3 Sheets—Sheet 1.

W. W. STEAD.

FIRE-ESCAPES.

No. 188,266. Patented March 13, 1877.

Fig. 2.

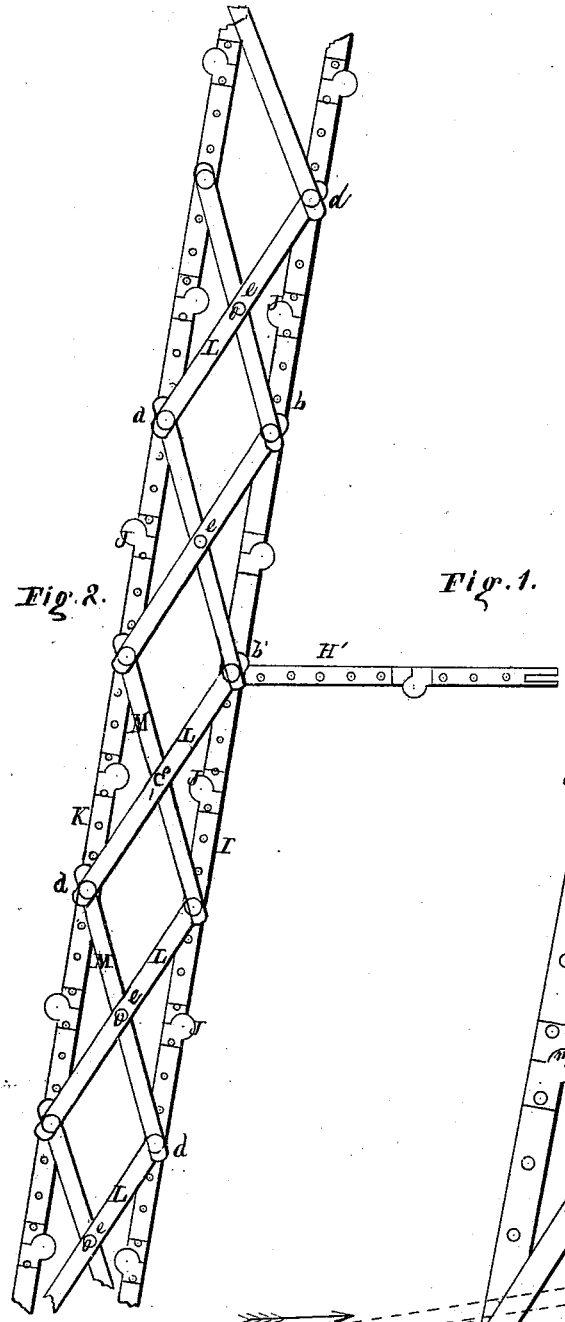

Fig. 1.

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Fig. 3.

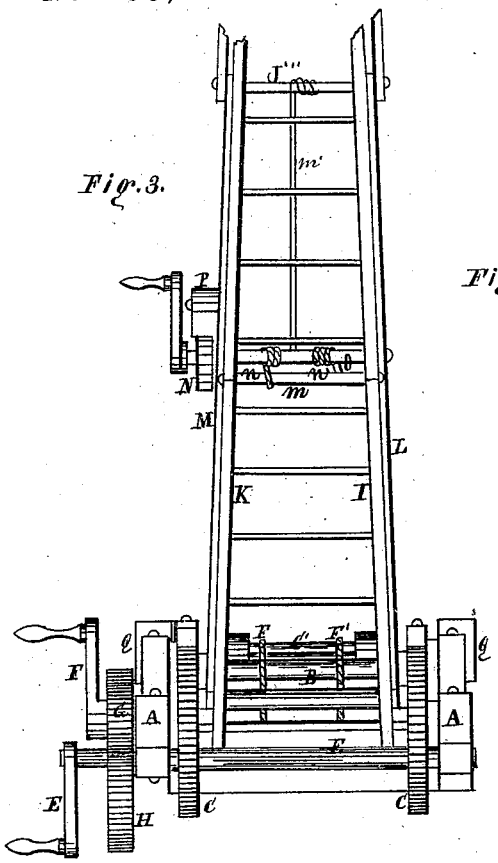


Fig. 4.

