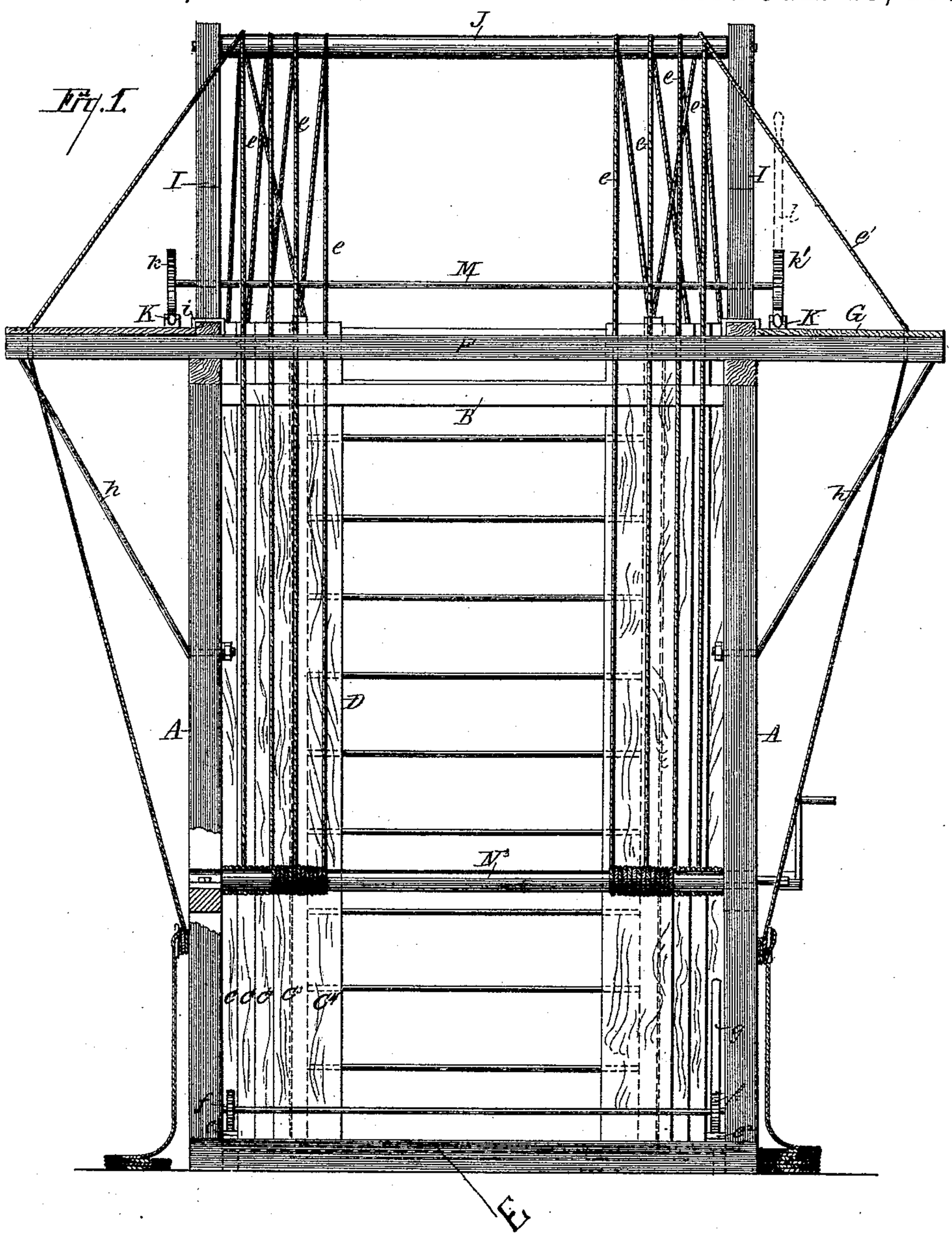
(No Model.) 2 Sheets—Sheet 1.

H. GOOSMANN.

FIRE LADDER.

No. 444,632. Patented Jan. 13, 1891.

