

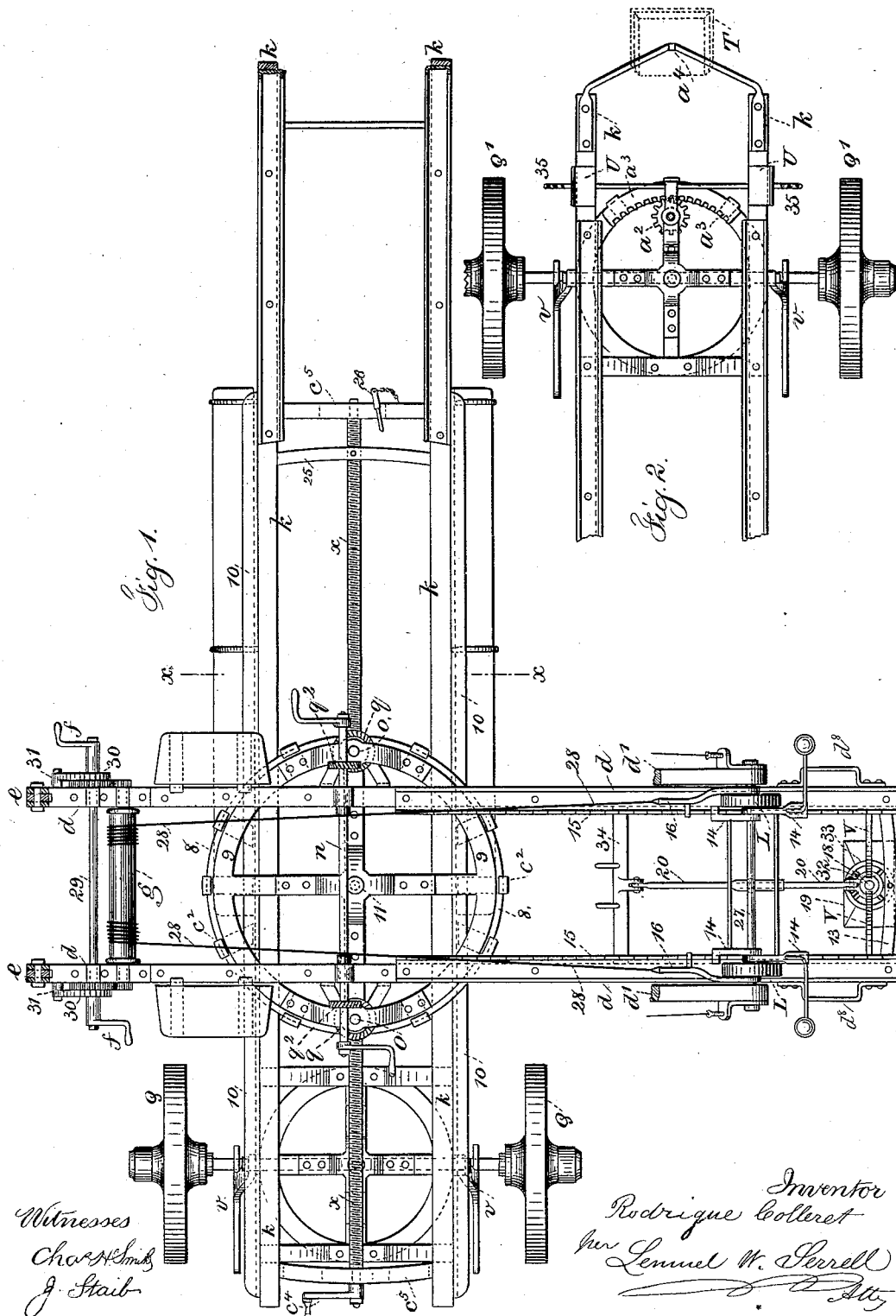
(No Model.)

3 Sheets—Sheet 1.

R. COLLERET.  
FIRE LADDER.

No. 489,628.

Patented Jan. 10, 1893.



