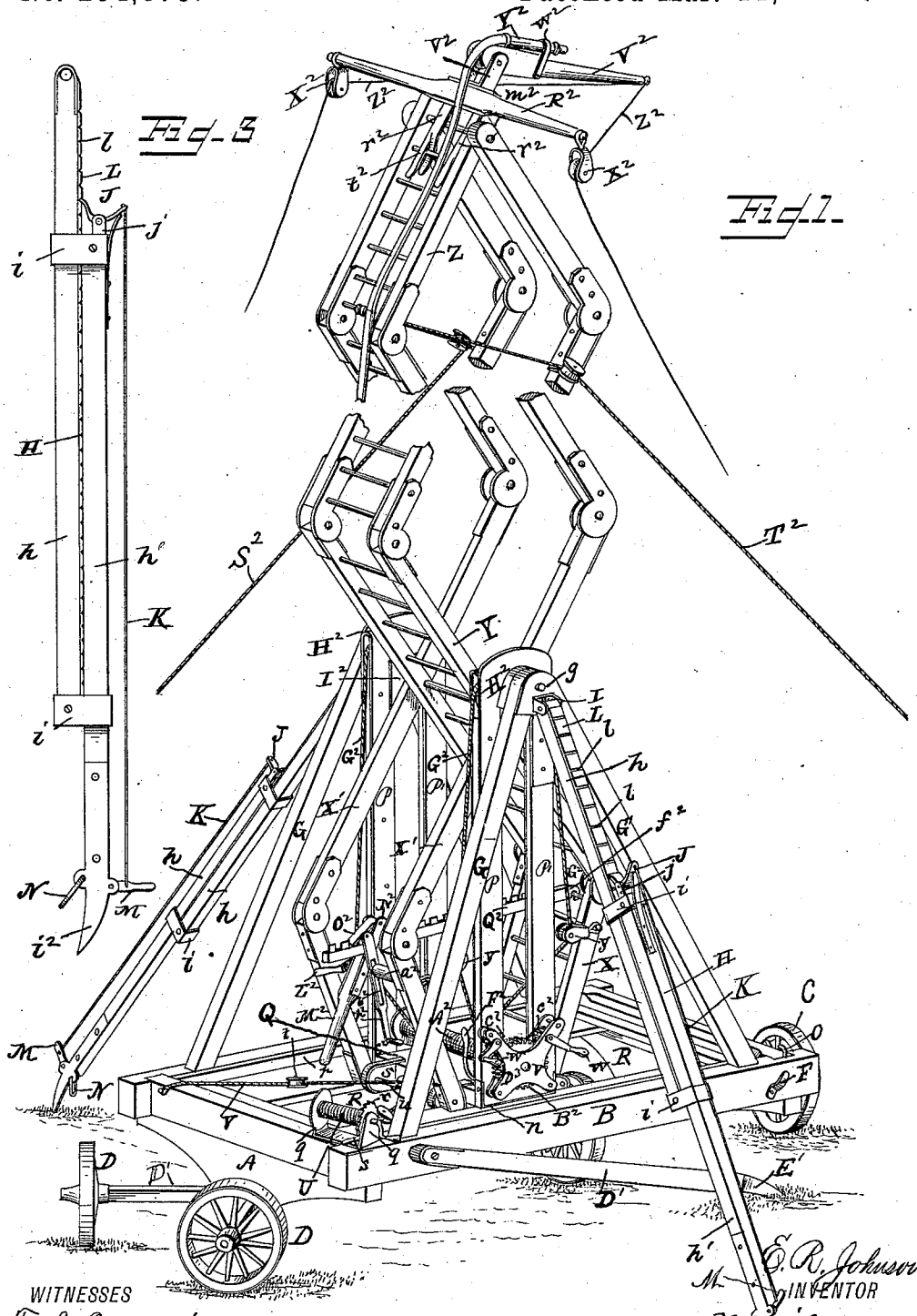
(No Model.) 4 Sheets—Sheet 1.

E. R. JOHNSON.

FIRE ESCAPE.

No. 294,879. Patented Mar. 11, 1884.



WITNESSES

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(No Model.) 4 Sheets—Sheet 2.

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Fig. 2.

