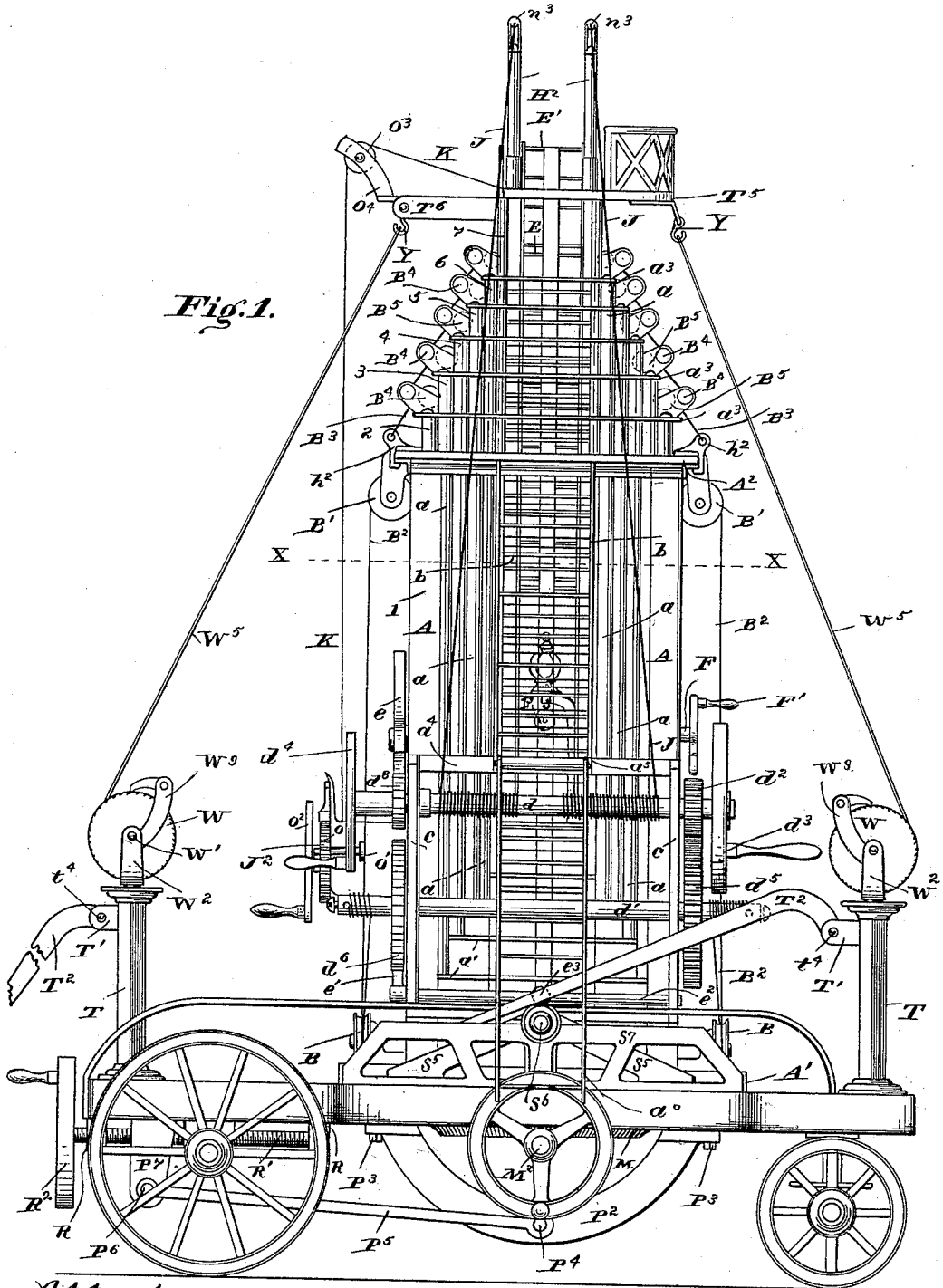
(No Model.) 5 Sheets—Sheet 1.

C. ALBERT.

FIRE TRUCK LADDER.

No. 401,623. Patented Apr. 16, 1889.

Fig. 1.



Attest.
C. W. Bogart.
E. C. Havens

Inventor.
Charles Albert
per Strehli and Hill
Attys.

