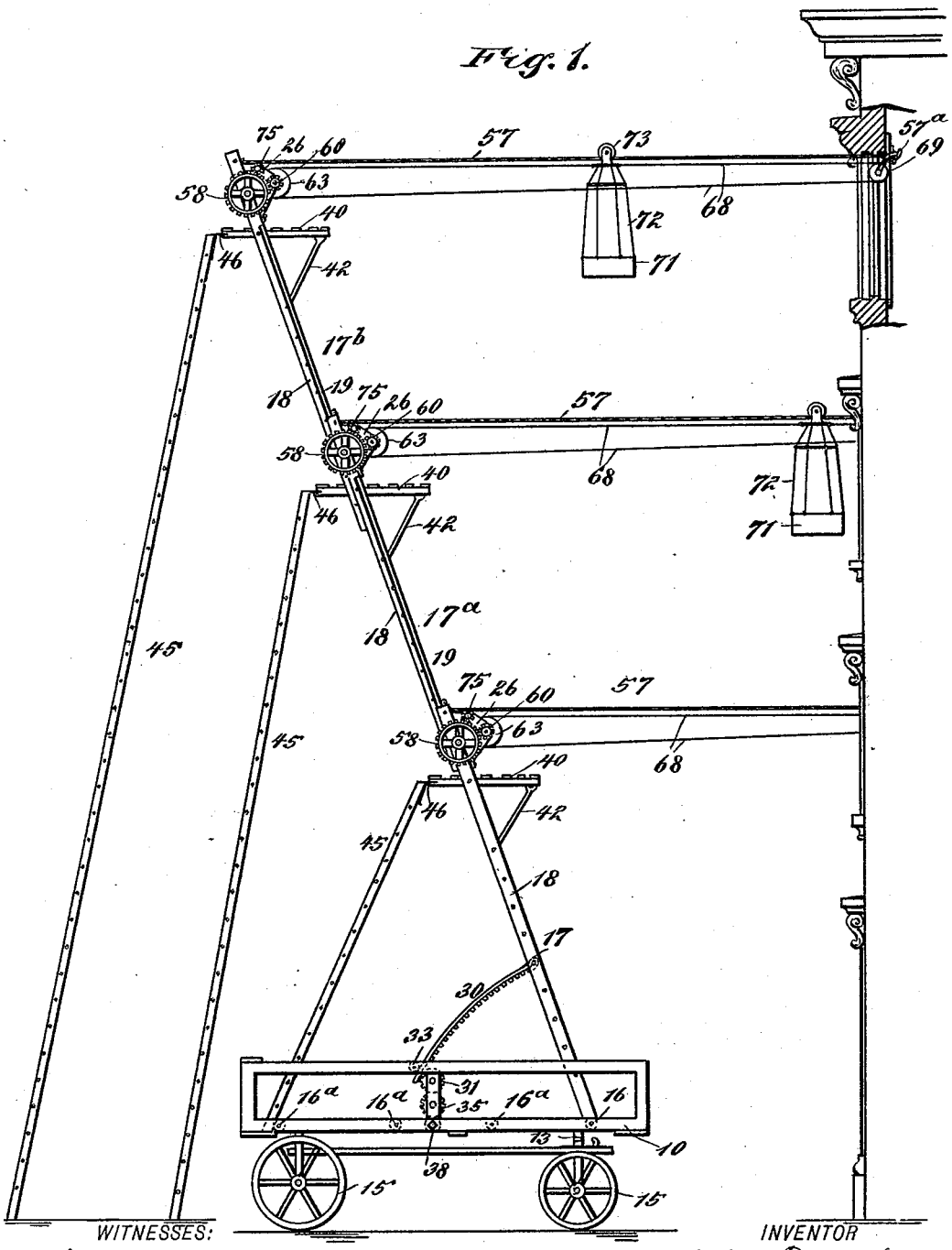
(No Model.) 4 Sheets—Sheet 1.

M. A. PAULY.

FIRE APPARATUS.

No. 490,496. Patented Jan. 24, 1893.

Fig. 1.