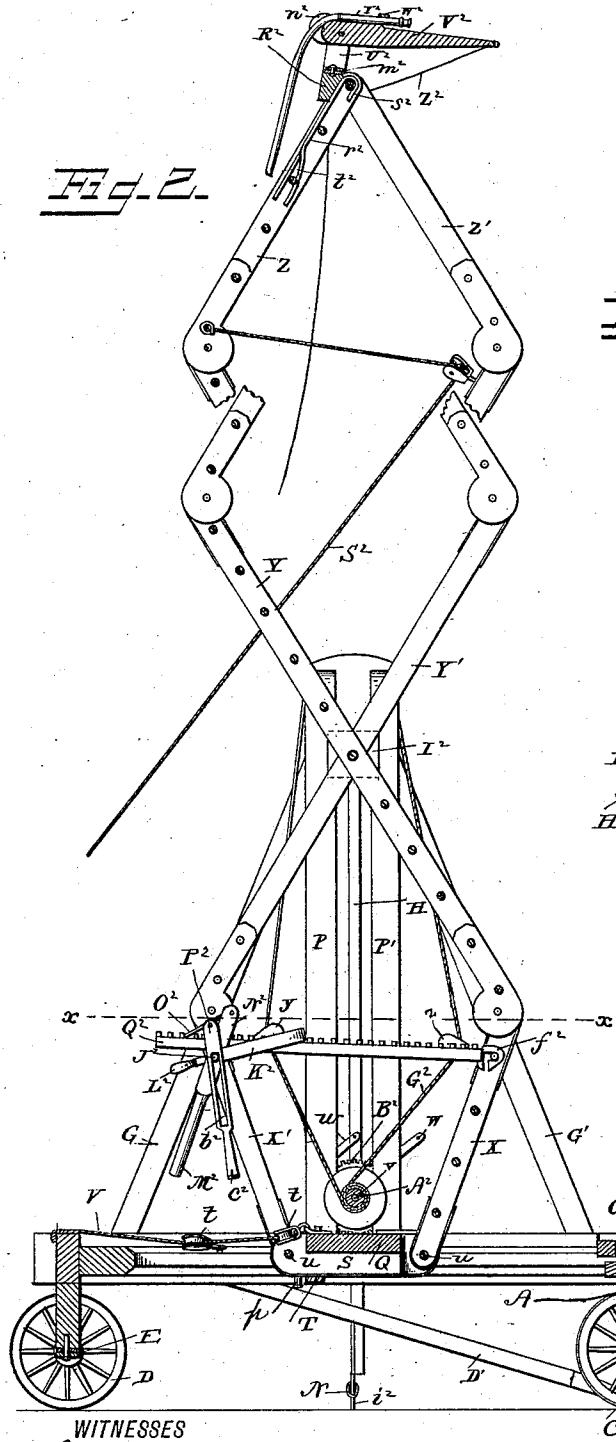
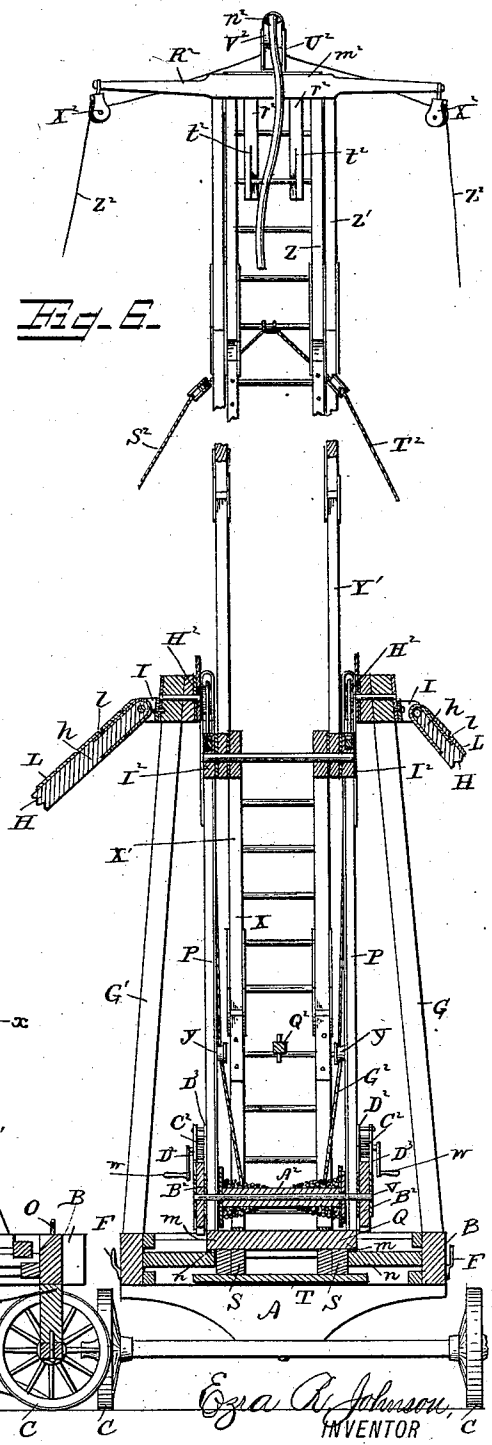


Fig. 6.