N. PETERS. Photo-Lithographer, Washington, D. C.

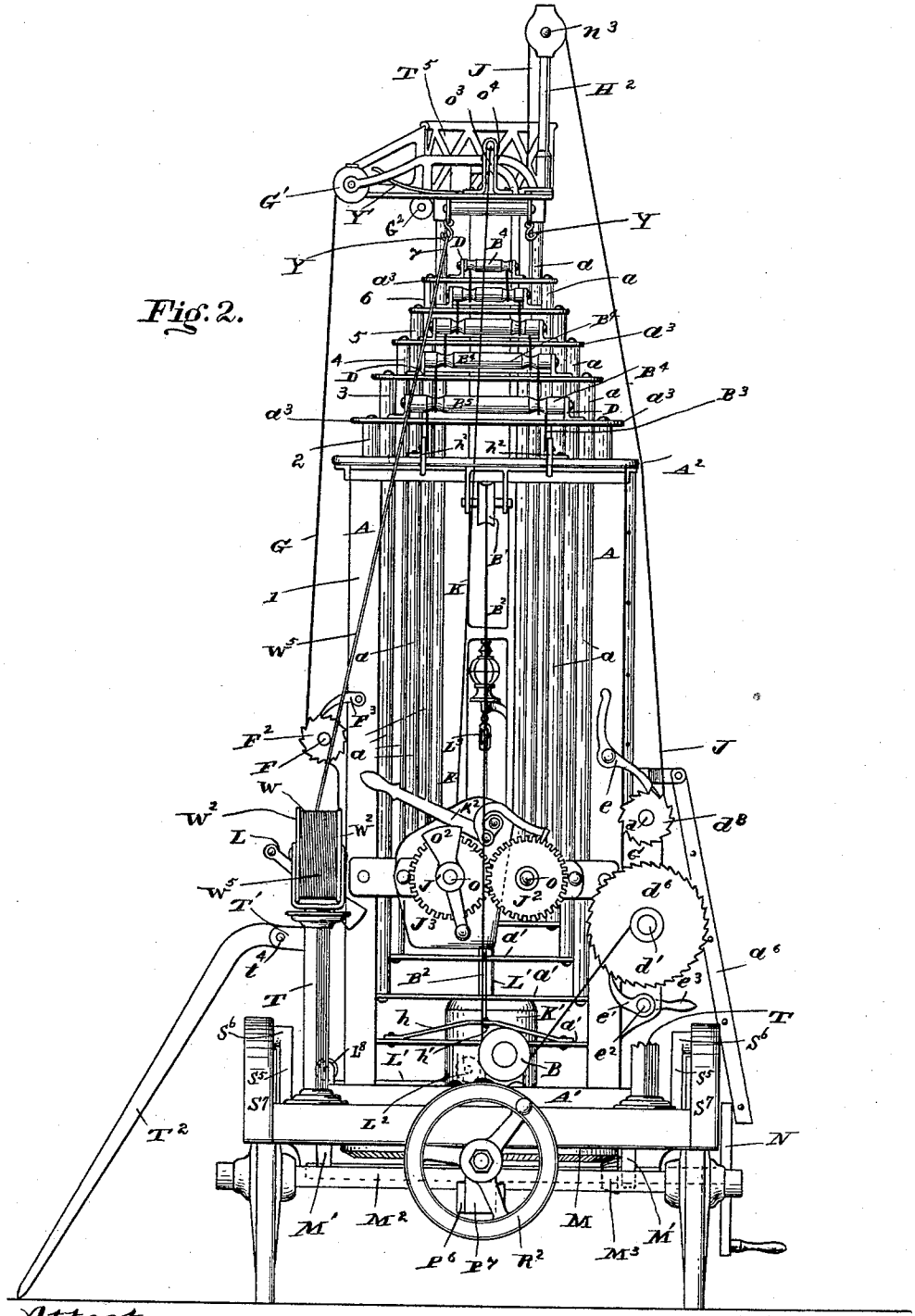
(No Model.) 5 Sheets—Sheet 2.

C. ALBERT.

FIRE TRUCK LADDER.

No. 401,623. Patented Apr. 16, 1889.

Fig. 2.



Attest.
C. W. Bogart.
E. C. Havens

Inventor.
Charles Albert
per Strehli and Hill
Attys.

N. PETERS, Photo-Lithographer, Washington, D. C.

(No Model.) 5 Sheets—Sheet 3.

C. ALBERT.

FIRE TRUCK LADDER.

No. 401,623. Patented Apr. 16, 1889.

Fig. 3.