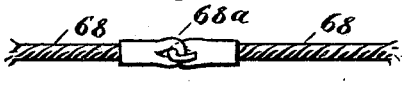


WITNESSES:

J. a. Bergstrom

C. Sedgwick

Fig. 12.



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ATTORNEYS.

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M. A. PAULY.

FIRE APPARATUS.

No. 490,496. Patented Jan. 24, 1893.

Fig. 2.

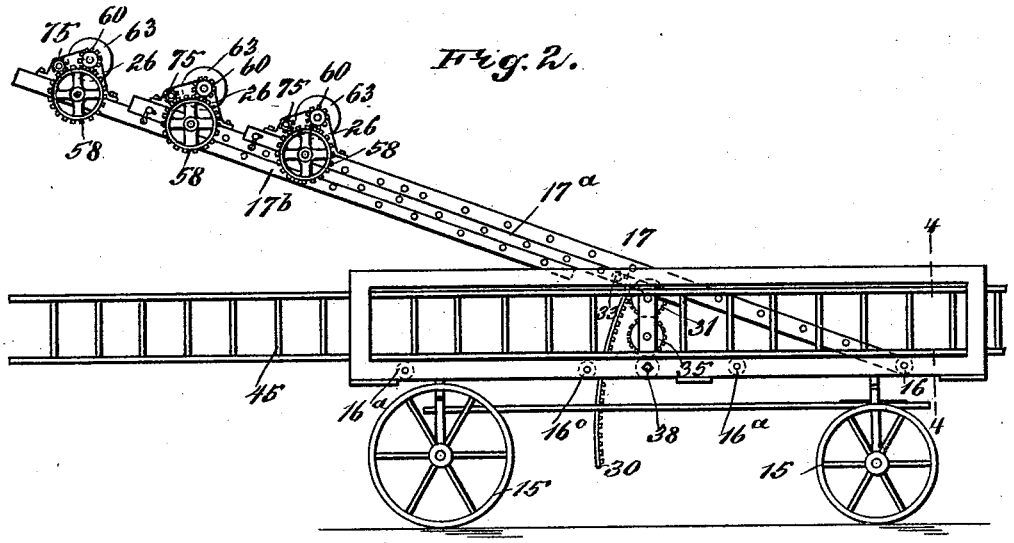


Fig. 3.

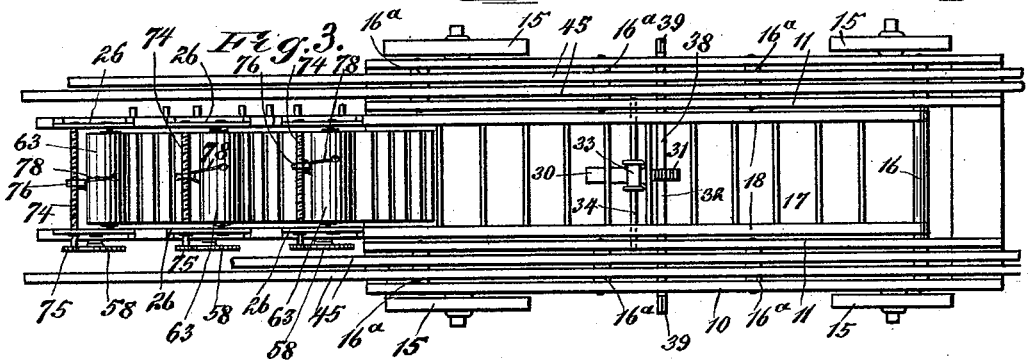
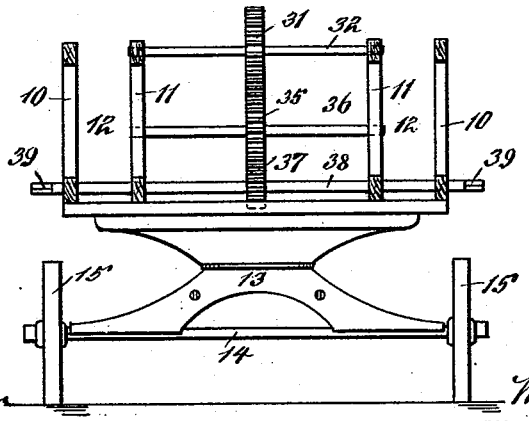


Fig. 4.