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Fig. 5.

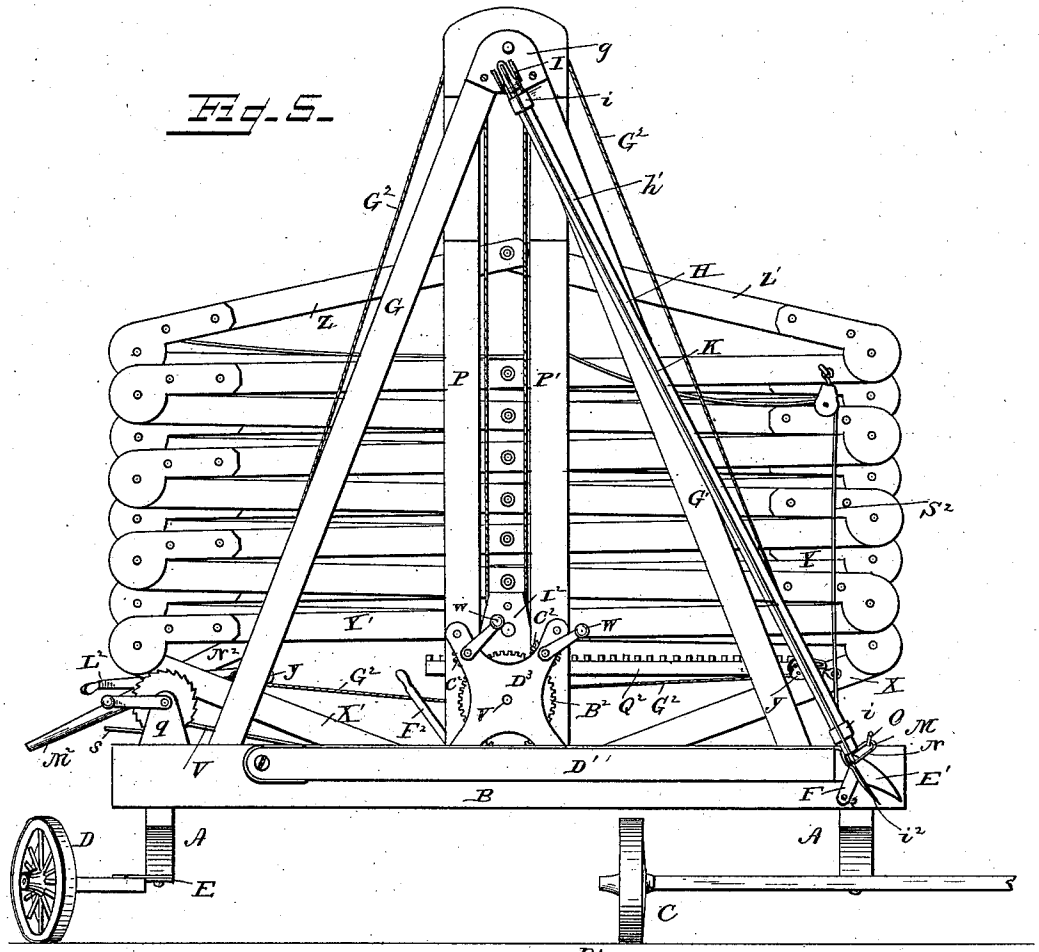
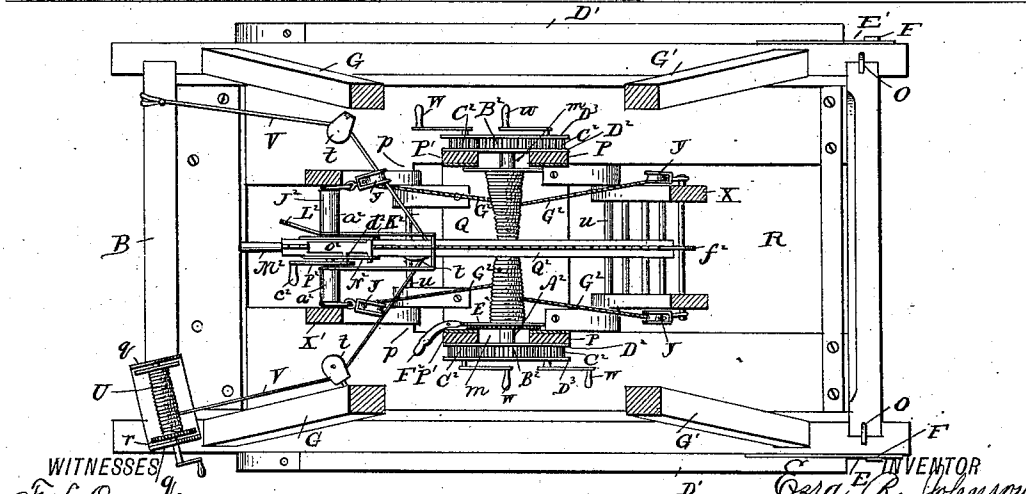