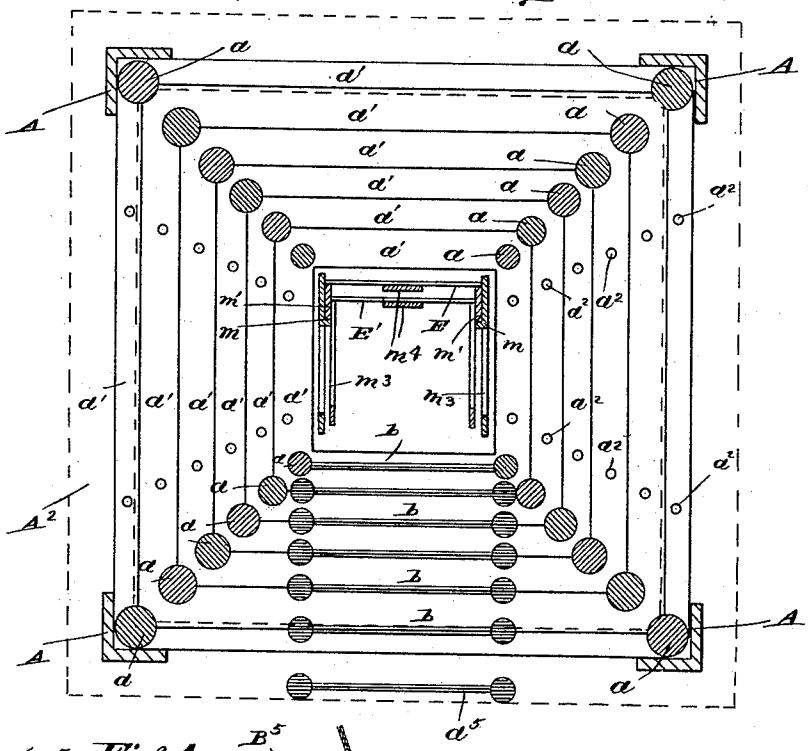


Fig. 4.

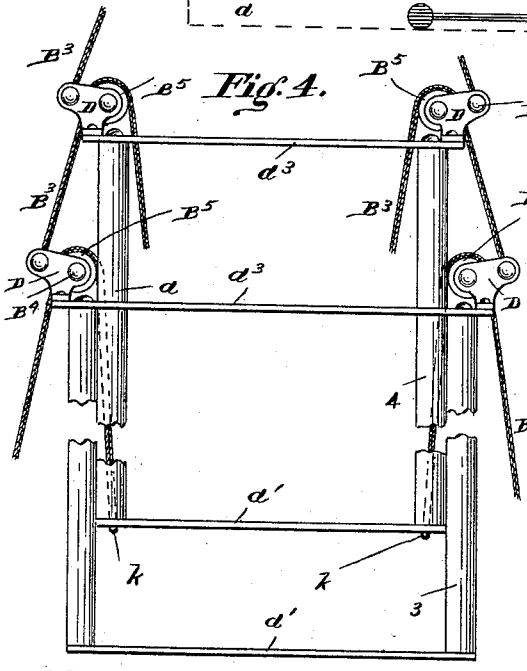
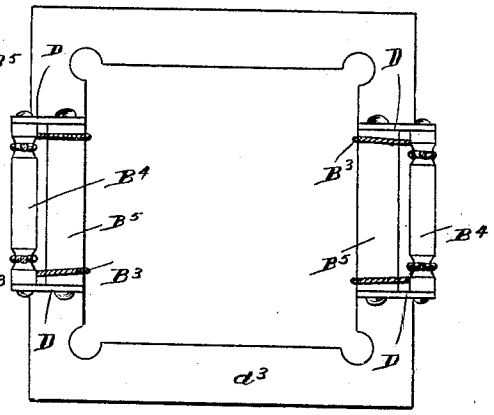


Fig. 5.



Attest.
C. W. Bogart.
E. L. Hawes

Inventor:
Charles Albert
per Strehli and Hill
Attys.

N. PETERS, Photo-Lithographer, Washington, D. C.

(No Model.) 5 Sheets—Sheet 4.

C. ALBERT.

FIRE TRUCK LADDER.

No. 401,623. Patented Apr. 16, 1889.

