(No Model.) 2 Sheets—Sheet 1.

J. DEMPSTER & W. J. HORTON.

COMBINED FIREMEN'S LADDER AND FIRE ESCAPE.

No. 279,545. Patented June 19, 1883.

Fig. 1.

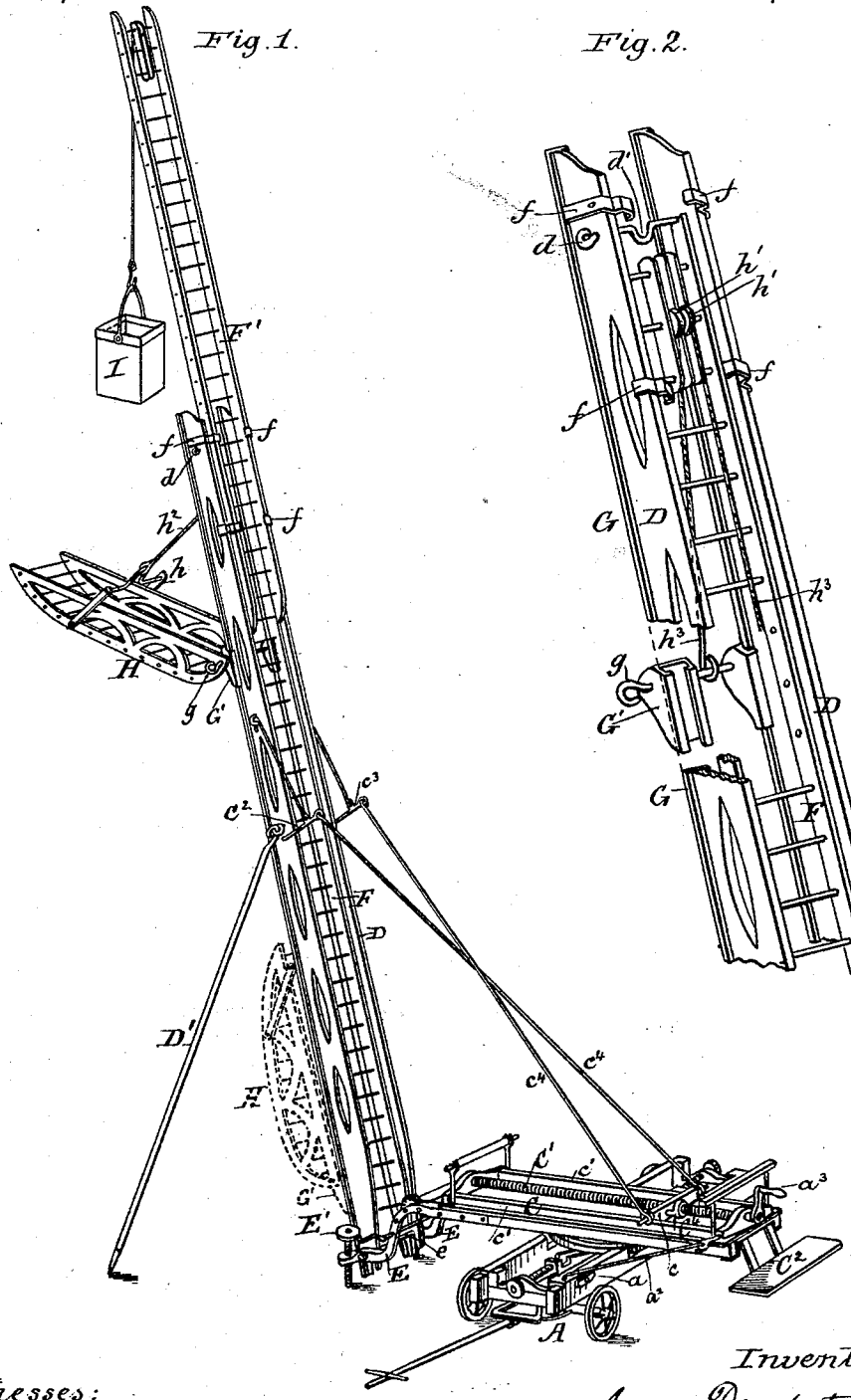


Fig. 2.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

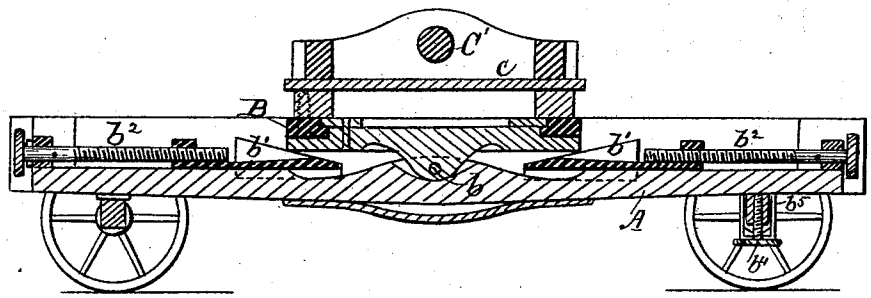


Fig. 4.