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M. A. PAULY.

FIRE APPARATUS.

No. 490,496. Patented Jan. 24, 1893.

Fig. 6.

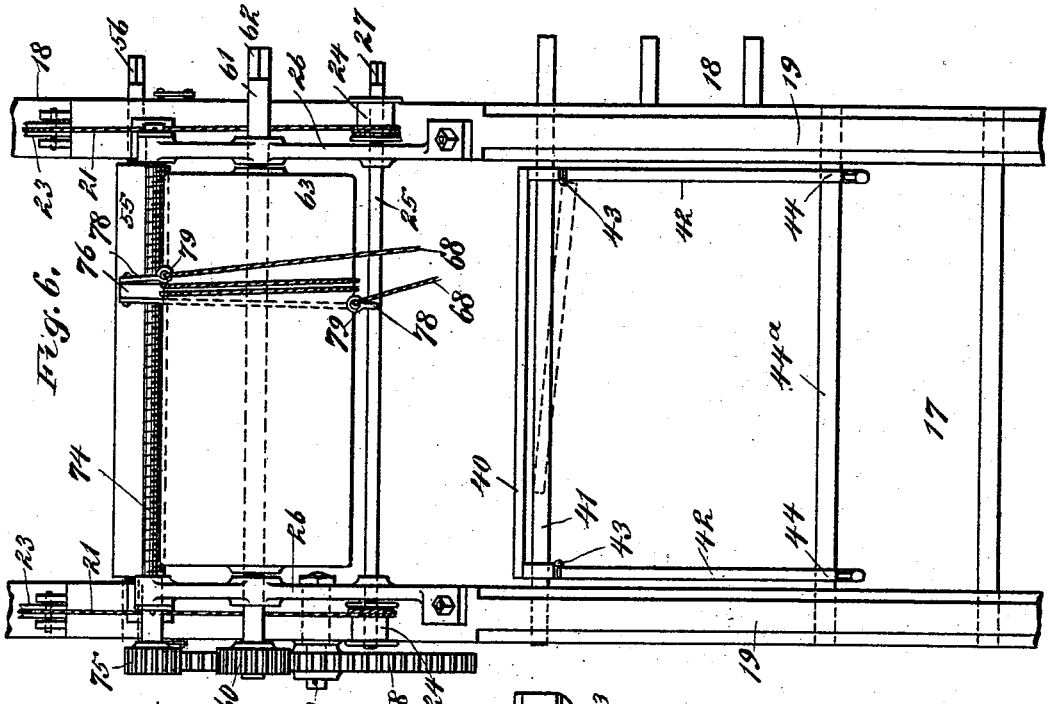
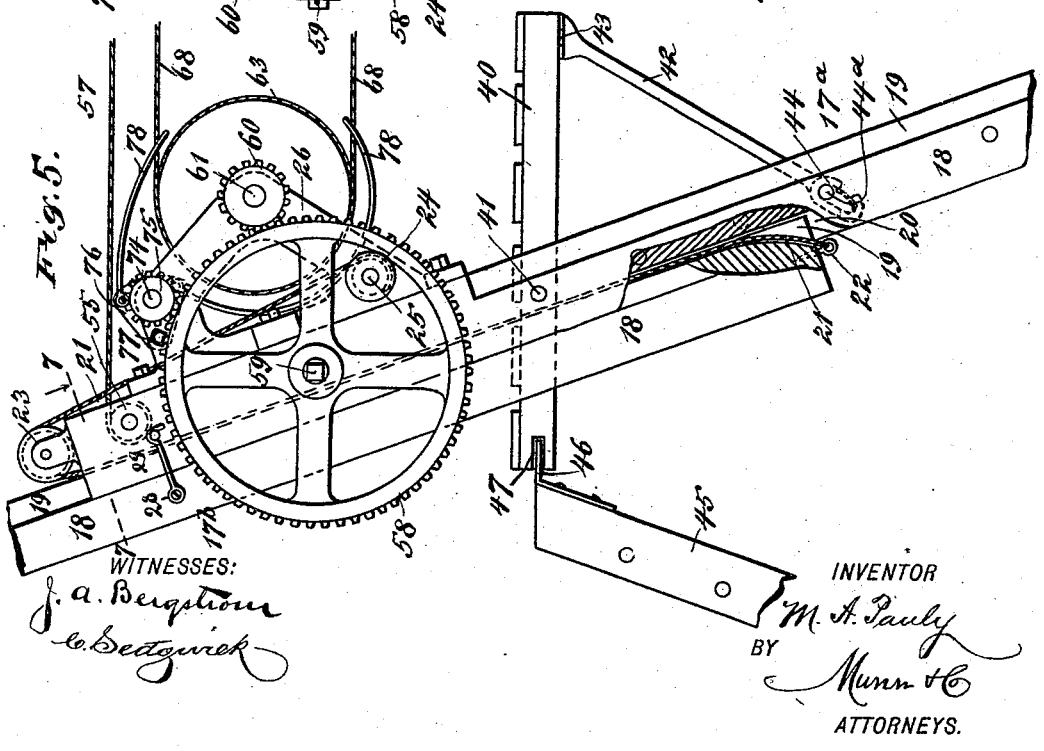