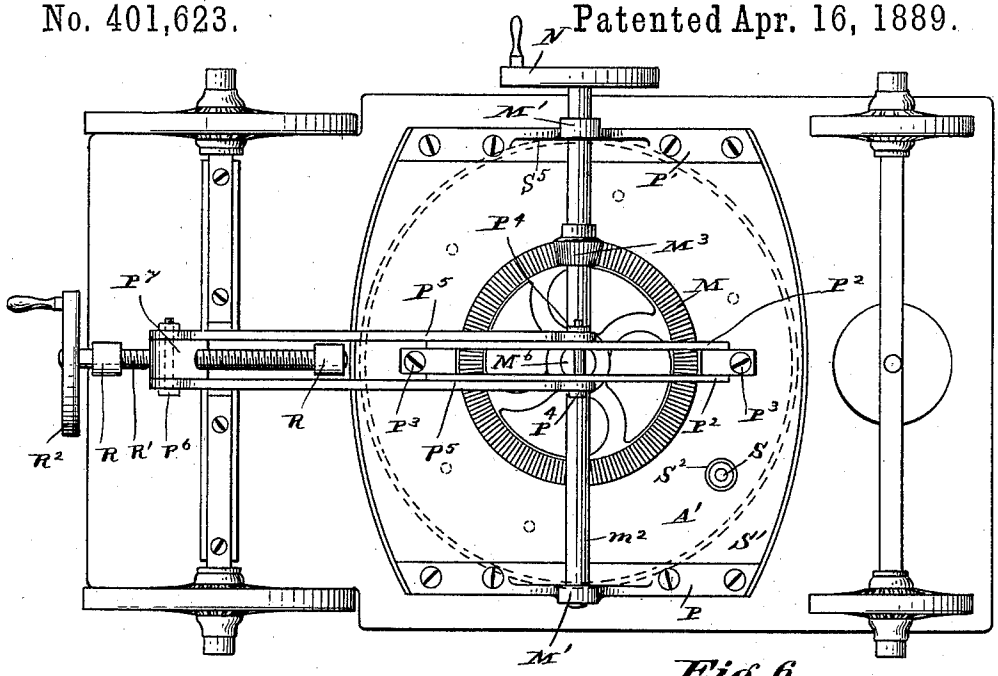


Fig. 6.

Fig. 9.

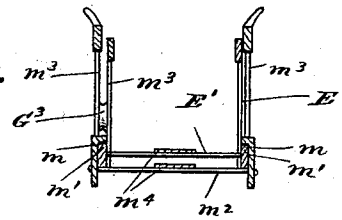


Fig. 7.

Fig. 8.

Attest.
C. W. Bogart.
E. S. Havens

Inventor.
Charles Albert
per Strehli and Hill
Attys.

N. PETERS, Photo-Lithographer, Washington, D. C.

(No Model.) 5 Sheets—Sheet 5.

C. ALBERT.

FIRE TRUCK LADDER.

No. 401,623. Patented Apr. 16, 1889.

Fig. 10.

