

(No Model.)

2 Sheets—Sheet 1.

G. L. WRIGHT.
EXTENSION LADDER.

No. 408,281.

Patented Aug. 6, 1889.

Fig. 1.

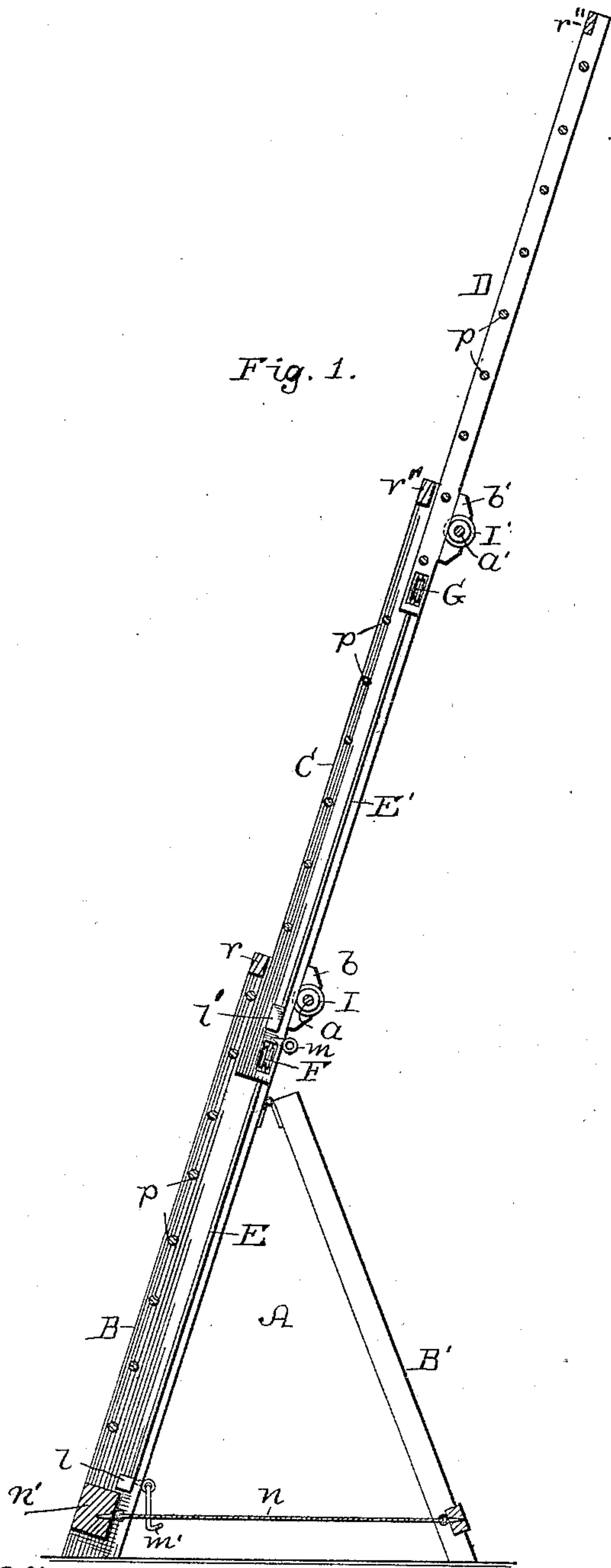
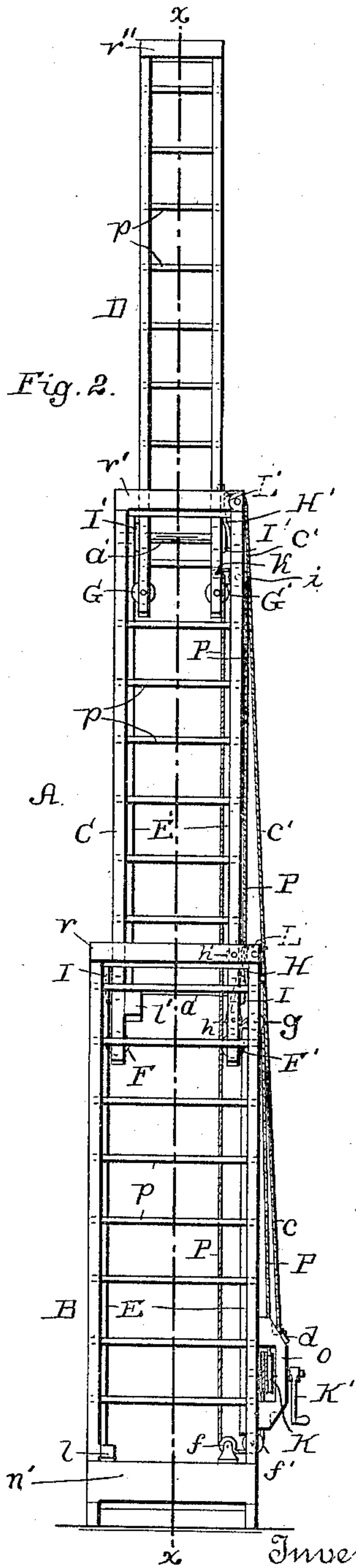