Fig. 5.



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(No Model.) 4 Sheets—Sheet 4.

M. A. PAULY.

FIRE APPARATUS.

No. 490,496. Patented Jan. 24, 1893.

Fig. 8.

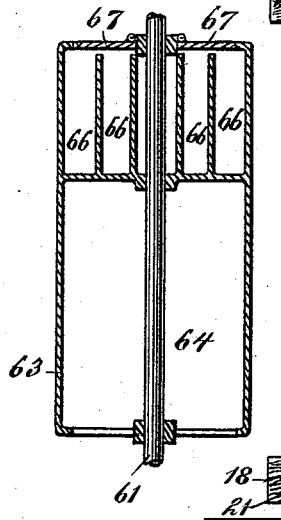


Fig. 7.

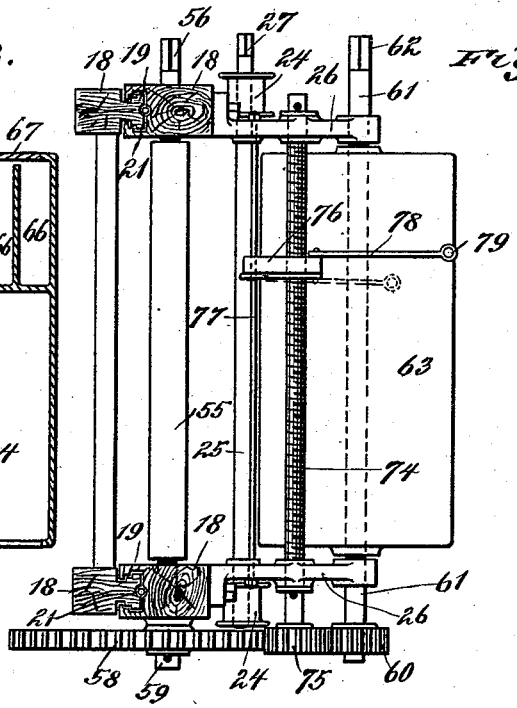


Fig. 9.

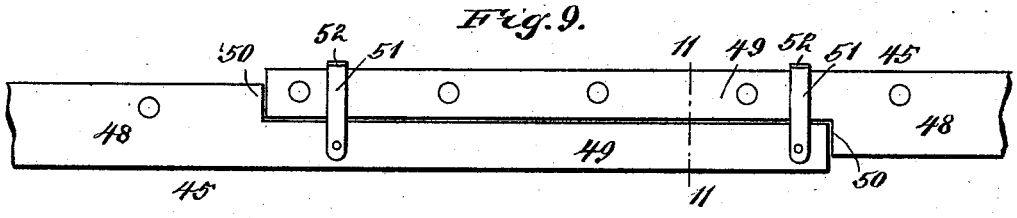


Fig. 10.