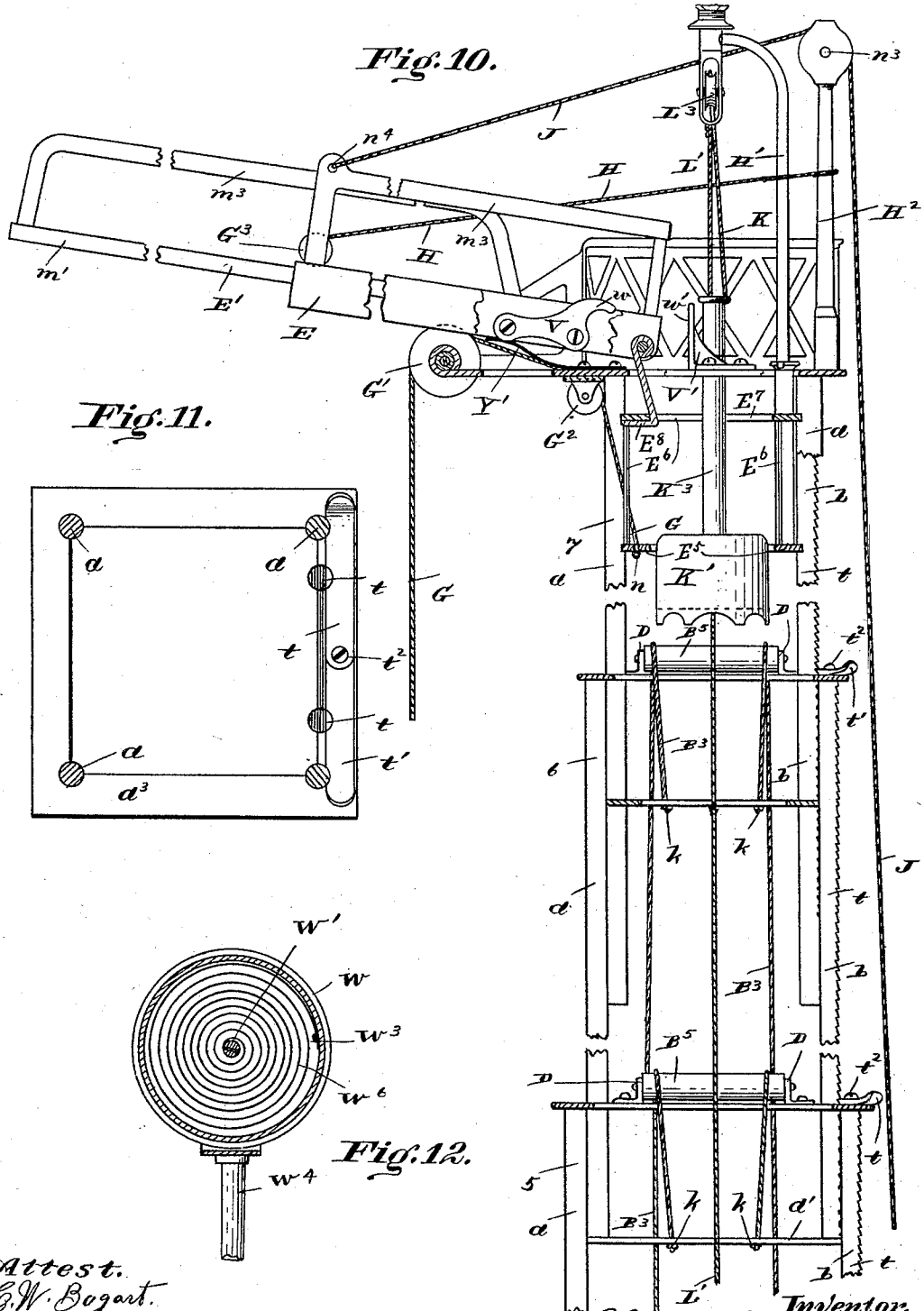


Fig. 11.

Fig. 12.

Attest.
C. W. Bogart.
E. C. Havens

Inventor.
Charles Albert
per Strebli and Hill
Attys.

N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

CHARLES ALBERT, OF CINCINNATI, OHIO.

FIRE-TRUCK LADDER.

SPECIFICATION forming part of Letters Patent No. 401,623, dated April 16, 1889.

Application filed February 18, 1888. Serial No. 264,474. (No model.)

To all whom it may concern:

Be it known that I, CHARLES ALBERT, a resident of Cincinnati, in the county of Hamilton, State of Ohio, have invented certain new and useful Improvements in Fire-Truck Ladders, of which the following is a specification.

My invention belongs or relates to that class of fire-ladders in which the sections of ladders can be elevated to the desired height from a platform on the truck. When the sections of ladders are elevated to the desired height, access to any desired portion of the burning building is had by means of the auxiliary top ladders, which latter form a bridge from the building to the ladder proper.

The various parts of mechanism are operated from the platform of the truck. I also provide mechanism for revolving all the ladder-sections and for inclining them at any desired angle from the platform of the truck. I am enabled to reach any window in the burning building and to escape coming in contact with telegraph and telephone wires. By reason of the mechanism for inclining the ladder-sections at any angle my device may be used on an undulated surface.

With slight alterations my invention may be used for a temporary light-house for ocean-steamers or as a point of observation in time of war.

In the accompanying drawings, forming a part of this specification, Figure 1 is a side elevation of my improved fire ladder and truck, and Fig. 2 is a rear elevation of same. Fig. 3 is a cross-section taken at line $x\,x$, Fig. 1. Fig. 4 is a view of two of the sections partly withdrawn, showing the arrangement of pulleys and ropes for hoisting or elevating the sections. Fig. 5 is a top view of one of the plates which connect the posts of the various sections, showing the rollers over which the ropes for elevating the sections pass. Fig. 6 is a bottom view of the truck. Fig. 7 is a top view of the upper section, showing the auxiliary ladders extended. Fig. 8 is a side view of the auxiliary ladders, partly broken away, also showing the position of the rope for extending same. Fig. 9 is a cross-section of the auxiliary ladders. Fig. 10 is a side view of the three top sections, showing arrangement of the ropes for elevating the sections, also showing the fire-escape basket and the top auxiliary ladders partly extended. Fig. 11 is a top view of one of the plates which connect the posts of the sections, showing the means employed for stopping and retaining the sections at any height should the ropes break. Fig. 12 is a view of one of the spring-drums.

In Figs. 1 and 2 a few minor details are omitted, as they could not be shown to advantage and would confuse and encumber the views.

A represents four standards, rigidly connected in any suitable manner to the circular platform A′, which latter rests on the plate S′. This plate S′ has two arms, S^5, rigidly connected thereto, which arms S^5 are pivotally connected at S^6 to the frame-work S^7 of the truck. (See Figs. 1 and 2.) The standards A are united at the top by the plate A^2. These standards and plate form the first section, No. 1. The other sections are numbered 2, 3, 4, 5, 6, and 7. The sections 2, 3, 4, 5, 6, and 7 are each formed of four posts, a, and each of said posts is united at the bottom by plates a', each plate having two holes, a^2, on each of their four sides. (See more particularly Fig. 3.) The top of the posts of sections 2, 3, 4, 5, 6, and 7 are united by the top plates, a^3. The bottom and top plates are rigidly united to the posts in any suitable manner.

The upper section telescopes into the section immediately beneath it, and these two into the next section, and so on until all the top sections are telescoped into the lower section. Any desired number of sections may be employed. On the lower section, No. 1, is a cross-piece, a^4, (see Fig. 1,) to which is rigidly connected the lower end of a ladder, a^5, the upper end of said ladder being connected to the top plate, A^2, of the section. A ladder, a^6, is also hinged to said cross-piece a^4, and extends down to the platform of the truck. Additional ladders b are also provided for each of the sections 2, 3, 4, 5, 6, and 7, which ladders are connected to the top and bottom plates of each section in any suitable manner.