Witnesses  
Charles Smith  
J. Strait

Inventor  
Rodrigue Colletet  
per Lemuel W. Perrell  
Att'y

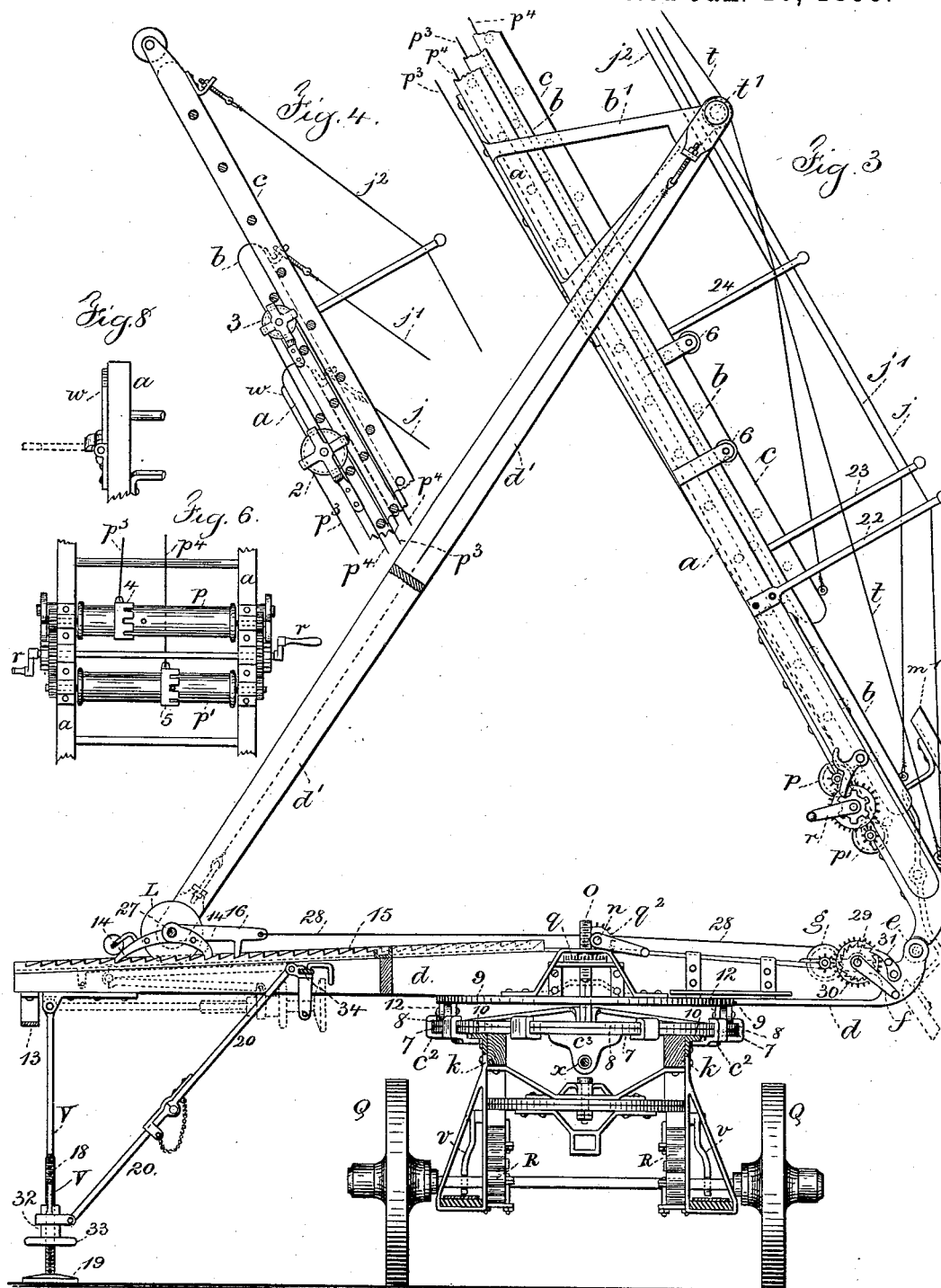
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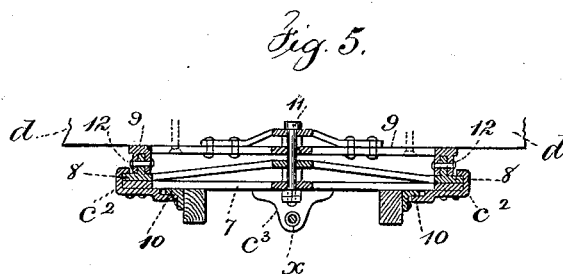
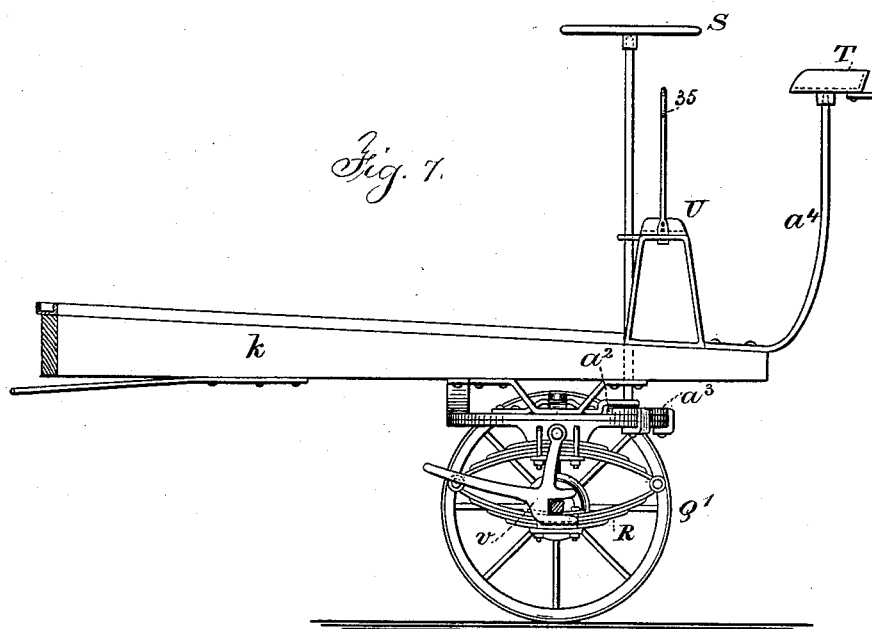
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# UNITED STATES PATENT OFFICE.