Fig. 2.



Witnesses

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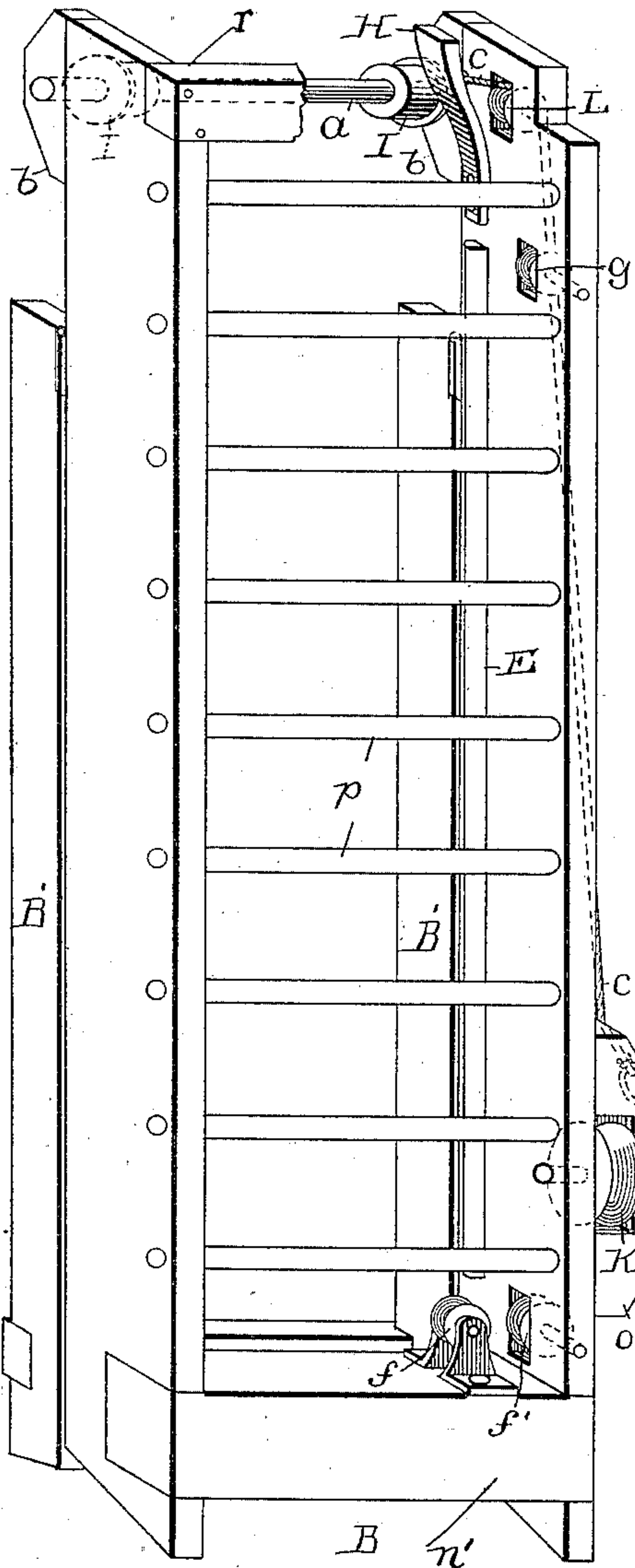


Fig. 3.