Fig. 1.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

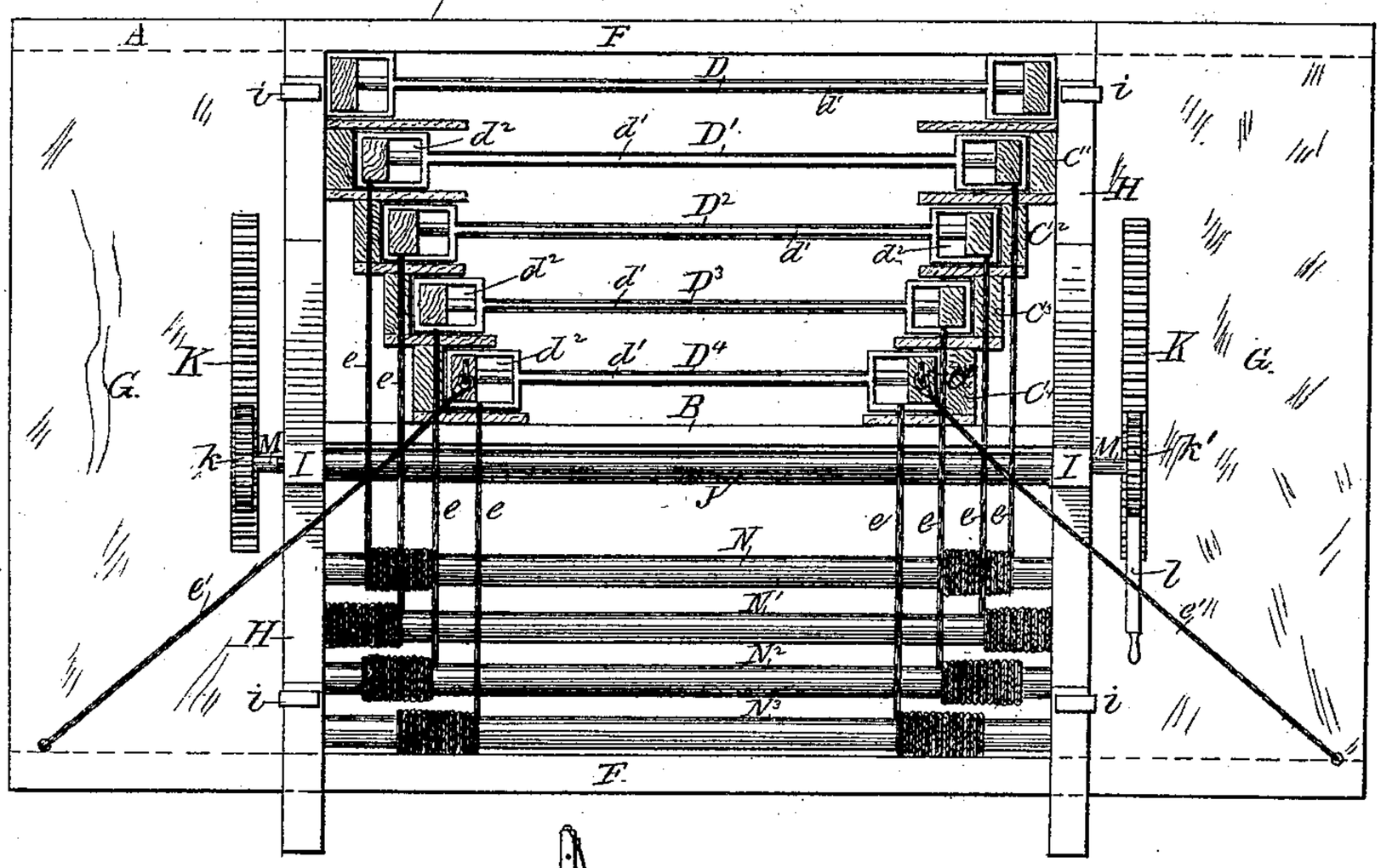


Fig. 3.