Fig. 4.



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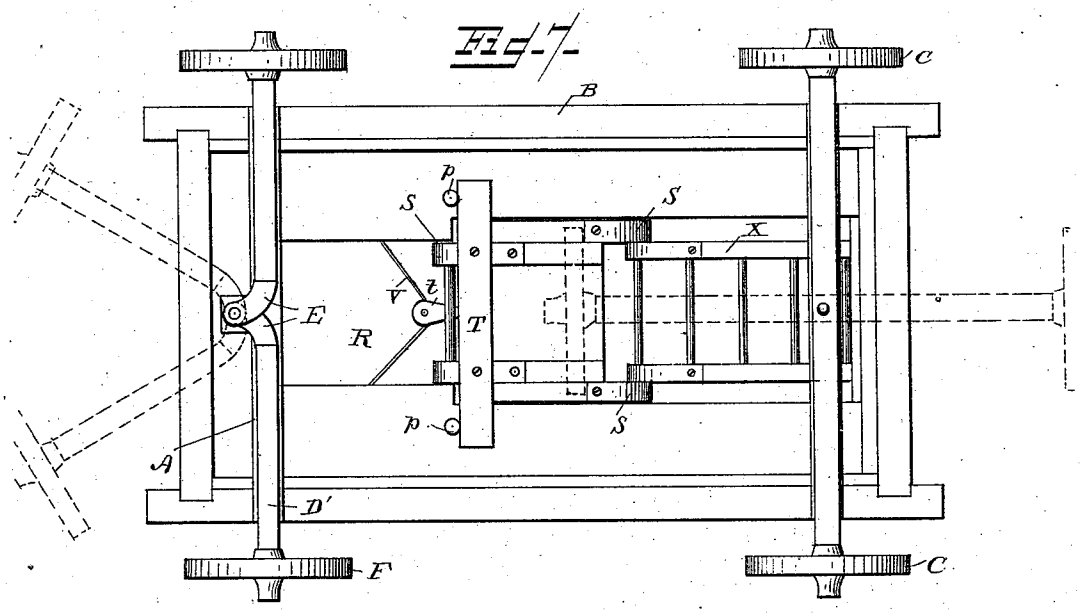
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FIRE ESCAPE.

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Fig. 7.



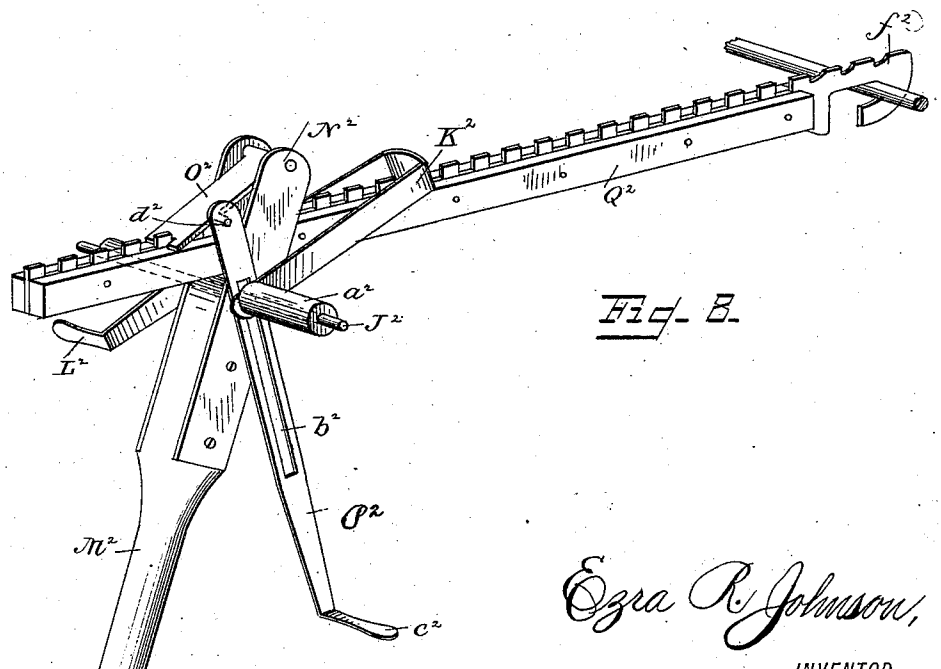


Fig. 8.