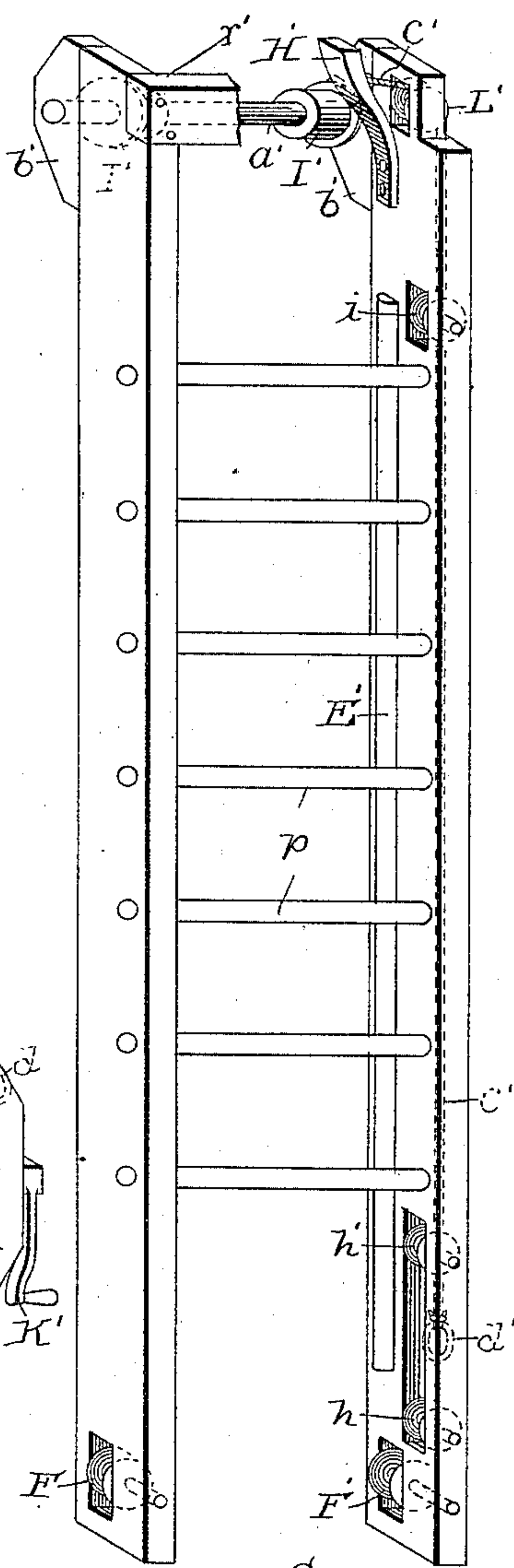


Fig. 4.

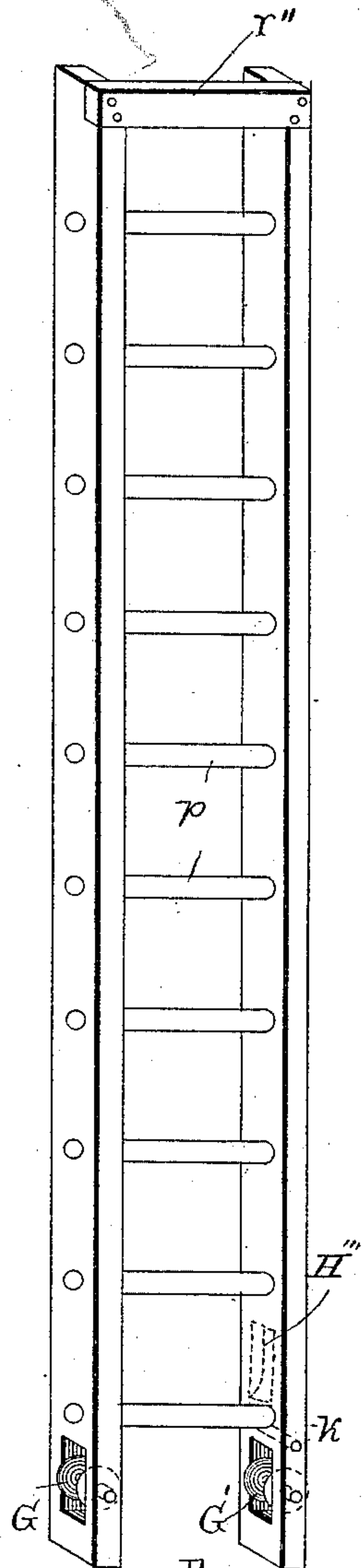


Fig. 5.