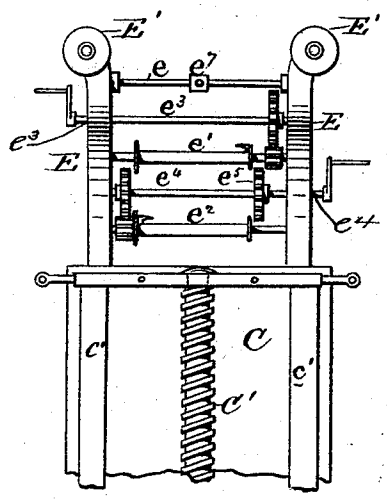


Fig. 5.

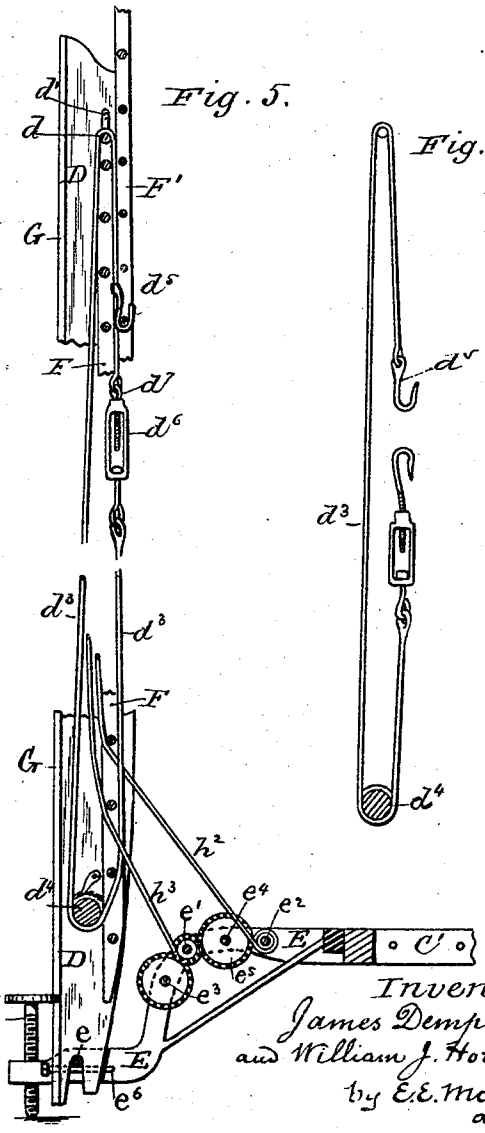
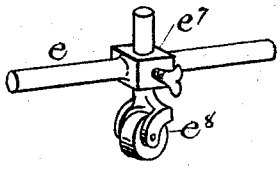


Fig. 6.

Fig. 7.



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UNITED STATES PATENT OFFICE.

JAMES DEMPSTER AND WILLIAM J. HORTON, OF HALIFAX, NOVA SCOTIA, CANADA.

COMBINED FIREMAN'S LADDER AND FIRE-ESCAPE.

SPECIFICATION forming part of Letters Patent No. 279,545, dated June 19, 1883.

Application filed February 10, 1883. (No model.)

To all whom it may concern:

Be it known that we, JAMES DEMPSTER and WILLIAM J. HORTON, subjects of Great Britain, residing at Halifax, in the Province of Nova Scotia, Canada, have invented certain new and useful Improvements in a Combined Fireman's Ladder and Fire-Escape, of which the following is a specification.

Our invention relates to that class of fire-escapes which comprise extensible ladders, means for elevating the same, and means for conveying the same from place to place for use. The objects, construction, advantages, and novelty of our invention will be hereinafter described and specifically set forth in the claims.