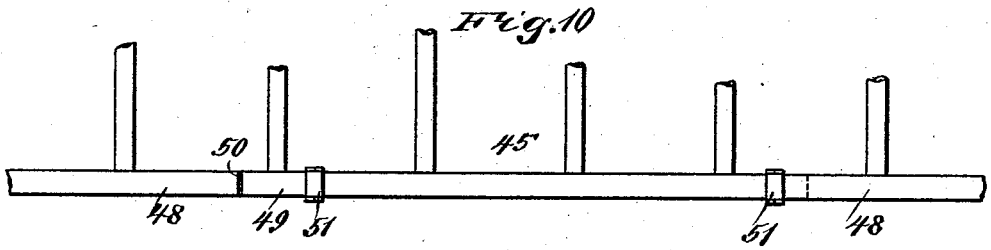
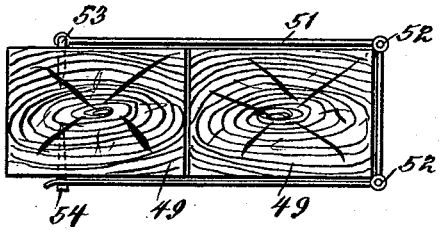


Fig. 11.



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UNITED STATES PATENT OFFICE.

MELVIN A. PAULY, OF EAU CLAIRE, WISCONSIN.

FIRE APPARATUS.

SPECIFICATION forming part of Letters Patent No. 490,496, dated January 24, 1893.

Application filed October 8, 1892. Serial No. 448,252. (No model.)

To all whom it may concern:

Be it known that I, MELVIN A. PAULY, of Eau Claire, in the county of Eau Claire and State of Wisconsin, have invented a new and Improved Fire Apparatus, of which the following is a full, clear, and exact description.

My invention relates to improvements in apparatus adapted for use at fires, and the object of my invention is to produce an apparatus which may be used as a fire ladder, fire extinguisher and a fire escape. In carrying out this idea, I provide an extensible ladder with a suitable gear mechanism by means of which it may be raised and extended to any necessary height from the ground, and also arrange supporting ladders extending to different landings on the extensible ladder so as to provide means for carrying up a hose, or to enable people to descend and escape from a burning building; and further, in carrying out the idea, I arrange landings or platforms at intervals upon the ladder and in connection with the landings operate cars which are adapted to move either horizontally or at an incline between the windows of a building and the landings, so that the occupants may be readily and safely transferred from the building to the ladder and from thence to the ground.

To these ends, my invention consists in certain features of construction and combinations of parts which will be hereinafter described and claimed.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar figures of reference indicate corresponding parts in all the views.

Figure 1 is a side elevation of the apparatus in position for use as a fire escape; Fig. 2 is a side elevation of the apparatus when in position to be hauled over the road, the ladders being collapsed and folded; Fig. 3 is a plan view of the apparatus as shown in Fig. 2; Fig. 4 is a central cross section through the wagon portion of the apparatus, showing the gear mechanism for raising the ladders and the compartments for holding the detachable ladders; Fig. 5 is an enlarged broken side elevation of the extensible ladder, taken at a point opposite one of the swinging platforms or landings, and showing in detail the gear mechanism for operating the life saving cars, and for extending the ladder, also showing the means of fastening the detachable ladders to the platforms; Fig. 6 is a front elevation of the construction shown in Fig. 5; Fig. 7 is a sectional plan on the line 7—7 in Fig. 5; Fig. 8 is a detail longitudinal section of one of the winding drums which carry the life lines and cars; Fig. 9 is an enlarged detail side elevation, showing a convenient manner of splicing the detachable ladders; Fig. 10 is a broken plan of one side of the ladder joint as shown in Fig. 9; Fig. 11 is a cross section on the line 11—11 in Fig. 9; and Fig. 12 is a broken detail view of one of the ropes used for carrying and suspending the cars.

The apparatus is provided with a wagon body which consists of an open rectangular framework 10, and this is divided longitudinally by partitions 11, so as to form longitudinal compartments 12 near the sides, in which the detachable ladders may be carried. The wagon body is mounted on the ends upon bolsters 13 of the usual kind, these being carried upon axles 14, which are journaled in wheels 15, the wheels at both ends of the body being so mounted that a short turn may be made, and any ordinary running gear may be used and a pole may be applied in the usual way for hauling the apparatus.