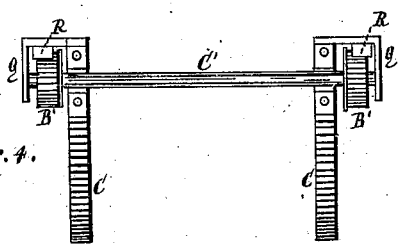


Fig. 5.

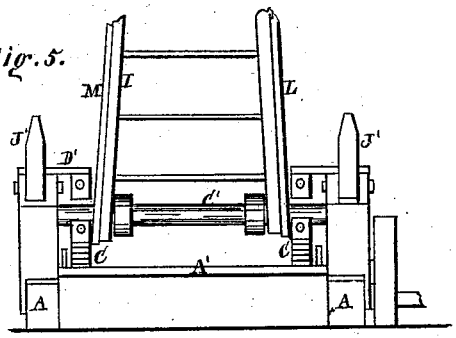
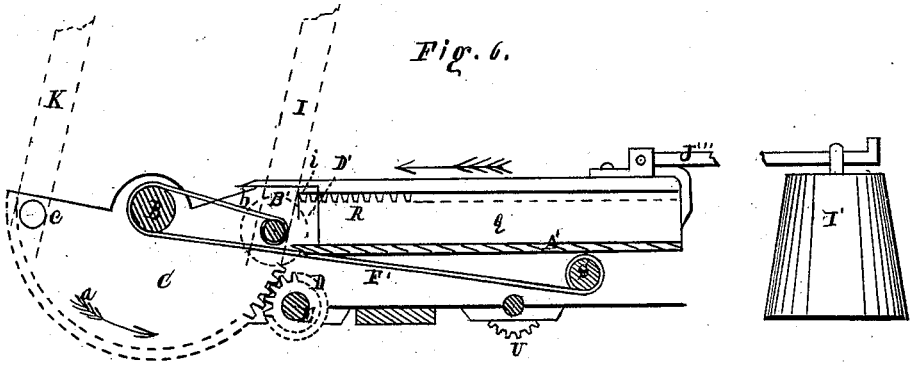


Fig. 6.



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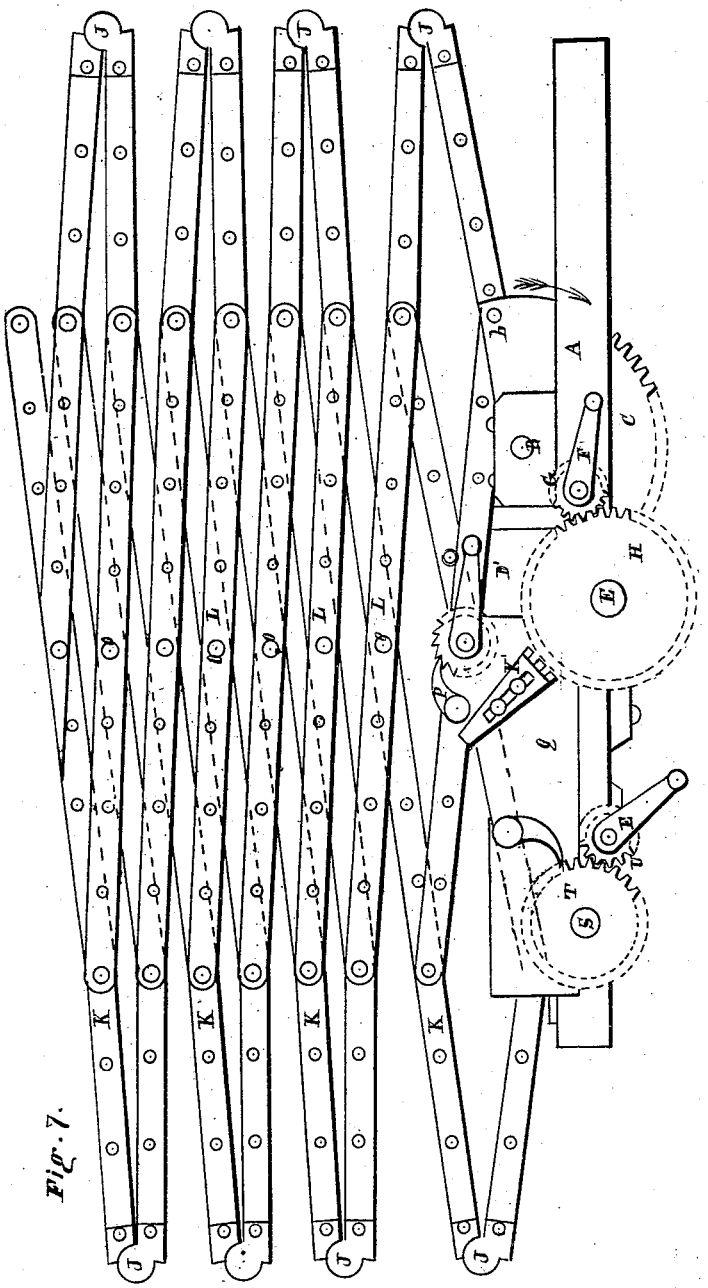