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UNITED STATES PATENT OFFICE.

EZRA RANDALL JOHNSON, OF BUCHANAN, MICHIGAN.

FIRE-ESCAPE.

SPECIFICATION forming part of Letters Patent No. 294,879, dated March 11, 1884.

Application filed November 19, 1883. (No model.)

To all whom it may concern:

Be it known that I, EZRA R. JOHNSON, a citizen of the United States, residing at Buchanan, in the county of Berrien and State of Michigan, have invented a new and useful Fire-Escape, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to fire-escapes, and especially to that class of the same which are constructed on the lazy-tongs principle; and the said invention has for its object, first, to provide a fire-ladder adapted to be operated similarly as other fire implements by companies educated in its use; second, to provide the truck containing the ladder with means whereby the entire apparatus may be moved sidewise or adjusted to any required pitch or angle without the necessary loss of time required to lower the ladder; third, to provide the lower end of the frame with braces arranged to be extended and held at any point; fourth, to provide means for attaching a line of hose to the upper section of the ladder, so that when the ladder is raised the hose will be carried up also; fifth, to provide a ladder of any desired length, either by lengthening the sections or increasing the number thereof; sixth, to provide a self-supporting ladder arranged to be adjusted to any height not to exceed its own length; seventh, to provide a ladder with a suitable truck mounted on wheels, so that it can be speedily conveyed to any point where its use might be required; and, finally, it has for its object to construct a ladder of this class possessing superior advantages in point of simplicity, durability, inexpensiveness, and general efficiency.

With these objects in view the said invention consists in certain improvements in the construction and combination of parts, as hereinafter set forth, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a perspective view of my improved fire-escape. Fig. 2 is a vertical sectional view of the same. Fig. 3 is a detail view of the extension-braces. Fig. 4 is a transverse sectional view taken on the line *x x*, Fig. 2. Fig. 5 is a view of the ladder when folded up. Fig. 6 is a vertical sectional view of Fig. 1, taken at right angles to Fig. 2. Fig. 7 is a bottom plan view of the truck, and Fig. 8 is a detail perspective view of the devices for tightening the ladders.

Like letters refer to corresponding parts in the several figures.

Referring to the drawings, A designates a truck constructed to support the frame B, upon which rests the apparatus. The front wheels, C, of said truck may be turned either to the right or left at right angles to the frame, while the rear axle, D′, should be divided at the center under the bolster, and by using two iron bars, E, in the form of quadrants, the rear wheels, D, can be thrown behind the frame at right angles and securely fastened. Thus the truck will be held from moving, and the entire apparatus may be moved sidewise, as hereinafter explained, without the necessary loss of time required to lower the ladder. To both sides of the frame B are pivoted braces D′, having prongs E′ attached thereto to engage with the ground; or, in lieu of these detachable prongs, the braces may have their ends pointed for the same purpose. Catches or hooks F are secured at the other end of the frame to receive the prongs or pointed ends of the braces, and thus when the apparatus is folded up the braces will be held up out of the way.

G G′ designate two bars or standards erected upon each side of the frame B, and converging toward their upper ends, where they are suitably secured together by means of metallic plates *g*.

H designates extension-braces, formed of two bars, *h h′*, connected by metallic plates *i*, one of the plates being secured to each of the bars and sliding upon the other, so that the bars are adjusted by sliding one upon the other. The upper end of bar *h* is journaled in a U-shaped casting, I, which is pivoted to the metallic plates *g* of the bars or standards G G′, so that the braces H may be moved either vertically or laterally, while at the lower end of bar *h′* is secured a pointed plate, i^2, which is arranged to fasten itself in the ground. A spring-pressed catch, J, is journaled in brackets *j*, projecting from the upper end of bar *h′*, and engages with grooves or serrations *l* in a plate, L, secured to the front face of the bar *h*, said catch being connected by a wire or rope,

K, to a hand-lever, M, pivoted at the lower end of bar *h'*. It will be seen that the braces may be extended to suit the variations in the distances to which they are required to be adjusted, the braces *h h'* sliding upon each other, while the catch J engages with the serrated plate L, so that when the adjustment has been effected the two bars will be held together in the extended position by means of the catch J. When it is desired to fold the braces in their normal positions, the hand-lever M is operated to pull the wire or rope K, and thus withdraw the catch from engagement with the serrated plate, and the two bars *h h'* may then be folded together parallel to each other, and connected to the frame B by means of a link, N, and hook O, or in any other suitable manner. I have shown two of these braces H—one on each side; but it will be apparent that they may be multiplied as desired.