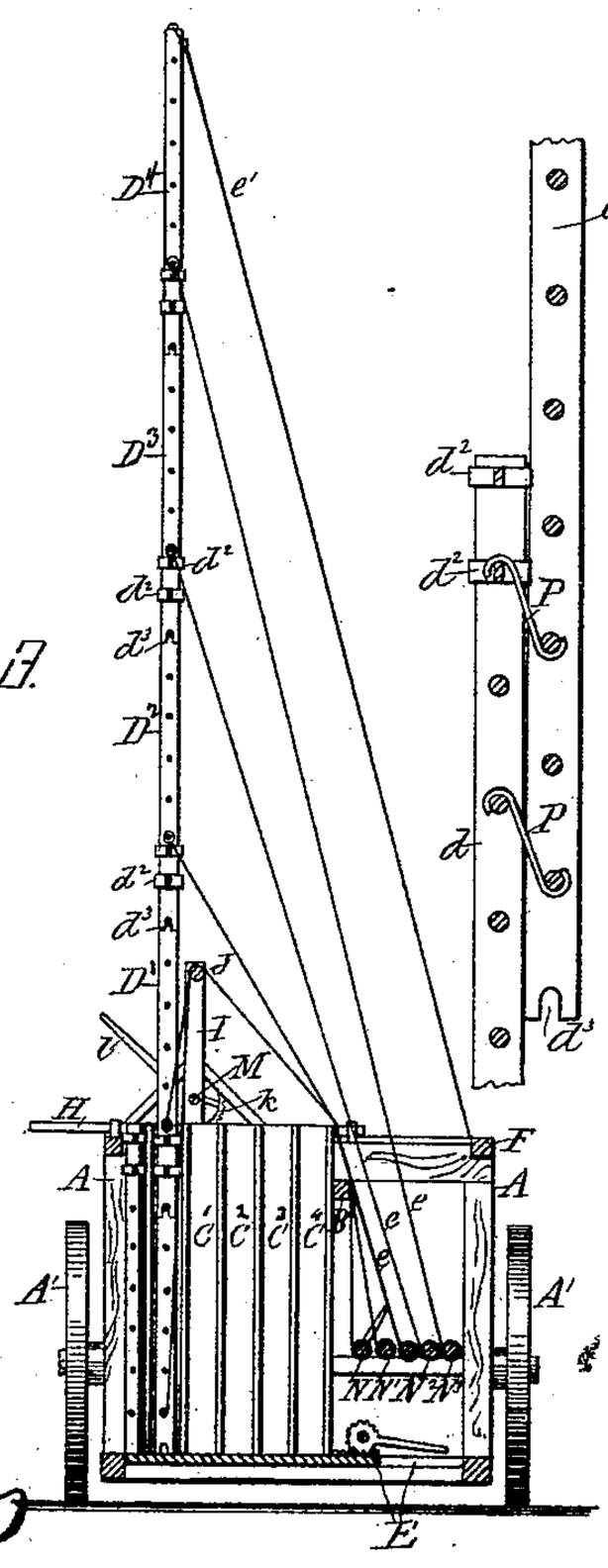
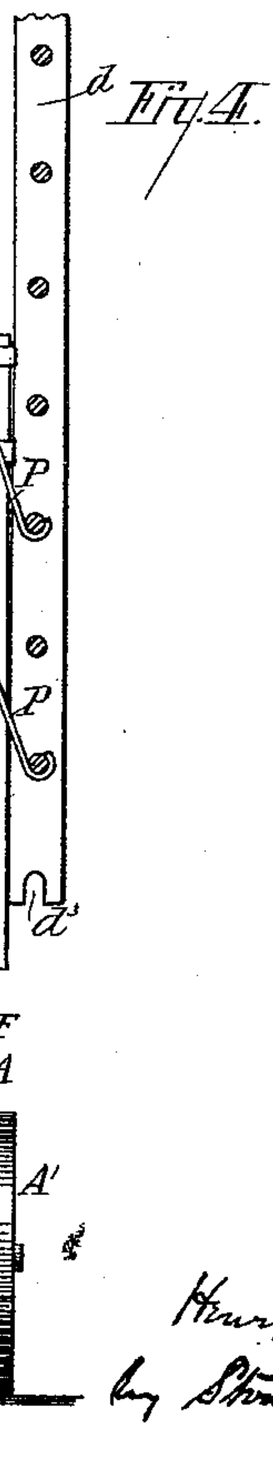


Fig. 4.



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UNITED STATES PATENT OFFICE.

HENRY GOOSMANN, OF WEST BEND, WISCONSIN.

FIRE-LADDER.

SPECIFICATION forming part of Letters Patent No. 444,632, dated January 13, 1891.

Application filed November 6, 1883. Renewed July 26, 1890. Serial No. 360,001. (No model.)

To all whom it may concern:

Be it known that I, HENRY GOOSMANN, of West Bend, in the county of Washington, and in the State of Wisconsin, have invented certain new and useful Improvements in Fire-Ladders; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates to extension-ladders and will be fully described hereinafter.

In the drawings, Figure 1 is a front elevation of my improved ladder unextended and without its truck. Fig. 2 is a top view of same. Fig. 3 is a central vertical section showing ladder on its truck and extended, and Fig. 4 shows a detail of same.

A A indicate the main frame, which may be mounted in any suitable manner on a four-wheel truck A′ A′. Said frame A is divided in about the center by a bar B, the rear portion being occupied by a series of upright ways C C, in which the ladder-sections D D stand when the ladder is not in use. These upright ways form a continuous frame, which is connected at the rear to the bottom section of the ladder, and this bottom section is hinged on the rear edge of a loose table E, resting on suitable supports or guides, as shown by dotted lines, Fig. 1, said table being provided with racks e^2 e^2, adapted to engage pinions *f f*, mounted on the respective ends of a suitable shaft and operated by means of a hand-lever *g*, secured to or forming an extension of one of said pinions. The top, front, and rear stringers F F of said frame A are extended out sufficiently to support the side platforms G G, from which part of the manipulation of the ladder is effected. *h h* are braces to strengthen the same. On the inside edge of said platforms G G are suitable loops *i i i*, which form guides for sliding bars H H, each of said bars carrying a short vertical standard I, having journaled therein at its upper end the operating-roller J.