Fig. 7.

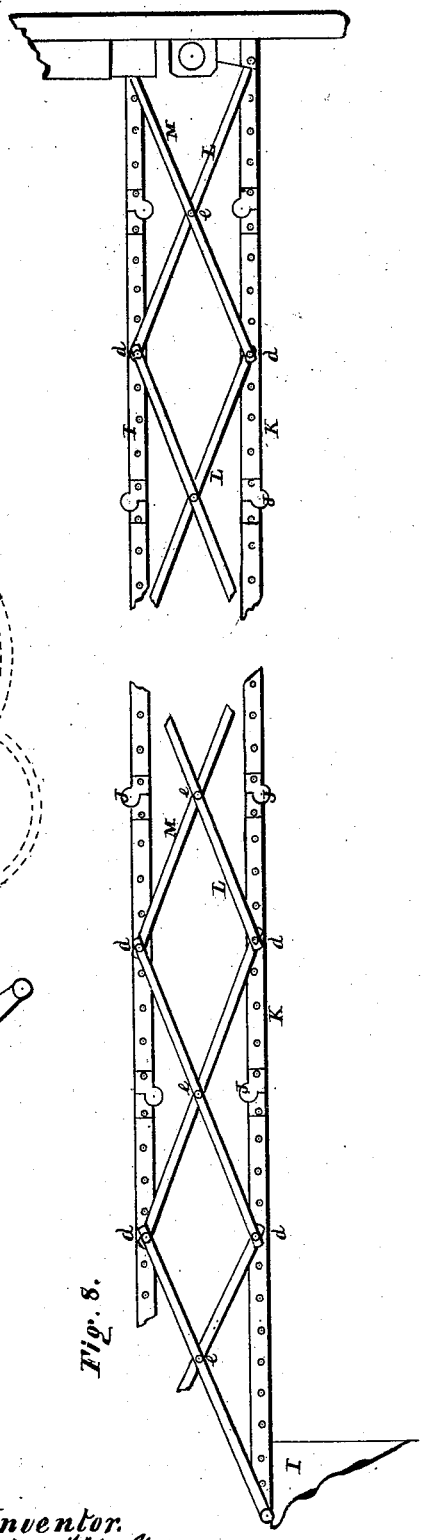

Fig. 8.

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UNITED STATES PATENT OFFICE.

WILLIAM W. STEAD, OF CLEVELAND, OHIO.

IMPROVEMENT IN FIRE-ESCAPES.

Specification forming part of Letters Patent No. **188,266**, dated March 13, 1877; application filed January 10, 1877.

To all whom it may concern:

Be it known that I, WILLIAM W. STEAD, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and Improved Combined Truss, Signal-Station, Fire-Escape, &c.; and I do hereby declare that the following is a full, clear, and complete description thereof, reference being had to the accompanying drawings, making part of the same.

Figure 1 is a side elevation of the fire-escape in extension. Fig. 2 is a detached section. Fig. 3 is an end view of Fig. 1. Figs. 4 and 5 are detached sections. Fig. 6 is a vertical longitudinal section. Fig. 7 is a side elevation of the fire-escape contracted or closed up. Fig. 8 is a detached section.

Like letters of reference refer to like parts in the several views.