P P' designate a pair of vertical bars, connected at their upper ends to the bars G G', and secured at their lower ends to a longitudinally-moving table, Q, on each side of an extension, *m*, of said table, a metallic covering or plate, *n*, being attached to the lower ends of the bars P P'. The table Q slides in an opening, R, of the frame B, the plate *n* running on the edges of the frame, while to the under side of the said table are attached runners S—two at each side—the front ends of the runners being extended and rounded upward to connect with the top of the table, the ladder-sections being secured to the runners, as will be presently described. A cross-bar, T, is secured to the under side of the runners, and as the latter are moved along with the table the cross-bar abuts against a projection, *p*, of the frame, and thus the movement of the table will be limited.

U designates a drum or windlass journaled in brackets *q* at the rear of the frame, and provided with an operating-handle, one of the heads of the drum being provided with ratchet-teeth *r*, having a pawl, *s*, engaging therewith. A rope or chain, V, extends from the windlass or drum, around suitable pulleys, *t*, attached to the frame B and table Q, to the end of the frame opposite from the drum. By the operation of the drum or windlass the rope or chain is wound upon the same, so as to draw the table Q backward, and thus the ladder may be adjusted to various degrees of inclination. The pawl *s* permits the free forward operation of the windlass, but holds the same from moving backward or allowing the return of the table to its former position.

X X' Y Y' Z Z' designate the members of three (more or less) pairs of lazy-tongs, each pair being composed of one continuous ladder, X Y Z, jointed at the several half-sections, and of a frame, X' Y' Z', embracing said ladder and correspondingly jointed. The several ladders form a continuous series, which may be lengthened or shortened, as desired, and may be raised and lowered by ropes and drums, in the manner hereinafter explained. The lower section, X X', of the ladder is secured by a transverse bolt, *u*, to the extended ends of the runners S, and thus the ladders will be moved with the table, as hereinbefore explained. The frames and ladders are connected at their joints by plates, which permit the top half of each section to fold over the lower half of the same section, the joint-plates being secured to the frames by rivets or bolts, and to the ladders by rods, which serve as rungs. The frames are pivoted to the ladders by rods, which also act as rungs, and suitable washers are interposed to effect a more secure attachment of the parts. Any desired number of the lazy-tong members may be added to increase the height, and I therefore do not limit myself to any particular number.

A^2 designates a windlass or drum disposed between the uprights P P', the shaft *v* of said windlass being provided at each end, outside of the bars P P', with a gear-wheel, B^2, and pinions C^2 C^2, engaging the gear-wheel on both sides of the same, and journaled between two plates, D^2 D^2, the plate D^2 being secured to the bars P P', while the plate D^2 is attached to the plate D^2, and covers the gear-wheel and pinions. Each of the pinions is provided with suitable operating-handles *w w* on the outside of plate D^2, said handles operating the pinions which impart motion to the gear-wheels, the latter turning the windlass or drum to cause the winding of the rope or chain. A ratchet-wheel, E^2, is fixed on the drum-shaft *v* between the drum and the bars P P', and is provided with a pawl, F^2, engaging therewith, to hold the drum from returning after it has been wound up to the desired degree. Ropes or chains G^2 connect at one end to the drum, then pass upward through a pulley-block, *y*, extending from the ladder X, to a pulley, H^2, journaled at the upper end of the bar P within suitable metallic inclosing-plates. The rope then extends downward through a grooved block, I^2, through which the pivotal round of the lower section of the ladder is passed, then upward again until it reaches the corresponding pulley, H^2, of the bar P', through which the rope is passed and begins its descent. As it passes downward, the rope extends through a pulley-block, *z*, connecting with the ladder in a similar manner to pulley-block *y*, and reaches the drum again, to which it is connected. The rope G^3 on the opposite side of the apparatus is arranged in a similar manner to the rope G^2, the pulleys, pulley-blocks, and grooved block being duplicated on both sides of the apparatus, so that when the drum is operated each side of the ladder will be raised equally and lowered in a similar manner. To the lower half-section of the frame X', near the joint, is attached a shaft, J^2, carrying spools a^2 at each end, a U-shaped lever, K^2, being pivoted by the shaft between the spools, and provided with a bent handle, L^2, extending out from one end of the lever. An operating-lever, M^2, is pivoted within the U-shaped lever,