To the cross-piece a^4 are attached the two side pieces, $c\,c$. (See Fig. 1.) Through these side pieces, $c\,c$, pass the shafts $d\,d'$. (See Fig. 1.) On one end of shaft d is the small gear-wheel d^2 and the hand-wheel d^3. At the other end of said shaft is the ratchet-wheel d^8

and the handle d^4. On one end of shaft d' is the large gear-wheel d^5, and at the other end is the large ratchet-wheel d^6. In connection with ratchet-wheel d^6, I employ a pawl, e, which is attached loosely to one of the standards A, (see Fig. 1,) and in connection with the ratchet-wheel d^6 the pawl e' is employed, which latter is rigidly attached to one end of the movable rod or bar e^2, which works loosely in the side pieces, c c. This bar e^2 is operated by the handle e^3. (Shown in dotted lines in Fig. 1.)

To the circular platform A′ are attached the pulleys B, and to the top plate of the lower section are attached, in any suitable manner, the pulleys B′. (See Fig. 1.) The ropes B^2 pass over these pulleys B and B′. These ropes B^2 are attached to the ends of shaft d', and then are passed down under the pulleys B, up over pulleys B′, and then down, passing through holes in the pieces h and ending in knots h', to keep the ropes from pulling through said holes. (See Fig. 2.) These pieces h are attached to the lower plate, a', of section No. 2. The ropes B^2 elevate section No. 2, when the shaft d is turned by means of hand-wheel d^3.

On the top plate, A^2, of the lower section are attached the eyes h^2, to which are fastened the ropes B^3. (See Figs. 1 and 2.) These ropes B^3 pass up over the pulleys B^5 (shown in dotted lines in Fig. 1) and then pass through holes in the bottom plate of section No. 3. Sections 3, 4, 5, 6, and 7 have a somewhat similar pulley-and-rope construction, differing only in having the ends of the ropes B^3 attached to cross-bars B^4 instead of to eyes, as h^2. The cross-bars B^4 are rigidly attached between the arms D D, the pulleys B^5 being loosely connected between said arms.

The manner in which the pulley-and-rope connections of sections 3, 4, 5, 6, and 7 are formed is shown in detail in Figs. 4, 5, and 10. The ropes B^3 are attached to cross-bars B^4 on two sides of the top plate of each section, pass over pulleys B^5, and then pass downward through holes a^2 in the lower plate of each section, ending in a knot, k, to keep the ropes from pulling through said holes. Thus each of the sections (except section No. 1) is suspended, as shown in Figs. 4 and 10.

E and E′ represent auxiliary ladders. The ladder E′ slides in ways m of the ladder E, the lower bars, m', resting and sliding on the foot-rails m^2. Each of these ladders is provided with the side rails, m^3, and also with the foot-boards m^4.

A shaft, F, extends entirely across the lower section, having on one end the handle F′, and on the other end the ratchet-wheel F^2, which latter is in connection with the pawl F^3. (See Fig. 2.) The ropes G are attached to this shaft F and pass up from said shaft over pulleys G′, then down over pulleys G^2 to the bottom plate, E^5, of the cage E^6, (see Fig. 10,) passing through holes in said plate, and secured substantially as shown at n, Fig. 10, the ladder E being secured to the top E^7 of said cage E^6—viz., by hanging arms, as E^3. When the shaft F is turned in the proper direction, the cage E^6, and consequently the ladders E and E′, will be elevated by reason of the rope G winding upon said shaft. The pulley G^3 is attached to the ladder E, as shown. At the point n' on the ladder E is securely fastened the rope H, which extends from said point over pulley G^3 to the extension H^2, where it is securely fastened. Consequently when the ladder E is being elevated the rope H pulls over the pulley G^3 and hoists or elevates the ladder E′, so that when the ladder E is extended the extension of ladder E′ is also effected.

H′ represents a standard attached to the basket, in which the auxiliary ladders E and E′ rest and are raised and lowered, carrying at its upper end the pulley L^3 and a lantern. Said standard moves up and down with said basket and auxiliary ladders.

On an extension, H^2, are attached the pulleys n^3, (see Fig. 1,) over which the ropes J pass, said ropes extending from the shaft d down to the eye n^4 in ladder E, where it is securely attached. (See Fig. 10.) By turning the shaft d in the proper direction the rope J is wound thereon, and thus the auxiliary ladders E and E′ and the cage E^6 are lowered into the space formed by the sections. (See Fig. 1.)