The object of this invention is to afford persons in the upper stories of a burning building a ready means of escape therefrom, and to enable the firemen to reach such elevated parts of the burning structure with the hose that cannot be reached from the ground, and thereby facilitate the extinguishment of the flames.

Of the construction and mode of operating the fire-escape alluded to, the following is a full and complete description: Transversely in the frame A is journaled a shaft, B, Fig. 1, on which are secured segments of gear C, which are made to rotate, for a purpose hereinafter shown, by pinions D, Fig. 6, also indicated by the dotted lines *a*, Fig. 1. Said pinions are arranged, respectively, in relation to the segments, on a shaft, E, Fig. 3, journaled in the frame, and operated by a crank, F, and pinion G, actuating the transfer-wheel H, secured to the shaft carrying the two pinions D alluded to. To the corners *b* of each of the segments are pivoted the sides of the extension-ladder I. Said sides consist of a series of sections, which may be more or less in number, as the length of the ladder may require, and which are jointed to each other, as shown at J, Fig. 7. The sides of the opposite corresponding ladder K are secured to a shaft, C′, as shown in Fig. 5. The two ladders, thus arranged in relation to each other and to the segments, are connected to each other by diagonal links or braces L M. Said links or braces are pivoted, respectively, to the sides of the ladders, and to each other, as shown at *d*, Fig. 1. They are also pivoted to each other at the point of intersection *e* by a rod, O, extending across from one series of braces to the other, parallel with the rounds of the ladders, which serve as a support to the braces, and as a pivotal axis for their movement. N, Fig. 1, is a ratchet-wheel, secured to the pivotal shaft or rod O of the braces L′ M′, the first in the series of braces, and of which wheel P is the pawl, the purpose of which will hereinafter be shown. Along the top of each side of the frame is secured a case, Q, Figs. 1 and 4, on the under side of the top of which is a rack, R, Figs. 4 and 6, which, as will be seen in said Fig. 6, is some distance above the floor A′ of the frame. In said racks run pinions B′, Fig. 4, secured to the ends of the shaft C′, having its bearings in the sides of the ladder K referred to, and whereby that side of the ladder is operated. To each of the segments is attached a box or shell, D′, which moves with the segments. On the inner side of the top of said boxes is a rack, *i*, Fig. 6, in which the pinions B′ referred to are engaged when the ladder is extended and inclined, as shown in Fig. 6. During an opposite position of the ladder the boxes are tilted up more or less, as the inclination of the ladder may be, as shown in Fig. 1; but when the ladder is in nearly a vertical position, as indicated by the dotted lines in Fig. 6, or when folded up, as shown in Fig. 7, the boxes are no longer tilted up, but down straight with the frame, thereby bringing the section of rack therein in a right line with the rack R, of which the rack *i* forms a short continuation, as shown in Fig. 6.

Transversely in the frame is journaled a shaft, S, Fig. 1, to which is secured a cog-wheel, T. Said shaft and wheel S T are operated by a pinion, U, actuated by the crank E′. To the shaft C′, Figs. 3 and 5, to which the ladder K is attached, is secured one end of cords or ropes F′, Fig. 3. Said cords extend therefrom to and over the shaft S, carrying the wheel T, to which shaft the cords are secured and wound by revolving said shaft by the pinion and crank U and E′, alluded

. In Fig. 6 is shown the arrangement and rection of one of the cords F′.

Having described the construction of the e-escape, the practical operation of the same as follows: The position of the apparatus, shown in Fig. 7, is such as when closed or lded up, when not in immediate use, and hich is intended to be mounted on wheels a truck, constructed with a view to that d; hence it can be easily transferred from ace to place, as occasion may require.

In order to extend or elevate the ladder or dders to the position shown in Figs. 1 and it is first partially elevated or started by eans of the segments C C, referred to, and hich is further extended by the crank E′, ereby revolving the wheel T and shaft S. his will wind the cord or cords F′ around e shaft S, which, at the same time, draws on the end of the ladder K, moving it in rection of the arrow, toward the ladder I, tached to the segments, the result of which an upward elevation or extension of the dder to any desirable height, or to a full tension thereof, as shown in the drawings. s the end of the ladder K is thus being awn forward, the pinions B′ roll along in e racks R R, respectively, thereby preventg the ascending ladders from being thrown er forward. The racks and pinions also rve to give uniformity to the movement, d prevent slipping; hence the elevation or tension of the ladder is effected in safety.