Referring to the drawings, Figure 1 is a perspective of a fire-escape constructed in accordance with our invention and represented as in position for use. Fig. 2 is an enlarged perspective of the upper end of the main-ladder-supporting frame and the adjacent parts of the apparatus, a portion of the frame-work being broken away to more clearly show details of construction. Fig. 3 is a central vertical longitudinal section of the truck and bed-piece of the apparatus. Fig. 4 is a plan of one end of the bed-piece and its adjacent mechanism. Fig. 5 is a side elevation of the portion of the apparatus shown in Fig. 4, and of the ladder frame-work mounted thereon. Fig. 6 is a modification hereinafter described. Fig. 7 is a perspective of the bracket-supporting wheel.

Like letters refer to like parts in all the figures.

Some of the principal objects of our invention are to produce an apparatus which is readily transportable, quickly arranged for use, adapted to all the usual circumstances of situation, location, condition of the ground, and character of the building, and other conditions under and at which it is desired to use the apparatus, and, although adapted in every respect to private use, it is designed to take the place of or may be considered an addition to the usual hook-and-ladder truck of organized fire-departments, for which purpose there may be added to the truck herein shown the usual devices and features of construction employed to accommodate the same to the carriage of axes, buckets, and other implements usually required. Furthermore, it is designed to secure a firm foundation for the ladder-frame and its adjuncts by resting it virtually on the ground and in such relation to the truck that the weight of the latter shall act as a counterbalance to any load upon the frame; furthermore, to supply means whereby the truck and ladder supported thereon may be adjusted to unevenness of the ground; furthermore, to supply means for the rescue of persons, which can be operated at the same time that the ladder or ladders are in use by the firemen without interfering with the work of the latter. Other objects and advantages will appear during the description of the invention.

A represents the truck, which may be provided with facilities for drawing it from place to place by either manual, horse, or steam power. In the middle of the truck is secured a circular turn-table, B, the lower half of which is supported upon the truck pivotally at *b*, so as to be capable of rocking upon said pivot. The front and back edges of the turn-table rest upon wedges *b'*, operated by screws b^2, whereby the wedges are forced beneath or withdrawn from under the turn-table in order to determine its position—as, for instance, when the rear end of the truck stands on a lower grade than the front end, the rear screw, b^2, will be turned, so as to force the rear edge beneath the turn-table, and the front screw, b^2, will be turned so as to withdraw the front edge, *b'*, from under the turn-table, thereby elevating the rear edge and depressing the front edge of the turn-table relative to the truck, and thus maintaining the former in a horizontal position. It will be understood that at this time the ladders are in a compact form—that is, not distended as shown in Fig. 1—and are placed upon the bed-plate C, and that said bed-plate, being secured in any suitable manner to the upper movable portion of the turn-table B, is disposed lengthwise upon the truck instead of crosswise, as shown in said figure, in which condition the apparatus is when being moved from place to place. The adjustment of the turn-table, as above described, may be accomplished either before or after the ladders are elevated. Suitable de-

vices—such as turn-buttons a—on the sides of the truck may be used to keep the bed-plate in line with the truck, and leather straps will retain the ladder securely upon the bed-plate. Braces or bolts a^2 may be used to keep the bed-plate in position across the truck.

The bed-plate C consists of any suitable frame-work adapted to support the principal elements of mechanism which we employ, which comprise, mainly, a longitudinally-disposed ladder-elevating screw, C′, having a double thread of high pitch or rapid feed. At one end (preferably the rear end) of the screw is a winch, crank, or handle, a^3, to operate the same.

To use this ladder, after the truck has arrived opposite the building where it is required, and while the bed-plate C is yet in line with the truck, the ladder is removed by the truckmen from its supports upon the truck and laid on the ground in the rear of the bed-plate and truck, and placed with its forked lower end straddling the bolt e, carried by the rear end of the brackets E, hanging from the bed-plate C, and the guy-rods e^4 of the ladder are then hooked to the arms projecting from the sides of the nut C^4, upon the screw C′, and while two or more firemen raise, first by hand and then with boat hooks or poles, the outer end of the ladder, other truckmen turn the handle a^3 and complete the raising of the ladder by means of the screw C′. The bed-plate and ladder are then swung around the truck to the position shown in Fig. 1.

A platform, C^2, is secured to the bed-plate, upon which platform a person may stand to operate the screw; or, in case of an excessive load upon the ladders, many persons may stand thereon to counterbalance said load. A nut, C^4, adapted to travel upon the screw C′, is provided with arms c, adapted to ride or fit guides c', fixed to the bed-plate and extending from end to end thereon. The arms c, projecting from the sides of the nut C^4, are adapted to receive at their ends two guy rods, c^4, which are connected to the ladder-frame D, being crossed or not, as desired, before reaching said frame. Intermediate posts, c^2, as shown in Fig. 1, may be used or not, as desired.