RODRIGUE COLLERET, OF MONTREAL, CANADA.

## FIRE-LADDER.

**SPECIFICATION** forming part of Letters Patent No. 489,628, dated January 10, 1893.

Application filed June 6, 1892. Serial No. 435,588. (No model.) Patented in Canada October 23, 1891, No. 37,670.

*To all whom it may concern:*

Be it known that I, RODRIGUE COLLERET, mechanical engineer, a citizen of Canada, residing in the city of Montreal and Province of Quebec, Canada, have invented an Improvement in Fire-Ladders, of which the following is a specification, and for which a patent has been issued in Canada, No. 37,670, dated October 23, 1891.

In this improvement, the extension ladders are supported by a frame upon wheels that can be drawn by horses and steered as usual, and the extension ladders are hinged to a secondary frame that can be turned around crosswise or at any desired angle to the main frame and supported by the main frame and by an adjustable standard; and the extension ladders can be elevated at any desired inclination and projected upwardly as required, and a provision is made for supporting the secondary frame transversely and adjusting it to the proper level, so that in raising the ladders, there will be no tendency to tip laterally.

In the drawings Figure 1 is a plan view with the extension ladders removed and the auxiliary frame swung around at right angles to the main frame, and one end of the main frame broken off. Fig. 2 is a plan view of the truck at one end and the portion of the main frame that has been separated in Fig. 1. Fig. 3 is a cross section of the main frame at the line  $x x$ , Fig. 1, and an elevation of the ladders as partially raised, the upper ends of the ladders being broken off and represented in Fig. 4, and Fig. 5 is a cross section through the turn tables connecting the respective frames. Fig. 6 is an elevation of a portion of the main ladder showing the drums or barrels upon which the ropes for elevating the ladders are wound. Fig. 7 is an elevation of the rear portion of the truck with the near wheel removed, and Fig. 8 shows one of the steps at the outer end of the main ladder.

The lower or main ladder  $a$  is hinged at  $e$  to the secondary or movable frame  $d$ , and upon the ladder  $a$  is an intermediate ladder  $b$ , and upon this rests the upper ladder  $c$ . These ladders are of suitable size and strengthened with tie rods or other usual appliances, and the ladders can be drawn up or extended

successively somewhat similar to extension ladders heretofore constructed.