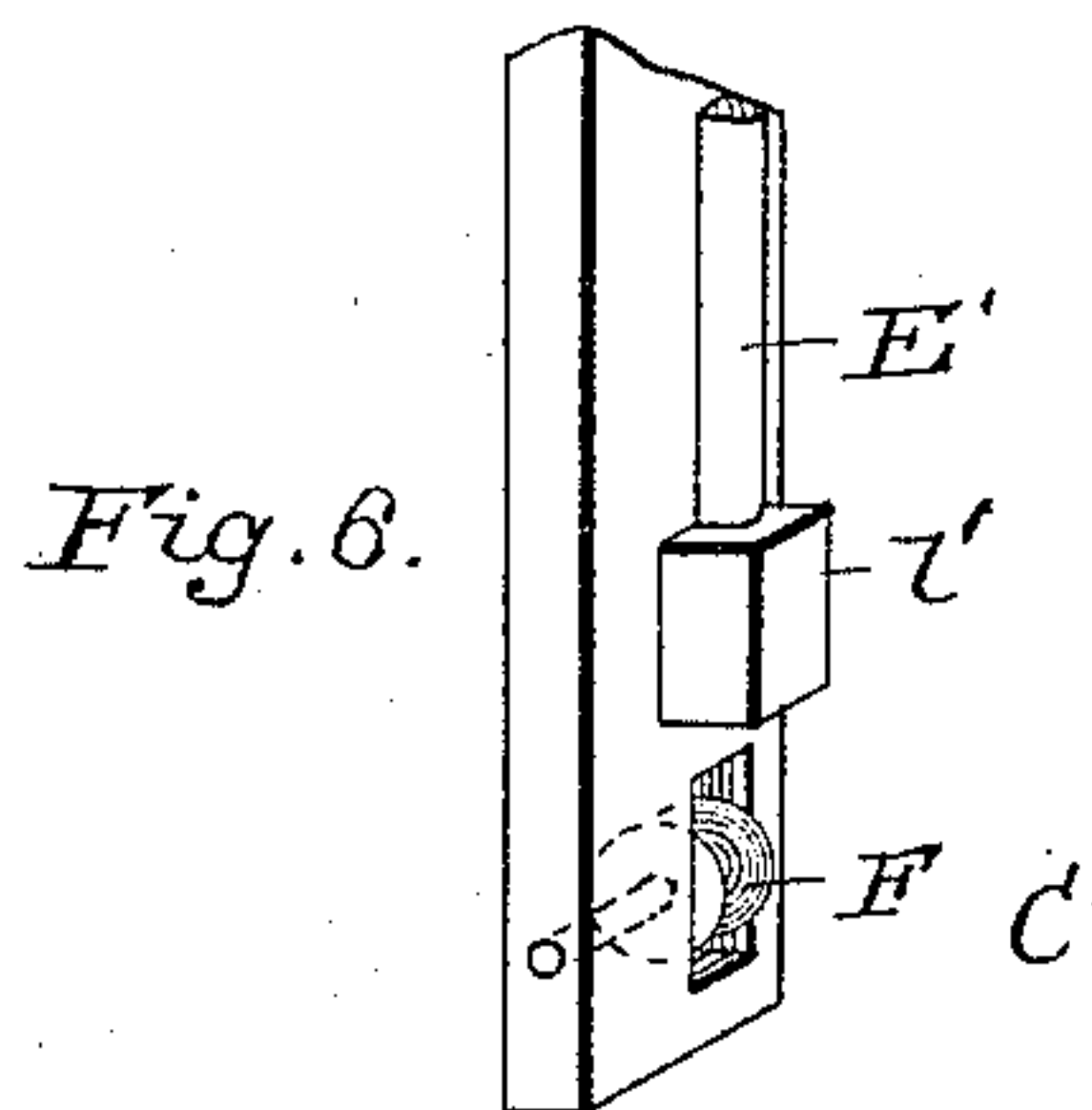
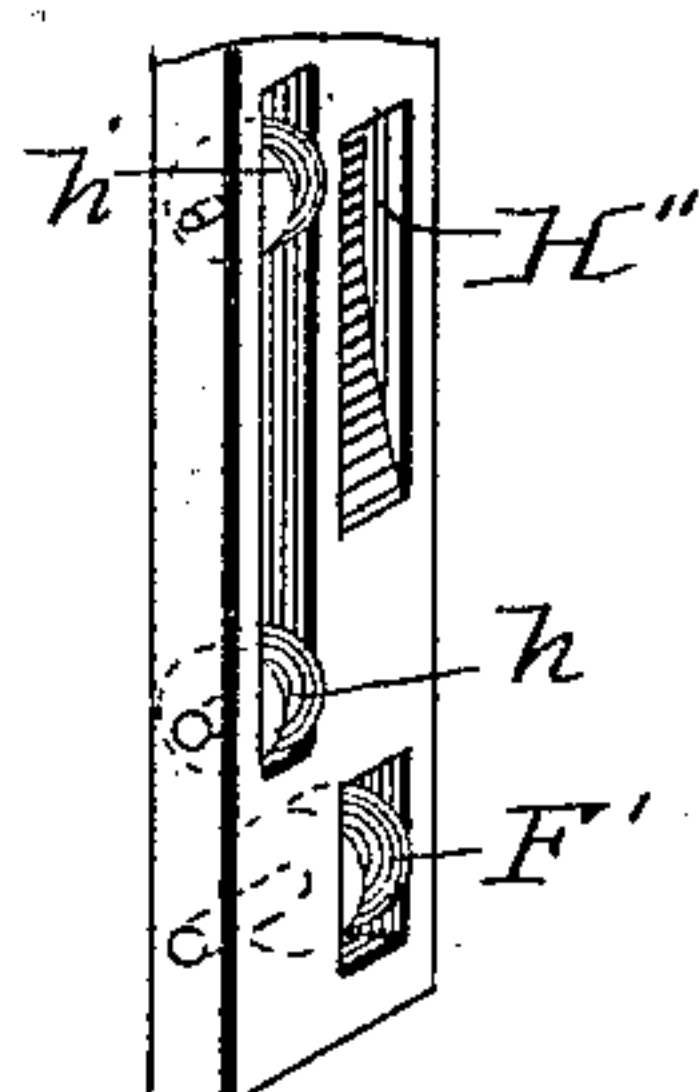