The front end of the truck (see Figs. 4 and 5) is provided with two rigidly-connected brackets, E, the feet of which are each provided with adjustable supporting or steadying screws E′, which, when in operative position, rest upon or may enter into the ground or pavement, and by their adjustability render it practicable for the front end of the bed-plate C to be well supported, whatever may be the inclination of the ground.

In the bottom of the brackets E is a rod, e, extending from one to the other, and between said rod and the front end of the bed-plate are two windlasses, e' e^2, and crank-shafts e^3 e^4, the latter being provided with a shifting-gear, e^5, having a feather entering a groove upon said shaft in order that uniformity of motion may be secured at will at times, for a purpose hereinafter described; and said shafts are to be provided with ratchet-wheels to receive pawls secured to the frames to arrest their motion when desired.

The ladder-frame D comprises two light but strong side pieces secured parallel to each other by two or more tie-rods, d. The feet of the ladder-frame are grooved to straddle the rod e in the brackets E, and said feet are perforated for the reception of a pin or bolt, e^6, passing below said rod, whereby the ladder-frame is secured to the brackets of the bed-plate C′. The construction of the brackets, their adjustable supporting and steadying hand-screws, and the lower end of the ladder-frame is such that the ladder-frame virtually rests upon the ground—that is to say, the load upon the ladder is supported by the ground, substantially, in its entirety, and still there is such connection between the bed-plate and the truck and the ladders that desirable adjustment for the purpose of maintaining the ladders at any desired angle is secured. If desired, braces D′ may be secured pivotally to the sides of the ladder-frame with their free ends resting upon or entering the ground, and be employed to steady the ladder-frame and ladders.

The main ladder F is permanently secured within the ladder-frame. In the upper tie-rod d is a loop, d', or it may be a pulley mounted at this point on the tie-rod, over which an endless rope, d^2, is made to pass. At the lower end of the ladder-frame is a windlass, d^4, about which said endless rope passes two or three times, in order to grasp the same with sufficient friction to cause the rope to travel by turning the windlass. The latter carries a ratchet-wheel to receive a pawl, and arrests the lowering of the upper ladder. Secured to the rope is a hook, d^3, adapted to receive the round of the secondary or extension ladder F′, which is maintained in the operative position within the frame D by suitable straps, f, secured to the ladder-frame. Below the hook d^3 is a swivel-link, d^6, screw-threaded to fit an eye-bolt, d^7, in order that the tension of the rope d^2 may be regulated, as shown in Fig. 5. If the rope used is not an endless rope, as shown in Fig. 6, each hook engaging with a round of the ladder, said rope must be slackened for the purpose of disconnecting the ladder F′, when desired, as is sometimes the case when, after reaching the roof of a building, the firemen desire to carry the upper ladder with them to reach an adjacent higher building, in which case the hook is lowered sufficiently by slackening the tension to be removed from a round of the ladder used for ascent or descent.

As thus far described, the apparatus is adapted as an ordinary fireman's ladder. To secure the further object, whereby the apparatus is adapted for use as a fire-escape, the rear edges

of the ladder-frame are provided with T guides or rails G, upon these guides sliding blocks G′ ride, being provided with T-grooves adapted to fit the rails, and are connected by the tie-rod *g*. To the sliding blocks is pivotally supported one end of a car, H, at or near the other end of which is the bail *h*. In the upper end of the main ladder F are secured two pulleys, *h′*. From the bail *h* the rope h^2 extends over one of the pulleys *h′* to the windlass e^2 in the brackets E. From the tie-rod *g* at the inner end of the car extends a rope, h^3, over the other pulley *h′* to the windlass *e′* in the brackets.

The car H consists of a light strong framework, the bottom of which is a series of rounds, and it and the sides may be entirely covered with canvas or wire-netting, as also may the top, or with any other suitable fabric for the purpose of protecting persons and property therein from sparks or water, or from the danger of falling therefrom.

As thus far described, it will be seen that by turning the windlass e^2 independently of the windlass *e′* the rope h^2 may be wound or unwound to depress or elevate the outer or free end of the car in order to direct it into or toward a window, from which persons or property may be rescued by entering or being placed in the car. Now, persons so entering might pass through the rounds of the main ladder F and descend thereon; but in order not to obstruct the use of the main ladder by the firemen the windlass e^2 may be turned and the free end of the car brought close against the ladder-frame. When the windlass *e′* is turning, by throwing the intermediate gear, e^5, into mesh with the pinion on the windlass *e′* both windlasses are operated mutually and uniformly, and thus the car is brought to the ground. (See dotted lines, Fig. 1.) It is apparent that the free end of the car need not be brought against the ladder-frame, for while operating the windlass mutually, as described, the car may be elevated and depressed bodily in a horizontal position from the ground to the various stories in a building.