The main frame  $k$  is provided with supporting trucks near the respective ends provided with wheels  $Q$   $Q'$  and axles and there are springs  $R$  between the axles and the bolsters of the lower circle or fifth wheel, and the upper circle or fifth wheel is connected by suitable bearings to the main frame  $k$ . The truck at one end is to receive a suitable pole or shafts to which horses are to be harnessed, and the truck at the other end is provided with a steering wheel  $S$  acting upon a pinion  $a^2$  that gives motion to a segmental rack  $a^3$  connected with the lower circle or fifth wheel of the truck, and there is at this end of the main frame a standard  $a^4$  with a movable seat  $T$  upon which the man sits to operate the steering wheel  $S$ , and at this end of the main frame  $k$  there is also a rest  $U$  for the reception of the ladders in a horizontal position when going to a fire or returning from the same.

The secondary frame  $d$  is above the main frame  $k$ , and about half the length of the same, and there is a turn table connection between the secondary frame and the main frame, such turn table connection being composed of three rings 7, 8, 9. The lower ring 7 of the turn table rests upon the main frame  $k$  and it is guided by clips  $c^2$  that grasp the projecting flanges 10 at the edges of the frame  $k$ , and this lower ring 7 has downwardly projecting nuts  $c^3$  through which passes the longitudinal adjusting screw  $x$ , the ends of which are held by cross bearings in the main frame  $k$ , and there is a crank  $c^4$  at one end of this screw by which it can be rotated, and, in so doing, the turn table and the parts carried by it can be moved endwise of the frame  $k$ .

The middle ring 8 of the turn table rests upon the lower ring 7, and there are edge clips for holding it in place and allowing the second or middle ring and the upper ring to turn together upon the lower ring, and the parts are provided with a king bolt 11 that keeps the respective rings of the turn table together, and the rings 8 and 9 are also hinged together by hinges 12 that are in line with the center of the secondary frame  $d$ , and the upper ring 9 of the turn table is per-

manently connected with the secondary frame *d*. There is a space between the rings 8 and 9 sufficient for a rocking or adjusting movement to be given to the upper ring in its relation to the lower rings for varying the position of the parts sufficiently to keep the upper ring and the frame *d* level, even if the carriage of the ladder is at an inclination in order that the ladder may be raised in a vertical plane to prevent the same tipping in either direction. To effect this object, I make use of vertical screws *o* passing through suitable supports and resting at their lower ends upon the middle circle 8, and the lower portions of these screws are preferably square, so that they are not revolved, but around each screw is a toothed wheel *q* having a central nut that fits upon the screw, and the cross shaft *n* is provided with crank handles by which it can be rotated and with pinions *q*<sup>2</sup> gearing into the teeth of the wheels *q*, so that by the rotation of the shaft *n* and wheels *q* *q*<sup>2</sup> the position of the ring 9 to the ring 8 of the turn table, can be varied; and it will be noticed that by the arrangement of the parts, the nut wheels *q* are rotated in opposite directions, hence one side of the secondary frame *d* is raised as the other side is lowered; by which means the upper ring 9 and the secondary frame *d* can be brought level when the ladder is in position longitudinally to the main frame, and also when the secondary frame *d* is swung around at any desired angle to the main frame; and it will be noticed that by rotating the longitudinal screw *x*, the turn table and the parts carried by it can be moved to any desired position along the main frame *k*, and when the ladders are to be lowered, the secondary frame *d* is turned into line with the main frame *k*, and the ends of the secondary frame coincide with the upper surfaces of the main frame, and it is advantageous to provide a cross bearer 25 on the main frame and a cross bearer 13 upon the secondary frame *d* resting upon the cross bearer of the main frame, and a pin 26 to pass through holes in the two bearers to keep the parts in position when the secondary frame is in line with the main frame.