Extending transversely across the front end of the body at the bottom, is a shaft 16 to which the lower section 17 of the extensible ladder is secured, and behind this shaft at intervals in the wagon body and on opposite sides are rollers 16^a, upon which the detachable ladders rest and which facilitate the easy withdrawal of the ladders from the compartments 12.

The extensible ladder comprises a series of united sections 17, 17^a and 17^b, three being shown in the drawings to illustrate the construction of the ladder, but in practice any necessary number of sections may be used so that the ladder may be extended as high as practicable. These sections are arranged to slide one upon the other, the lower section being secured to the shaft 16, and the side rails 18 of the ladder sections are connected by rungs in the usual way, and all except the bottom section have front longitudinal angu-

lar tongues 19, which are dovetailed into grooves 20 in the boxes of the adjacent rails, as shown clearly in Fig. 7, so that the sections may be easily moved up or down.

At the lower end of each of the lower rails 18, save those of the lower ladder section, is secured a cable 21, the attachment being made preferably by means of an eye-bolt 22, as shown clearly in Fig. 5, and these cables extend upward over pulleys 23 on the tops of the rails of the next lower ladder section, as shown in Figs. 5 and 6, and the cables then extend downward and are secured to grooved pulleys 24 on a shaft 25 which is journaled in brackets 26 at the top of the ladder section, and the end 27 of the shaft 25 is squared so that a wrench or crank may be applied to it and the shaft turned. This arrangement is provided at the top of each ladder section except the top section, so that from the top of one section the crank shaft may be worked so as to raise the next section, and so on until all the sections are raised. After one section has been raised above the other, it may be held by fastening the shaft 25, and this may be done by means of an ordinary ratchet, and the fastening may also be effected by a hasp 28, see Fig. 5, which is secured to the upper section and engages a stud 29 on the lower section. These hasps and studs should be placed on the opposite rails of the two sections and they prevent one section from sagging while the one above is being raised.

The extensible ladder is raised to the necessary angle by the following gear mechanism; the lower ladder section 17 has on its back or under side and near the center, a rack bar 30, which is made bowing and extends downward and rearward and engages a pinion 31 on a shaft 32, the latter being journaled in the frames 11, and the back of the rack bar is held against a roller 33 on the shaft 34 which is also journaled in the frames 11, see Figs. 1 and 3, so that the bar is always held in proper position. The pinion 31 meshes with the pinion 35 beneath it, this pinion being secured to a shaft 36, and the pinion 35 engages a pinion 37 on a transverse shaft 38, the latter extending outward from both sides of the wagon body and terminating in square ends 39, to which wrenches or cranks may be attached. By turning the shaft 38 the gear mechanism just described is operated and the rack bar moved up and down so as to adjust the extensible ladder to the desired pitch.

Near the top of each ladder section is a swinging platform 40, which serves as a landing for people taken from a building and which also serves as a landing or support upon which the persons may stand who are operating the apparatus, as hereinafter described. Each platform 40 is carried by a shaft 41, which is journaled in the side rails of the extensible ladder, and the swinging platform has hinged to opposite sides of its forward ends supporting arms 42, the arms being connected by hinges 43, see Fig. 5, and the lower ends of the arms terminate in snap hooks 44, adapted to engage the rung 44^a of the ladder, and the platform is thus supported in a horizontal position. When the platforms are not in use the arms 42 are folded upward and rearward and the platforms may be tilted into a plane substantially parallel with the rails of the ladder.

The extension ladder is braced and connection made with it so as to enable people to pass down rapidly by means of the detachable ladders 45, which are arranged so as to connect with each landing, the ladders having laterally extending arms 46 at the top, which are adapted to enter slots 47, see Fig. 5, in the back ends of the platforms. This is an arbitrary arrangement however, and the ends of the detachable ladders may be fastened to the platforms in any convenient way.