To prevent the sides of the ladders from flection, when extended more or less, is the rpose of the ropes *n n′*, Figs. 3 and 1. One d of each of the ropes is attached, respectely, to a bar, *m*, extending across from one le of the ladder to the other, and which bars rm the pivots of the joints J. The other ds of the ropes are attached to the shaft O, ound which they are wound by means of e crank *h*. The two ropes, when drawn ut, are retained thus by the pawl and ratchetheel P N, referred to. Said ropes may also used to aid in elevating or extending the dders, and which, when but partially exnded, may be further extended by said ropes, hich, as they are wound around the shaft, ll draw the ladders toward each other, and ereby cause their further extension without ing the crank E′.

The ladder or ladders, when fully extended, e shortened by first deflecting the sides, hich will then, by virtue of its own weight, scend, but which is, however, controlled by e pawl and ratchet-wheel T and T′, Fig. 1, and rds F′, arranged in combination therewith, above described, and by which the ladder maintained at any desired elevation. The flection of the sides of the ladders for lowing them is effected by the cords or ropes . Said ropes are attached to the rounds or nts J′ of the ladders. The rope from each the ladders is passed over the pivotal bar of the braces, as seen in Figs. 1 and 3, om which they depend to the shaft O, around which they are wound, thereby drawing the ladders toward each other so far as to allow their descent or contraction by virtue of their own weight, as aforesaid.

The ladders are projected from a vertical position to any degree of inclination or oblique position by the segments C C, which, by being actuated by the crank F and its connections therewith, as above described, will turn the segments in direction of the arrows *a′*, thereby throwing forward the ladders to any position desired from a vertical one, and which is maintained by the pawl; hence the apparatus may be placed at considerable distance from a building, and the elevated ladder be projected against it by the segments C C, operated as above said. This peculiar feature of the invention is of great importance, as in the event of a burning building an ordinary ladder cannot always be placed near it, whereas this one can be stood in the street and the ladder thrown therefrom to the building with ease and safety.

The extended ladder can be lowered to a horizontal position, as shown in Fig. 8, in which position it may be used in the capacity of a bridge by projecting it over the street and allowing the outer end to rest upon an abutment, I′, in which use the sides of the two ladders form upper and lower chords of the bridge structure, and the links L the braces of the same.

H′, Fig. 2, is a supplementary ladder or side extension, pivoted at *b′* to the sides of the ladder, which, when not in use, can be turned upward between the sides of the ladder I, and thereto secured by a batten or other suitable device. The object of this side extension H′ is to obtain access to the upper windows of a building when the ladder is so situated as to reach above them or not near them. By throwing out the extension H′ to the window, communication can be had thereto from the ladder by passing along over the said side extension. In the event the ladders are leaned far over from a vertical position, the weights I′ are used as a counter-balance. These are hung upon the arms J‴, which are extended from the end of the frame for that purpose, as shown in Figs. 5 and 6, but which, when not needed for that purpose, are turned up upon the frame out of the way, as indicated by the dotted lines *h′*, Fig. 1.

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

1. The racks R R, boxes D′, with racks therein, in combination with the pinions B′, shaft C′, and ladder I, arrangad substantially as herein described, and for the purpose set forth.

2. Wheel H, pinions D, and segments C, in combination with hinged ladders I K, jointed, respectively, to said segments and shaft C′, arranged in relation to, and co-operating with, the pinions B′ and racks, for the purposes described.

3. Jointed ladders I K, braces L M, pivoted to said ladders, and cross-rods *o'*, in combination with the shaft O, ratchet and pawl P N, and cords *n n'*, in the manner as herein set forth.

4. The shaft and cog-wheel S T, pinion U, and cord or cords F', in combination with the pinions B', racks R, and ladder I, substantially in the manner as described, and for the purpose specified.

5. The boxes D' and racks therein, in combination with the racks R R and segments C C, as and for the purpose set forth.

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Witnesses:
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