Upon the upper surfaces of the main and secondary frames, there are tracks with upwardly projecting flanges between which the rollers *L* run, which rollers are at the lower ends of the prop bars *d'*, and these prop bars are united at their upper ends by a joint to the triangular lifter frames *b'*, the lower ends of which frames are permanently fastened to the under sides of the lower ladder *a*, and there is a cross shaft 27 uniting the lower ends of the prop bars and forming the axle for the rollers *L*. Upon this axle there are pawls 14 adapted to engage the rack teeth 15 upon the inner vertical edges of the metal rails upon the secondary frame *d*, so that as the ladders are raised to any desired angle by the action of the prop bars, these pawls 14 hold the prop bars and ladders, and in order to obtain the

proper power for bringing the lower ends of the prop bars along upon the rails of the frames, I employ a winch barrel *g* with suitable ropes or cables 28 connected to the links 16 that are pivoted upon the cross shaft 27 at the lower ends of the prop bars, and these links 16 are provided with pawl projections that engage the teeth 15 when the cables or ropes passing from the winch barrel *g* to such links are slackened; and to rotate the winch barrel *g*, cranks *f* upon a cross shaft 29 with suitable intermediate gearing are employed, and ratchet wheels 30 and pawls 31 are made use of for holding the cranks and winch barrel as the winding up progresses.

By the means before described, the ladders can be raised to any desired angle or lowered into position upon the frame, but when the secondary frame is turned around upon the turn table into an angular position to the main frame, the outer end of the stationary frame is to be supported by a movable strut or leg *V* which is preferably formed of a *V* shaped frame pivoted at the upper end and provided with a nut 32 at the lower end for the vertical screw 18 that can be rotated by a suitable hand wheel 33, and there is a foot 19 at the lower end of the screw to rest upon the ground, and the folding brace 20 is connected at one end to a cross bearer 34 upon the secondary frame *d* and at the other end to the *V*-shaped frame of the strut or leg, and these parts can be folded up to place, as shown by dotted lines in Fig. 3, before the secondary frame is turned around into position upon the main frame or brought down for use when the fire ladder is to be erected, as shown by full lines in same figure.

I employ a crank *r* in bearings upon the ladder *a*, and the shaft of this crank is provided with gearing for rotating the winch barrels *p p'*, from which suitable ropes or cables pass to the respective ladders, the rope *p*<sup>3</sup> from the barrel *p* passing over a pulley 2 at the upper end of the ladder *a* and passing down between the two ladders and connecting with the lower end of the intermediate ladder *b*, and the rope *p*<sup>4</sup> from the winch barrel *p'* passing over a pulley 3 upon the upper end of the intermediate ladder *b* and extending down between the ladder *b* and the ladder *c* and connected to the lower end of the ladder *c*.

Any suitable device can be employed for causing the crank *r* to rotate either or both of the winch barrels *p p'*; I have however represented the respective ropes as connected with sliding couplings 4 and 5 upon the respective winch barrels, such couplings being in the form of cylinders notched at one end to receive the stationary pins upon the winch barrels, so that by slipping these couplings endwise they are either connected to or disconnected from the respective winch barrels, and when the cranks *r* are actuated, the ladders are drawn up or extended; and I remark that upon the respective ladders *a* and *b* are

suitable guides with rollers 6 to connect the one ladder with the other but to allow for the end movement in projecting the ladders.

Upon the lower ladder *a* there are supporting posts or stanchions 22 permanently fastened and provided with eyes near their upper ends through which pass cords or wires which serve as hand rails and also to stiffen the ladders, and upon the intermediate ladder *b* are stanchions 23, the lower ones of which have two eyes near the upper ends; one eye passes the cord or wire *j* and the other eye passes the cord or wire *j'*, the ends of which are fastened to the secondary ladder, and upon the upper ladder *c* are stanchions 24 similarly fitted and provided with the cords or wires *j''*, so that as the ladders *b* and *c* are projected upwardly, the lower stanchions 24, slide over the wires *j'*, and the lower stanchions 22, slide over the wires *j*, of the respective ladders below them.

The driver's seat *m'* is supported by bars connected at their lower ends with the lower ladder *a*, and this seat can be swung downwardly and out of the way when the ladders are being raised for use, as shown by dotted lines in Fig. 3.

It is to be understood that this fire ladder may be provided with runners or sleighs for the winter season in place of wheels, and that when it is brought into position for being raised, the main frame can stand transversely of the street and at right angles to the building, so that the ladders can be raised without swinging the secondary frame upon the main frame, or the main frame of the apparatus may remain longitudinal in the street, and the secondary frame and the ladders be swung toward the building after the ladders have been partially raised so that the lower ends of the prop bars rest upon the secondary frame, and during this operation, the cranks and shaft *n* are manipulated to keep the secondary frame *d* level, so that the ladders may be raised in a vertical plane, and the longitudinal screw *x* may be adjusted to bring the ladders into their proper positions to the building.