When the distance to the platform is too great for a ladder formed of single rails to reach, the rails may be spliced in the manner shown in Figs. 9 to 11. Here, the rails 48 of a ladder are reduced at their meeting ends, as shown at 49, and the reduced ends terminate in shoulders 50, so that when placed together the extremity of one of the reduced portions of one rail will abut with the shoulder of the other. The reduced portions of the rails are held together by straps 51, which are adapted to embrace the rails, the straps being jointed or hinged, as shown at 52; these bends coincide with the rail corners so that the straps may fit nicely upon the rails, and one end of each strap is secured to an eye-bolt 53, which is fastened to one side of a rail, and the free end of the strap is attached, as shown at 54, in Fig. 11, to a fastening hook on the opposite side of the rail.

Journaled in the upper end of each ladder section is a drum 55, the shaft of which projects through one of the rails and terminates in a square end 56 to which a wrench or crank may be applied, and this drum 55 is adapted to carry a strong rope 57, which serves as a track upon which the life car runs as hereinafter described. This rope 57 is adapted to be thrown to any desired window in the building, but preferably to one nearly horizontally opposite or above the drum 55, and the free end of the rope is made fast by a substantial hook 57^a to a strong ring within the building, and adjacent to the window, see Fig. 1, and when this apparatus is used the various rooms of a building should be provided with rings of this class for the purpose of fastening the hook 57^a of the rope 57. After the rope is made fast, the drum 55 is turned so as to take up the slack of the rope.

The drawings show the lines 57 in a horizontal position, but when necessary they may be connected with a window high above the ladder, and the car described below will run upon them as well.

Beneath the drum 55, and on one side of each section is an enlarged gear wheel 58, which has a square shaft 59 to which a wrench

or crank may be applied, or in lieu of the wrench or crank, a handle may be fastened to one of the spokes of the gear wheel, and this gear wheel meshes with a pinion 60 on the shaft 61, which shaft is journaled in the outer portion of the brackets 26, and has one square end 62.

The shaft 61 carries a large drum 63, which has a large compartment 64 in one end, see Fig. 8, and in this compartment the free ends of the ropes of the apparatus may be placed when not in use. The opposite end of the drum has pigeon holes 66 therein, which are closed by doors 67, and these are adapted to contain rubber mitts, insulated shears for cutting electric wires, extra sections of carrying rope for the life car, and any small tools adapted for use in connection with the apparatus.

Each drum 63 carries an endless rope 68, which is the carrying rope for the life car, and the rope is preferably made in sections connected by hooks and eyes, as at 68^a, see Fig. 12, or by snap-hooks, so that the length of the rope may be easily regulated. The rope runs over a pulley 69, which is suspended from the hook 57^a. The rope 68 is adapted to operate a car 71, which may be of any approved construction and should be large enough to carry one or two people. This car is suspended by ropes 72, which should be adjustable like the rope 68 already described, and the ropes are carried by a pulley 73, which is supported in a suitable bracket, and runs upon the track or cable 57. It will be seen that by turning the drum 63, the rope 68 may be moved in the desired direction and the car 71 moved quickly backward and forward so as to convey people from the building to the adjacent landing 40, after which the people may descend by the ladder 45.

Arranged parallel with and immediately behind each drum 63 is a screw shaft 74, which is also journaled in the brackets 26, and which has at one end a pinion 75 driven by the gear wheel 58. On this screw shaft is a triangular nut 76, which is held to move back and forth on the shaft and to prevent the nut from turning and to cause it to move steadily in a longitudinal direction on the shaft, one corner of the nut is held to slide on the rod 77, see Fig. 7, which is arranged parallel with the screw. This nut 76 also carries the rope guides, which comprise oppositely and forwardly extending arms 78, which straddle the drum 63, extending above and below it, and the guide arms terminate in eyes 79, through which the rope extends. It will be seen that when the drum 63 is turned, the screw 74 will be also turned, and the nut 76 moving backward and forward on the shaft causes the arms 78 to be carried in a like manner and the rope 68 to move in a regular manner upon the drum. The rope when arranged for use is wound several times upon the drum so that it will have sufficient friction to prevent its slipping.

The car will be supplied with a small rope, so that a fireman may raise a line of hose to him when he is in the car at the burning building or between the ladder and the building.