and is provided with a forward extension, N^2, at the outer end of which is pivoted a bar, O^2, which acts as a detent. A bar, P^2, slotted at b^2 to clasp and move longitudinally on the shaft J^2, is provided at the lower end with a handle, c^2, as a means for operating the same, and at the upper end is attached to a projection, d^2, of the detent-bar O^2, outside of the pivotal attachment of the latter to the extensions N^2. A rack-bar, Q^2, having the teeth upon the upper face, is provided with a hook, f^2, engaging the upper rung of the lower half-section of ladder X, the other end of the rack-bar extending through the U-shaped lever K and between the extensions N^2, the U-shaped lever being thrown toward the front end of the rack-bar, while the detent-bar is thrown from the same. By operating the lever M^2 the detent-bar O^2 engages, by means of a notch in its front end, with the teeth on the rack-bar, so as to push the said rack-bar backward and cause the front end of the lever K^2 to drop into the succeeding notch of the rack-bar. This operation can be repeated until the said bar has drawn the ladder X together sufficiently to tighten the apparatus and prevent any sudden collapsing. By the operation of handle L^2 the U-shaped lever is withdrawn from engagement with the rack-bar, and then by sliding the bar P^2 upward the detent-bar O^2 is also raised from the rack-bar, and thus the tightening devices may be disengaged when it is desired to fold the ladder to the position shown in Fig. 5.

R^2 designates a bar provided with metallic plates r^2 r^2, secured at right angles thereto, said plates having hooks s^2 at their upper ends to catch over the topmost rung of the upper ladder, and their lower ends bifurcated or forked, as at t^2, to clasp a lower rung of the same ladder. This construction affords means for readily detaching the bar R^2 from its position, and also serves to secure the same firmly from displacement when the hose attachment, hereinafter explained, is in course of operation. A plate, m^2, is attached to the upper face of the bar R^2, near the center, and a U-shaped plate or casting, U^2, is journaled in the plate m^2, so as to turn freely around in any direction, and is provided with a lever, V^2, pivoted therein, said lever having a pivoted clamp, W^2, arranged near its center, and having its rear end enlarged, as shown. A nozzle, Y^2, of a line of hose rests upon the enlarged end of the lever within a groove, n^2, the clamp W^2 fitting over the front end of the nozzle, and the hose extending from said nozzle over the groove n^2 and downward toward the ground, where it is connected with any suitable source of water-supply.

Z^2 Z^2 designate ropes attached to the front end of the lever V^2 and passing through pulleys X^2 X^2, journaled at each end of the bar R^2, said ropes then extending downward toward the ground. The operation of this hose attachment is as follows: When the ladders are raised, the hose attachment, having been applied to the upper ladder of the series, is carried up with the same, so that it is in position for operation. By drawing on the ropes Z^2 the lever is turned around, so as to cause the hose-nozzle to direct a stream of water at any point desired, the lever having a universal movement, so as to be capable of turning either upward or downward, backward or forward. It will be seen that the hose-nozzle will be held securely in the groove n^2 by means of the clamp W^2, and is adapted to be detached as desired. Guy-lines S^2 T^2 are attached to the upper ladder and extend over suitable pulleys to the ground, said guy-lines being arranged to hold the upper sections from swaying to and fro.

Supposing the ladder to be folded and in the position shown in Fig. 5, the manner of operating the same is as follows: Uncoil the guy-lines S^2 T^2, and unhook the bottom braces and fix the points firmly in the ground. Then move the entire apparatus forward sufficiently to hold it securely in proper position. Adjust the extension-braces so as to give the most support to the upper part of the ladder. By operating the windlass or drum A^2 the ladders are raised to the desired height, and then by means of the rack-bar and its operating devices the ladders are tightened and held sesure in their raised position. If it is desired to adjust the ladder to any desired angle, the windlass U is operated to cause the longitudinal movement of the entire apparatus, which may be caused to slant to such a degree as to bear against a building at its upper end. The apparatus is now in proper position for use, and when it is desired to close the same the reverse movements, as described above, are made to perform this action. It is simple and self-supporting in its construction, and the mode of operation is easily learned. It possesses many other advantages which will suggest themselves to a critical public, and which need not be recited here; but it would be well to state that, being mounted on wheels, the apparatus can be readily and speedily conveyed to any point where its use might be required, and by the peculiar manner of attaching the wheels to the frame the ladder can be easily moved sidewise to reach different parts of the building without lowering the ladder.