J′ and J^2 represent two small gear-wheels, the wheel J^2 acting as an idler. These wheels are suitably secured to a plate, J^3, by short shafts o, which shafts extend from said plate J^3 to the piece o'. (See Fig. 1.) To the wheel J′ is rigidly secured the handle o^2. To the shaft o', on which the gear J′ and handle o^2 are attached, is fastened the rope K. This rope passes up over pulley o^3 on the arms o^4, and then down in the space formed by the sections, and is attached to the fire-escape basket K′. The rope K elevates the basket K′, when the former is wound upon the shaft o, the latter being operated by the handle o^2 and gear J′. The pawl K^2, attached to the plate J^3, acts in connection with the gears J′ and J^2.

To a shaft which extends across the device, and which carries at one end the handle L, is securely fastened one end of the guide-rope L′. This rope extends down under the pulleys L^8 and L^2, (shown in dotted lines in Fig. 2,) and then up through the basket K′ and neck K^3, and is attached to the pulley L^3. This rope L′ guides said basket.

To the bottom of the circular platform A′ is rigidly attached in any suitable manner the gear-wheel M, preferably by a pin, M^6, passing through the plate S′. The gear-wheel M^3 is attached to shaft N^2, which latter is journaled in lugs M′. On the end of shaft M^2 is rigidly attached a hand-wheel, N. By turning this hand-wheel, the shaft M^2 turns, and consequently the gear-wheel M^3 on said shaft meshing with gear-wheel M turns said

wheel, and the latter being rigidly attached to the circular platform A′ the revolution of said wheel in either direction causes the ladder-sections to revolve in either direction, whether the ladders be raised or lowered.

P and P′ represent strengthening-strips.

P^2 P^2 represent two semicircular arms secured to the plate S′ (on which rests the circular platform A′) by screws P^3. To the lowest point of these arms are loosely secured by a pin or bolt connection, P^4, one end of the long inclined rods P^5 P^5, the other end of said rods being secured at P^6 in a similar manner to the nut-block P^7. The lugs R R are screw-threaded, through which passes and works the screw-rod R′, to the front end of which is rigidly attached a hand-wheel, R^2. The nut-block P^7 is also screw-threaded to allow it to work on said rod R′. By turning the hand-wheel R^2 to the right the nut-block P^7 works toward the operator and causes the inclined rods P^5, which are attached to said block P^7, to move toward the operator; and said rods P^5 being attached to the semicircular arms P^2, which latter are attached to the plate S′, (on which rest the circular platform A′ and sections,) the revolution of hand-wheel R^2 causes the plate, platform, and ladders to tilt from the operator. If the hand-wheel R^2 be turned to the left, the plate, platform, and ladders are tilted toward the operator.

The screw-threaded pin S may be inserted in either of several holes in the platform A′ and passed through the plate S′, in which latter the circular platform and ladders rest. A thumb-screw, S^2, may then be screwed on one of said pins S, and when screwed tightly to place locks said circular platform to plate S′, and thus prevents any revolution of said platform. (See Fig. 6, in which the dotted lines show the several holes in said platform A′, the said platform being also shown in dotted lines.)

In Fig. 10 the posts at right-hand side are broken away to show the ladders *b* and the manner in which the faces of the side rods are serrated or notched, said serrations being marked *t* in the drawings. To the top plates, a^3, are attached two movable arms, t' t', pivoted loosely at t^2. (See Figs. 10 and 11.) Should any of the ropes or chains which operate the ladders and other parts of the device break, the arms t' can be moved into said serrations *t* and rigidly hold the sections to place at any height.

The corner-posts T are secured to the corners of the truck in such a manner that they may be revolved in either direction. The posts T at their top portion have rigidly connected to them the short arms T′, between which the supporting-legs T^2 are loosely connected by pin t^4. The arms T^2 being loosely connected to the revolving corner-posts T, the former may be swung in any direction or position and dropped to the ground to steady and support the truck and keep the same from moving.

If desired, the top of each ladder may be provided with suitable platforms, as T^5 and T^6. The spring-drums W are secured to the corner-posts T—one to each post. The drums W are held between the arms W^2 W^2 by a key, W′, and revolve thereon. One end of the coiled spring W^6 is fastened in a slot in the key W′, (shown in Fig. 12,) the other end being secured at W^3 to the inside face of the drum. The shank W^4 of the drum fits loosely into a recess in the corner-posts T, so that said drum may be revolved, the shank being so secured that it will not slip out of said recess in the posts. Pawls W^9 (see Fig. 1) work in connection with these drums W. The ropes W^5 are attached at one end to the drums and wound thereon, the other end of said ropes being secured to the hooks Y on the platforms T^5 and T^6. The ropes W^5 act as guides to steady the sections and ladders when elevated, and, being placed on the four corners of the truck, hold the sections and ladders in proper position. When the sections are being elevated or lowered, the ropes W^5 are either automatically wound or unwound upon the spring-drums W.

