or  
75 other suitable rigid part of the roof and thence downward to a point below the scuttle opening where it may be easily grasped by a person standing upon floor *a*. When the free end of said rope is grasped, and drawn down-  
80 ward, the ladder is drawn upward, through the scuttle hole *b'* and so soon as the hinges of the ladder pass through said hole, the upper section *c* folds back as shown in dotted lines.  
85

I find in practice that, when the two-part ladder is simply hinged, but not otherwise fastened, the upper section *c* (by reason of its weight, and also because of the fact that the ladder stands inclined against the side of  
90 the scuttle), begins to break over before the lower section is carried upward far enough to enter the scuttle-hole and, in consequence, the lower section is crowded forcibly to the opposite side of the hole and, unless carefully  
95 guided, catches under the casing of the scuttle. To avoid this result I have now provided a simple locking device, shown in Figs. 1 to 5, by



means of which the two ladder sections are held in alignment with each other until the lower section enters the scuttle hole. Said locking devices are then disengaged and the upper ladder section  $c$  is permitted to fold over, as above stated. These locking devices consist of two metallic pieces  $g-g'$ , the former being fixedly secured to the edge of the lower ladder section, opposite the hinge  $c^2$ , and provided with a hook-shaped upper end that slightly overlaps the end of the upper ladder section. The companion locking piece  $g'$  is pivotally secured to the upper ladder section, by a screw  $h$  and its lower end is formed with a hood that may swing under, and interlock with, the hook of the fixed piece  $g$ . When the parts thus swing together a lug  $g^2$  on piece  $g'$  serves as a stop to prevent the hook of said piece  $g'$  from swinging too far. One edge of piece  $g'$  is formed with two cam surfaces  $g^3$  and  $g^4$  that extend laterally beyond the side of the ladder and which may engage, and be moved by, a stud  $k$  secured to the casing of the scuttle hole when the ladder is drawn up through said scuttle. The office of the stud  $k$  is to unlock the pieces  $g-g'$ , as the ladder is drawn upward, and lock them together again as the ladder is drawn downward for use. It will be noticed that the lower cam  $g^3$  projects laterally, beyond the upper cam  $g^4$  when the pieces  $g-g'$  are locked together as seen in Fig. 3, in full lines. When the ladder moves upward cam  $g^4$  passes stud  $k$ , without touching it, but cam  $g^3$ , being longer, is met, and checked, by said stud and, as a result, piece  $g'$  is rocked on its pivot into the position shown in full lines in Fig. 4, thus disengaging the hooked ends of the locking pieces and permitting the ladder to fold back, as in dotted lines in Fig. 1. When the ladder is drawn downward through the scuttle, the cam  $g^4$  engages stud  $k$  (see Fig. 4), just at the time or slightly after the two ladder sections are brought into alignment, and the piece  $g'$  is thus swung back to its normal position and the hooked ends are again interlocked. The described locking and unlocking operations are automatically performed as the ladder passes upward and downward through the scuttle-hole.

During the operations of raising and lowering the ladder the operator grasps one of the lower steps or rungs to steady and guide the ladder as it passes through the scuttle.

In Figs. 6 and 7 I have illustrated the pulley-block which, in combination with my described ladder improvements, forms an important feature of my invention. The operative parts of said block are supported in a housing formed of front and rear plates  $m$  connected by rivets  $m'$ ,  $m^2$  and  $m^3$ , the front plate being removed in said Figs. 6 and 7 to expose the interior parts.  $n$  denotes a scored pulley, or sheave, journaled upon an axial shaft  $n'$  and having secured to its side a ratchet disk  $n^2$  whose teeth are engaged by a

pawl  $o$  forming a part of a lever  $o'$  fulcrumed on the rivet  $m'$ . The arm of lever  $o'$  that bears the pawl is extended as at  $o^2$  and connected to one end of a spring  $p$  whose other end is secured to the plate  $m$  in such manner that the spring seeks constantly to hold the pawl  $o$  in locking engagement with the teeth of disk  $n^2$ . The opposite end of the lever  $o'$  is formed with an eye  $o^3$  which, when the pawl is in mesh with the ratchet teeth, is set to one side of vertical alignment with the fulcrum of said lever so that when a rope  $d$  is passed around pulley  $n$ , and through said eye, the rope is carried away from the pulley, as seen at the right hand side of Fig. 6. The lower ladder section is secured to the left hand portion of the rope seen in Figs. 6 and 7, these figures being the opposite of the pulley of Fig. 1. That portion of the rope that extends through eye  $o^3$  is free to be grasped and drawn downward when it is desired to pull up the ladder. When said free portion is grasped and pulled downward, the resisting weight of the ladder causes the rope to straighten and thus draw the eye  $o^3$  toward the pulley  $n$ , thus throwing the pawl out of mesh with the teeth of disk  $n^2$ . Continued pull on the rope then draws the ladder upward until the desired height is reached when the rope is released and the pawl is drawn, by spring  $p$ , into mesh with the teeth again to prevent the backward rotation of pulley  $n$ . To prevent rope  $d$  from slipping around on said pulley, and thus allowing the ladder to fall through the scuttle, I provide a clamping lever  $s$  that is pivoted on rivet  $m^2$  and whose free end rests upon the rope near the top of the pulley. The free end of said lever is formed with a slot  $s'$  into which extends a pin  $o^4$  on the side of the lever  $o'$ . The length of the slot is such that when lever  $o'$  is first raised to disengage pawl  $o$  the pawl will leave the ratchet teeth before the pin reaches the upper end of the slot. Continued movement of lever  $o'$  will then result in raising the free end of the clamping lever  $s$  away from the rope, when the latter is free to be moved in either direction around the pulley. In drawing the ladder upward the lever  $s$  acts as a drag and the rope will, of course, render in the direction of the arrow of Fig. 6 but in lowering the ladder said lever must be raised away from said rope as in Fig. 7. The instant the pull upon the rope is removed the pawl drops into mesh with the teeth of disk  $n^2$  and the pin  $o^4$  crowds lever  $s$  down upon the rope and thus prevents said rope from rendering farther in a backward direction.

In many instances the described pulley block provides a desirable substitute for the weight used in my said earlier patent and serves its purpose equally well.

Having described my invention, I claim—

1. In combination with a scuttle a two-part ladder hinged as set forth, means for drawing said ladder through said scuttle, locking



devices attached to the ladder substantially as described and means for operating said locking devices as the ladder is raised and lowered through said scuttle, for the purpose specified.

5 2. In combination with a scuttle, a two-part ladder hinged as set forth, a pulley-block suspended over said scuttle, a cable secured

to the lower ladder section and rove through said block, and clamping levers connected to with said block in the manner and for the purpose herein specified.

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