Having described my invention, I claim as new—

1. In a fire-escape, the extension-braces, comprising bars connected together and sliding upon each other, a catch at the upper end of one of the bars, engaging with teeth or serrations on the other, and a hand-lever pivoted at the lower end of one of the bars, and connecting with the catch for withdrawing the same from engagement, as set forth.

2. In a fire-escape, the ladders constructed on the lazy-tongs principle, in combination with a frame provided with a central opening, a table sliding in said opening and connected

to the ladders, runners attached to the under side of the table, and having a cross-bar secured thereto, a projection on the under side of the frame, against which the cross-bar is arranged to abut, and means for operating the table, as and for the purpose set forth.

3. In a fire-escape, the ladders constructed on the lazy-tongs principle, in combination with a rack-bar attached at one end with one side of the ladders, and a lever pivoted to the opposite side of the lazy-tongs, and engaging with the rack-bar, as set forth.

4. In a fire-escape, the ladders constructed on the lazy-tongs principle, in combination with a rack-bar, a lever adapted to engage with the same, and a detent-bar arranged to be either lifted from the rack-bar or engaged therewith to cause the forward movement of the same, as and for the purpose set forth.

5. In a fire-escape, the ladders constructed on the lazy-tongs principle, in combination with a rack-bar, a lever adapted to engage the same, a detent-bar pivoted at its end to an operating-lever, and a lifting-bar attached to the side of the detent-bar, as and for the purpose set forth.

6. In a fire-escape, the ladders constructed on the lazy-tongs principle, in combination with a frame and a sliding table, a drum or windlass provided with suitable operating means, a grooved block on the sides of the ladders, and a rope or chain passing from the drum, over suitable pulleys, to the grooved block, as and for the purpose set forth.

7. In a fire-escape, the ladders constructed on the lazy-tongs principle, in combination with a frame and a sliding table, a pair of bars on each side, carrying pulleys at their upper ends, grooved blocks on the sides of the ladders adjacent to the pulleys, a drum or windlass provided with suitable operating means, and a rope or chain connecting the drum with the pulleys and grooved blocks, as and for the purpose set forth.

8. In a fire-escape, the ladders constructed substantially as explained, in combination with a frame and a sliding table, a pair of bars on each side, attached to the table and carrying pulleys at their upper ends, grooved blocks on the sides of the ladders adjacent to the pulleys, a rope or chain connecting with the pulleys and grooved blocks, a drum or windlass to which the rope or chain is attached, a pawl and ratchet secured to the windlass or drum, and a set of gear-wheels and pinions arranged to operate the said windlass, as and for the purpose set forth.

9. In a fire-escape, the ladders constructed substantially as explained, and provided with suitable guy-lines, in combination with a frame and a table sliding in said frame, a pair of standards attached to the sides of the frame and converging toward their upper ends, a pair of bars secured at their upper ends to the said converging standards, and at their lower ends to the sliding table, pulleys journaled at the upper ends of the bars, grooved blocks on the sides of the ladders adjacent to the pulleys, a rope or chain connecting with the pulleys and grooved blocks and attached to a drum or windlass, a pawl and ratchet secured to the latter, and mechanism for transmitting motion to the drum or windlass, as set forth.

10. In a fire-escape, a bar secured to the upper ladder, and carrying a lever having a universal movement, a hose fitted to said lever, and cords, also attached to the lever and passing through suitable pulleys to the ground, as set forth.

11. In a fire-escape, a bar attached to the upper ladder, a U-shaped plate journaled in said bar, a lever pivoted in said plate, and having a hose-nozzle attached thereto, and cords connecting with said lever, and arranged to operate the same in the manner set forth.

12. In a fire-escape, a bar provided with plates which hook at their upper ends over the top rung of the upper ladder, and encircle or clasp at their lower ends one of the lower rungs, a U-shaped plate journaled in said bar, a lever pivoted in the U-shaped plate, and having a hose-nozzle fitted thereto, a clamp for holding the nozzle in place, and cords connecting with the said lever, and arranged to operate the same in the manner set forth.

13. In a fire-escape, the truck having its front wheels arranged to be thrown at right angles thereto, the rear wheels being divided, as shown, and connected by quadrant-shaped plates, which permit the rear wheels to be thrown behind the frame or truck, as and for the purposes set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

EZRA RANDALL JOHNSON.

Witnesses:
DOUGLAS SYLVESTER,
RICHARD V. CLARK.