I remark that it is advantageous to employ the swinging hooks *v* adjacent to the respective springs *R*, which hooks are adapted to pass above and below the axle at the respective springs and form rigid connections so that the ladders will not be influenced by the yielding of the springs while such ladders are being raised or lowered. It will also be evident that the ladders may be moved from one window to another or any short distance without changing the position of the carriage itself, because the auxiliary frame and ladders can be moved along upon the main frame by the action of the screw *x*.

The main or lower ladder *a* may be stiffened and the risk of vibration lessened by rods or wire ropes *t* connected at their ends near the ends of the ladder *a*, and tightened by screws, such wire ropes passing over the

cross bar *t'* that connects the upper ends of the prop bars *d'* to the lifting frames *b'*, and there may be steps *w* upon the sides of the ladder *a* near the upper end, to allow the fireman to stand upon such steps while the ladders *b* and *c* are being raised or lowered, and by providing handles upon the sides of the ladder *a* near the lower end thereof and upon the secondary frame *d* near its moving end, as at *d''* the handling of the parts is facilitated.

In consequence of the rod for the steering wheel *S* and the support for the seat *T* for the driver passing through the ladders when the same are lowered, it is necessary to lift the seat and the steering wheel off before the ladders are raised, and they may be hung up on hooks 35 provided for the purpose, and after being used, the respective parts of the fire ladder are returned to their normal positions and the seat and steering wheel replaced, so that the ladder can be removed to the building in which it is ordinarily kept.

The steps *w* may be hinged so as to be folded up against the sides of the lower ladder *a*, as illustrated in Fig. 8.

I claim as my invention.

1. The combination in an extension fire ladder, of a main frame, trucks for supporting the same, extension ladders, hinges for connecting the lower extension ladder with the frame, prop-bars connected at their upper ends to the extension ladders, rails upon the frame and rollers upon the lower ends of the prop-bars running upon the rails, a barrel and cables or ropes extending from the barrel to the base of the prop-bars for moving the same along and elevating the extension ladders, rack teeth upon the frame and pawls for holding the ladders in their elevated positions, substantially as set forth.

2. The combination with the extension ladders, one sliding upon the other, of ropes or cables, pulleys at the upper ends of the ladders over which such ropes or cables pass and winch barrels, mechanism for revolving the same and sliding cylindrical couplings engaging projections on the winch barrels and to which the cables or hoisting ropes are connected, and means for holding such ladders when elevated, substantially as set forth.

3. The combination with the extension ladders, of a frame and trucks for supporting the same, a secondary frame to which the ladders are hinged, prop-bars and mechanism for operating the same to raise the ladders, a turn table for connecting the primary and secondary frames and adjusting screws and cog nuts and one cross shaft for actuating the nuts simultaneously and in opposite directions for leveling the secondary frame and ladders, substantially as set forth.

4. The combination with the main frame and a truck for the same, of a secondary frame, ladders connected to the secondary frame, a turn table connecting the primary and secondary frames, a longitudinal adjust-

ing screw for moving the turn table and secondary frame lengthwise of the main frame, and screws for bringing the secondary frame and ladders into a level position, substantially as set forth.

5 5. The combination with the main frame and a truck for the same, of a secondary frame, ladders connected to the secondary frame, a turn table connecting the primary  
10 and secondary frames, a longitudinal adjusting screw for moving the turn table and secondary frame lengthwise of the main frame, screws for bringing the secondary frame and ladders into a level position, and a swinging  
15 strut or leg connected with the secondary frame near the end thereof, and a screw for supporting such secondary frame when swung into an angular position across the main frame, substantially as set forth.

6. The combination with the extension ladders and the primary frame and trucks for supporting the same, of the secondary frame and a turn table composed of three rings, the lower one of which rests upon the main frame, an intermediate ring connected to the lower  
25 ring by clips, and an upper ring permanently connected to the secondary frame and hinged to the intermediate frame, screws for adjusting the upper ring and secondary frame in relation to the lower rings, and means for  
30 adjusting the turn table longitudinally of the main frame, substantially as set forth.

Signed by me this 8th day of April, 1892.

RODRIGUE COLLERET.

Witnesses:

A. LÉVÊQUE,

A. PRÉFONTAINE.