The springs Y′ are so placed that they will come in contact with the auxiliary ladders when lowered, so as not to jar the ladders and sections.

The sections are elevated as follows: The hand-wheel d^3 is rotated, the revolution of which turns the shaft *d* and gear-wheel d^2, which latter meshes with and operates the gear-wheel d^5. This wheel d^5 rotates the shaft *d*′, on which the ropes B^2 are wound. The other ends of said ropes being connected at *h*′ to the lower end of section No. 2, said section is hoisted or elevated. The ropes B^3 on each section immediately above the section below it are securely fastened to the cross-pieces B^4 on said lower section, and then pass over rollers B^5, and thence down to the bottom plate, *a*′, on the upper section, to which they are securely fastened at *k*. As each section is provided with ropes B^3, each of the upper sections is elevated at the same time that section No. 2 is being elevated, and when said section No. 2 is elevated its entire height the other sections above it will be elevated their entire height. While the sections are being elevated the pawl *e*′ on the bar e^2 engages the ratchet-wheel d^8 on shaft *d*′. When the sections are elevated to the desired height, the pawl *e*′ engages the teeth of ratchet-wheel d^8, thus holding the sections in an elevated position. When it is desired to lower the sections, the handle e^3 on bar e^2 is lifted, which operation tilts the bar e^2, and the pawl *e*′ being rigidly attached to said bar the tilting thereof causes the pawl *e*′ to disengage from the teeth of the ratchet-wheel. All the other pawls having been disengaged the sections will be lowered by their own weight. The operator holding the hand-wheel d^3 allows it to revolve slowly, so that the sections will not be lowered too suddenly.

I have already described how the auxiliary ladders E and E′ are elevated and lowered. I might, however, here mention that when said auxiliary ladders are about at their height the finger *w* on the piece V, attached securely to the side of ladder E, (shown in Fig. 10,) rides over the face *w′* of the post V′, which latter is securely attached to the platform T^6. (See Fig. 7.) In this manner the said auxiliary ladders are lowered at an angle to the sections. I have also described how the fire-escape basket is elevated and guided, and the manner in which the sections and ladders can be revolved and inclined. Suitable lanterns are preferably placed on the sections and ladders. Minor details in construction of the sections and ladders may be altered, if desired, as may also the mechanism for elevating the sections. The ropes which elevate the sections, instead of being fastened on each side of the bottom plates, may extend across said bottom, or one rope only may be used on each side.

Parts of the mechanism herein described may be employed in connection with fire-truck ladders of a construction differing from the one herein set forth.

What I claim as new and of my invention, and desire to secure by Letters Patent, is—

1. In a fire-truck ladder, a series of telescoping sections, the lower section being attached to a movable platform, rollers B^5, cross-pieces B^4, ropes and winding mechanism, substantially as set forth, for elevating said sections, and mechanism for revolving said sections, consisting of shaft M^2 and gear-wheels M and M^3, suitably supported, substantially as set forth.

2. In a fire-truck ladder, a series of telescoping sections, the lower section being attached to the platform of the truck, mechanism, substantially as set forth, for raising and lowering said sections, and mechanism for inclining said sections, consisting of arms P^2 P^2, rods P^5 P^5, block P^7, screw R, and wheel R^2, substantially as set forth.

3. In a fire-truck ladder, a series of telescoping sections, and mechanism, substantially as described, for raising and lowering said sections, in combination with revolving corner-posts, as T, and legs T^2, pivotally attached to said posts T and revolving with them, substantially as set forth.

4. In a fire-truck ladder, a series of telescoping sections, and mechanism, substantially as set forth, for raising and lowering said sections, in combination with guide-ropes, as W^5, and drums W, said drums W automatically winding up the guide-ropes when the sections are being lowered, substantially as set forth.

5. In a fire-truck ladder, a series of telescoping sections, and mechanism, substantially as described, for raising and lowering said sections, each of said sections having a ladder notched at *t*, in combination with plates, as *t′*, pivoted on the top plates of each section, substantially as set forth.

6. In a fire-truck ladder, a series of telescoping sections, and mechanism for raising and lowering said sections, said sections being united at the top by top plates, a^3, having cross-rods B^4, and rollers B^5, and bottom plates, *a′*, and ropes B^3, substantially as set forth.

7. In a fire-truck ladder, a series of telescoping sections, and mechanism, substantially as described, for raising and lowering said sections, in combination with auxiliary ladders E E′, ladder E, having pulley G^3, and rope H, suitably connected at one end to ladder E′ and at the other end to uprights H^2, substantially as set forth.

CHARLES ALBERT.

Attest:

HENRY WOOST,

H. H. BUSE.