Fig. 6.



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UNITED STATES PATENT OFFICE.

GEORGE L. WRIGHT, OF KANSAS CITY, MISSOURI.

EXTENSION-LADDER.

SPECIFICATION forming part of Letters Patent No. 408,281, dated August 6, 1889.

Application filed February 8, 1889. Serial No. 299,149. (No model.)

To all whom it may concern:

Be it known that I, GEORGE L. WRIGHT, of Kansas City, Jackson county, Missouri, have invented certain new and useful Improvements in Extension-Ladders, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates particularly to that class of extension-ladders in which each upper section slides within the next lower one, and has for its object to provide a ladder which will occupy very little space when folded, but can be easily and quickly extended to the desired extent; and with these objects in view the invention consists in certain novel constructions and combinations, as will be more fully specified and then claimed.

In the drawings, Figure 1 is a vertical section taken on the line xx of Fig. 2. Fig. 2 is a front view of the ladder extended. Fig. 3 is a perspective view of the bottom section; Fig. 4, the middle section; Fig. 5, the top section; and Fig. 6 shows details in perspective.

Referring to the drawings, in which similar letters of reference indicate corresponding parts in all the figures, B indicates the lower section of my improved ladder, which is constructed with side pieces or uprights, rounds p , and supports B' , hinged to the rear side of the uprights, all of which are of the usual and well-known type. The front top portions of the uprights are cut away, as shown, to receive the cross-pieces r , and at the rear of said top portions are secured the brackets b , in which is journaled the horizontal shaft a , which carries at either end the flanged guide-rollers I I, and to the inner sides of the uprights are secured the vertical tracks E, upon which run the grooved rollers F F', journaled in recesses cut in the lower ends of the middle section C. The middle section C, being made narrower than the bottom section, is pressed down in between the cross-piece r and the horizontal shaft a , the rear sides of the uprights bearing against and being guided by the flanged guide-rollers I I, and the grooved rollers F F' run freely upon the vertical tracks E E. Thus it will be seen that a safe guide is formed for the folding

section, and one that greatly facilitates its operations.

The front top portions of the uprights of the middle section C are also cut away to receive a similar cross-piece r' , and its rear portion is also provided with brackets b' , supporting the horizontal shaft a' , which carries the flanged guide-rollers I' I' at either end, all of said parts being similar to those of the bottom section. The section C is also supplied with the vertical tracks E' E' on its inner side, upon which work the grooved rollers G G', journaled in recesses cut in the lower portions of the uprights of the top section D. The top section D is narrower than the middle section C, and is constructed with the uprights connected by the rounds p , as usual, and at its front top portion is braced by a cross-piece r'' , secured similar to the cross-pieces r r' .

Near the bottom of the uprights are formed the recesses in which are journaled the grooved rollers G G', and in a recess just above the rollers G' is fixed a pin k , the purpose of which will appear farther on.