If desired, the secondary ladder may be provided with a pulley or pulleys, over which the rope or ropes connected to another car or basket, I, may pass, and be operated either by hand or additional windlasses to rescue persons or property from higher stories, and deliver them or it either into the car or upon the ground.

Various modifications may be made in the details of construction herein shown, and various principal elements employed by us may be used in connection with co-operative elements other than those herein shown and described. For instance, the elevating-screw, the bed-plate, and the brackets may be used with other truck-ladder and escape constructions. Other means of connecting, bracing, and steadying the bed-plate and ladder may be employed. Other specific rails and sliding blocks for the car may be employed. The location of the windlasses may be changed. We therefore do not restrain ourselves to the exact details in these and similar respects, but deem such modifications comprehended by our invention.

Instead of wedges to level up the turn-table, set-screws may be employed, passing upwardly through the truck and working against the under side of the turn-table at each side of it. Pivot ropes or chains may be substituted for the rods c^4.

To prevent the brackets E from accidentally trailing on the ground when the truck is passing over depressions in the ground, the rear part of said truck can be elevated above the axle by means of a lifting-screw, b^4, passing through the axle, and the latter is retained connected with the truck by means of iron straps b^5, pendent from said truck and of such length as to permit it to be sufficiently elevated.

To support the lower end of the bracket E when the bed-plate is swung around with the ladder-frame resting upon the bolt *e*, the central portion of said bolt is provided with a bar, e^7, through which passes a vertical stem carrying the caster-wheel e^8.

Having described our invention and its operation, what we claim is—

1. The combination of a truck, a ladder supporting and operating bed-plate mounted thereon, and having ladder-supporting brackets resting on the ground, and an interposed turn-table located centrally in the length of the truck, substantially as specified.

2. The combination of a truck, a turn-table, a bed-plate provided with ladder-supporting brackets adapted to rest upon the ground at one end, and a platform at the other end, substantially as specified.

3. A bed-plate provided with a longitudinal screw, a nut provided with arms, and brackets adapted to support the end of the ladder close to the ground, with means for connecting the ladder and the arms of the nut, substantially as specified.

4. A bed-plate pivotally supported upon a truck and provided with brackets extending close to the ground and adapted to support a ladder, in combination with adjustable hand-screws, as described.

5. The combination of a bed-plate provided with a turn-table and having brackets supporting windlasses, a ladder-frame provided with a ladder, a windlass, and an endless rope having means for connection to a secondary ladder, substantially as specified.

6. The combination of a bed-plate having brackets supporting windlasses, with a ladder-frame having guides or tracks, a car pivotally secured to sliding blocks on said tracks, and ropes secured to the car and to the windlass, substantially as specified.

7. The combination, with a ladder-truck, of the brackets in the rear thereof, the two wind-

lasses, and the shifting-gear, substantially as specified.

8. The combination, with the ladder-truck and the ladder-frame, of the two brackets, the two windlasses, the shifting-gear, and the car pivotally secured to the ladder-frame, substantially as specified.

9. The combination of the truck A, the turn-table B, bed-plate C, wedges b, and screws b^2, substantially as shown and described.

10. The combination of the bed-plate C, having guides c', longitudinal screw C', having a nut provided with arms c, and guy-rods, substantially as shown and described.

11. The combination of the bed-plate C, its rear bracket E, and platform C^2 with the truck A, substantially as specified.

12. A combination of the bed-plate C, brackets E, cross-bars e thereon, and the ladder-frame D, substantially as specified.

13. The combination, with the ladder-truck, of the brackets E, windlasses e' e^2, crank-shafts e^3 e^4, and the intermediate gear, e^5, substantially as specified.

14. The combination of the main ladder F and the ladder-frame D, adapted to be supported upon the ground and upon the brackets E, substantially as shown and described.

In testimony whereof we affix our signatures in presence of witnesses.

JAMES DEMPSTER.
WILLIAM J. HORTON.

Witnesses:
E. E. MASSON,
W. B. MASSON.

Witnesses to William J. Horton's signature:
C. H. WHITMAN,
W. FERGUSON.