The operation of the apparatus is as follows: It is wheeled to the building where a fire is in progress, and arranged with the wagon endwise and opposite the windows with which connection is to be made. The shaft 38 is then turned so as to actuate the rack bar 30 and bring the extensible ladder in the desired position. A fireman then runs up the first ladder section, turns the shaft 25 and drums 26 so as to wind the cables 21 upon the drums or pulleys 24, thus raising or extending the next ladder section. When this section is fastened in its position as hereinbefore described, the fireman swings up the platform 40 and fastens it by the arms 42, while others adjust the shortest adjustable ladder 45 and connect it with the platform. Other firemen run up the ladder and raise the third ladder section, when the second platform is adjusted in the manner described, and this operation is repeated until the ladder is extended to the necessary height. A light rope is then attached to the hook 57^a which is to be extended to a certain window, or several ropes may be arranged in the same manner if more than one is to be used, and the light rope thrown into the window of the building and the heavy rope or ropes 57 with hooks 57^a drawn in and attached to the rings in the building. If it is more convenient, the occupants of the building may throw out the ropes which are to be attached to hooks 57^a. The ropes 68 are then adjusted by means of the sections above specified, and then by turning the drum 63, the car 71 may be carried back and forth, running upon the ropes 57 which serve as tracks. In this way a large number of people may be quickly taken from the building.

If the apparatus is used as a fire extinguisher simply, the firemen may stand upon the landings 40 and play with precision and effect through the windows upon the fire, or they may be brought still nearer if necessary, by means of the cars which are arranged and operated in the manner described.

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

1. A fire apparatus, comprising a portable wagon body, an extensible ladder carried by the body and comprising a series of sliding sections, a gear mechanism for raising the extensible ladder, a series of horizontally traveling cars to convey the persons from the building to the platforms, and mechanism for operating the cars from the platforms, a series of landings or platforms adapted to extend horizontally from the upper portions of the ladder sections, substantially as described.

2. A fire apparatus, comprising a series of sliding sections, a gear mechanism for raising the ladder into an inclined position, a

gear mechanism arranged at the top of each ladder section and adapted to operate the next higher section, platforms or landings arranged near the tops of the ladder sections, cable tracks adapted to be extended from above each platform to the building and connect therewith a car for each track and mechanism for moving the cars to and from the building, substantially as described.

3. A fire apparatus, comprising a portable wagon body, an extensible ladder hinged to the body and comprising a series of sliding sections, a gear mechanism for raising the extensible ladder, platforms or landings arranged near the tops of the ladder sections, and detachable ladders adapted to be fastened to the platforms and to extend downward to the ground, substantially as described.

4. A fire apparatus, comprising a portable wagon body or support, a swinging extensible ladder carried by the body and comprising a series of sliding sections, a swinging platform arranged near the top of each section, supporting arms secured to the free edges of the platforms and adapted to engage the ladder rungs, and detachable ladders adapted to be fastened to the opposite edges of the platforms and extend down to the ground substantially as described.

5. A fire apparatus, comprising a main ladder, means for supporting the ladder in an inclined position, a series of detachable ladders adapted to be connected with the main ladder, adjustable tracks extending from the ladders near the platforms and adapted to connect with a building, cars held to run upon the tracks, and a drum and rope mechanism for moving the cars forward and back, substantially as described.

6. A fire apparatus, comprising an extensible ladder having landings or platforms near the tops of the sections, detachable ladders adapted to connect with the platforms and extend to the ground, cables or tracks secured to the ladders above the platforms and adapted to connect with a building, drums arranged above the platforms and beneath the tracks, a gear mechanism for operating the drums, endless ropes carried by the drums and adapted to be supported on pulleys which are hooked into rings, and movable cars connected with the ropes and held to run upon the tracks or cables, substantially as described.

7. In a fire apparatus, the combination of the revoluble drum, the rope carried by the drum and adapted to connect with a car, a revoluble screw shaft geared to the drum shaft, a nut held to slide on the screw shaft, and guide arms carried by the nut and arranged to embrace the drum, the arms having terminal eyes to receive the rope, substantially as described.

8. In a fire apparatus of the character described, the combination with the main extensible ladder of the detachable ladder sections having the meeting ends of their rails reduced and adapted to fit together, and a fastening strap secured to one rail and embracing the next rail, the strap being jointed at the corners, substantially as described.

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Witnesses:
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