Near the inner edges of the platforms G G and parallel with the sliding bars H H are fastened racks K K, one of which is adapted to engage a pinion *k* and the other a segment *k′*, the latter designed to be operated by a hand-lever *l*, said pinion and segment being keyed to a shaft M, journaled in the short standards I I a short distance above the platforms.

The ladder-sections D D′ D^2 D^3 D^4 are ordinary ladders, the length of which is determined by the height given to the frame A, according to circumstances. The width of said ladder-sections decreases from the bottom with each succeeding one by the thickness of both of their side pieces *d d*, thus allowing the bottom or permanent one D to receive the lower end of ladder-section D′ inside its side pieces, while ladder-section D^2 may in its turn telescope in D′, and so on with the others. Each of said ladder-sections, except the uppermost one, is provided with two hooped bars *d′ d′ d′* connecting its top. The hoops d^2 d^2 of said bars *d′ d′* are square and long enough to embrace the side pieces of the ladder-section to which they are attached and the lower end of the ladder-section side pieces which must be inserted in same after said section is hoisted by its own ropes. A notch is formed in said lower end at d^3 d^3, which rests against the top round of the adjoining ladder. The lower end of each section D, except obviously the permanent one, is connected by a rope *e*, attached to each side piece *d d* with a shaft. Said ropes, being passed over the operating-roller J, are wound on shafts N, N′, N^2, and N^3.

The operations of the extension are effected in the following manner: The truck having been put in the proper position in front of the building and the men all being at their assigned post, those in charge of the top platforms G G working at the hand-lever *l*, which works pinions *k k* in the racks K K will bring the operating-roller J just above the ladder-section D^4 or the uppermost one. The top of this section has a guy-rope *e′* attached to each of its side pieces, and these ropes are held by one or two assistants who have only to give out as much of the ropes as the hoisting proceeds. The hand-crank having been applied to shaft N^3, which belongs to ladder-section D^4, said section is hoisted its length out of its way C^4 and united to the top of section D^3. The hand-crank is now put on end of shaft N^2, which, being turned, hoists said ladder-section D^3, taking with it the section D^4. As each section is elevated out of its respect-

ive way, the operating-roller J is moved so as to bring the same nearer the section which is next designed to be raised, this movement being effected by operating the lever *l*, so as to cause the segment *k'* and pinion *k* to travel on the racks K K, and thus carry the bars H H and short standards I I, to which latter said operating-roller is journaled. By this means the elevating-rope for each section is given a sufficient purchase to perform its function, and the ropes that have acted to hoist one section serve as guy-ropes therefor when the operating-roller J is moved along to form the purchase for the hoisting-ropes of a succeeding section.

Whenever it is desirable to make a connection between two adjoining sections of the ladder without hoisting them their whole length, the S-shaped hooks P, Fig. 4, will answer the purpose in the best manner possible.

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

1. An extension-ladder consisting of ladder-sections of equal length and of gradually-decreasing width, which are provided with notches in the lower end of their side pieces, and at their upper ends with transverse rods terminating in loops, whereby said ladder-sections are adapted to fit and be supported on top of each other after each section has been raised its own length clear out of the adjustable ways provided in the truck-frame for said ladder-sections, as set forth.

2. In an extension-ladder, the ladder-sections D D' D^2 D^3 D^4, having hooped bars *d' d' d'*, hoops d^2 d^2, and notches d^3 d^3 d^3, in combination with the upright ways C C, sliding table E, and connections, substantially as shown and described, and for the purpose set forth.

3. In an extension-ladder, the platforms G G, having clamps *i i i i*, the bars H H, standards I I, and roller J, in combination with the toothed rack K K, pinions *k' k'*, and hand-lever *l*, substantially as shown and described, and for the purpose set forth.

4. In an extension-ladder, the ladder-sections D' D^2 D^3 D^4, having ropes *e e* attached to the lower end of their side pieces *d d*, in combination with the roller J and winding-drums on shafts N N' N^2 N^3, substantially as shown and described, and for the purpose set forth.

In testimony that I claim the foregoing I have hereunto set my hand, at Milwaukee, in the county of Milwaukee and State of Wisconsin, in the presence of two witnesses.

HENRY GOOSMANN.

Witnesses:
FRED SCHRIBER,
STANLEY S. STOUT.