From the above description it will be seen that I form an extensible and collapsible ladder in which the smaller sections slide within the larger, forming a small and compact body, and to prevent the section C from sliding down too far I form a lug l integral with the track E at the lower end, upon which the bottom of the upright strikes, limiting the downward movement of the section C. The track E' is provided with a similar lug l' , which prevents the top section D from sliding too far.

The sections being connected substantially as shown and described, it is necessary to provide a means for operating said parts, and this I do by means of a rope and windlass. The windlass K is secured to the outside of one of the uprights by a suitable bracket or block o , as best shown in Fig. 3, and is operated by means of a crank K'.

The lower portions of the uprights of the bottom section are slotted to receive a base-block n' , upon which is mounted the sheave f between vertical arms, as shown, and the side of the upright carrying the windlass is

recessed at a point opposite the sheave *f*, and within such recess is fixed the sheave *f'*, and near the top of the same upright is cut another recess, intended to receive a sheave *g*, similar to *f* and *f'*.

In the upright of section C, at a point above the roller *F'*, is cut a vertical slot having the sheaves *h* and *h'* secured in its ends, and near the top of this upright is cut a recess adapted to receive the sheave *i*.

The sheaves *f f' g h h' i* are for carrying and guiding the operating-rope *P*, and it is done in the following manner: One end of the rope *P* is secured to the lower end of the top section by the pin *k*, and from there it passes down under the sheaves *f f'*, thence to the windlass *K*, around which it is wound two or three times to prevent slipping. From here it passes up over sheave *g*, under sheaves *h* and *h'*, over sheave *i*, and then fastened again to the pin *k*, thus forming a continuous operating rope or cable, and as the rope is wound several times around the windlass the sections can be readily raised and lowered without occasioning any slack whatever. To hold the sections in position when extended, I employ the spring supporting-arms *H H'*, said arms being secured, respectively, to the inner sides of the uprights of the sections *B* and *C*, projecting upwardly therefrom and adapted to spring into the recesses *H'' H'''*, cut in the outer sides of the uprights of the sections *C* and *D*, respectively, and to throw such supporting-arms out of engagement with the recesses I use the cords *C* and *C'*, connected, respectively, with the arms *H* and *H'* and passing over the sheaves *L* and *L'*, secured, respectively, in the upper parts of the sections *B* and *C*, as clearly shown in Figs. 3 and 4.

The operation of my device is as follows: The ladder having been placed in the proper position, the crank is operated, revolving the windlass. This turns the rope *P*, and the section *C*, carrying the section *D* with it, is moved upward, the rollers *F F'* running upon the tracks *E* and guided between the cross-piece *r* and flanged rollers *I I*. As the section *C* moves upward, the spring supporting-arms *H* are pressed in, and when said section is raised a sufficient distance to bring the recess *H''* opposite the arm *H* said arm will spring out-

ward into said recess and support the section in its extended position. The revolving of the windlass is continued, drawing out the top section *D*, which is guided in a manner similar to section *C* and is supported by the spring-arm *H'*. When it is desired to fold the sections, the cord *c* is pulled, which draws the arm *H* from the recess *H''*, and by turning the crank in the opposite direction the section *C* is guided down into the section *B*, and its downward movement is limited by the lug *l*. The cord *c'* is then pulled, which releases the arm *H'*, and the top section is guided into the section *C* in the same manner as said section was guided into the bottom one. If it is desired to raise only the top section, the hook *m'* on the lower section is placed in the eye *m* on the middle section, securely holding the same down.

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

1. In an extension-ladder, the combination, with a lower section carrying a track upon its inner sides, the cross-piece *r*, and flanged rollers *I* at its top portion, of a narrower upper section sliding within the lower section and provided with rollers adapted to run on the track, substantially as shown and described.

2. In an extension-ladder, the combination, with the sections constructed as shown, of the sheaves *f f' g h h' i*, the rope *P*, and windlass *K*, all arranged and adapted to operate substantially as shown and described.

3. An extension-ladder consisting of two or more folding sections, the lower sections provided with tracks *E E'* and guides *r r' I I'*, the supporting-arms *H H'*, the upper sections being provided with rollers *F F' G G'*, adapted to run upon the tracks *E E'*, and recesses *H'' H'''*, to receive the supporting-arms *H H'*, the sheaves *f f' h h' i*, arranged as shown, the windlass *K*, rope *P*, and cords *c* and *c'*, all arranged and adapted to operate substantially as shown and described.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE L. WRIGHT.

Witnesses:

F. G. FISCHER,
A. A. HIGDON.