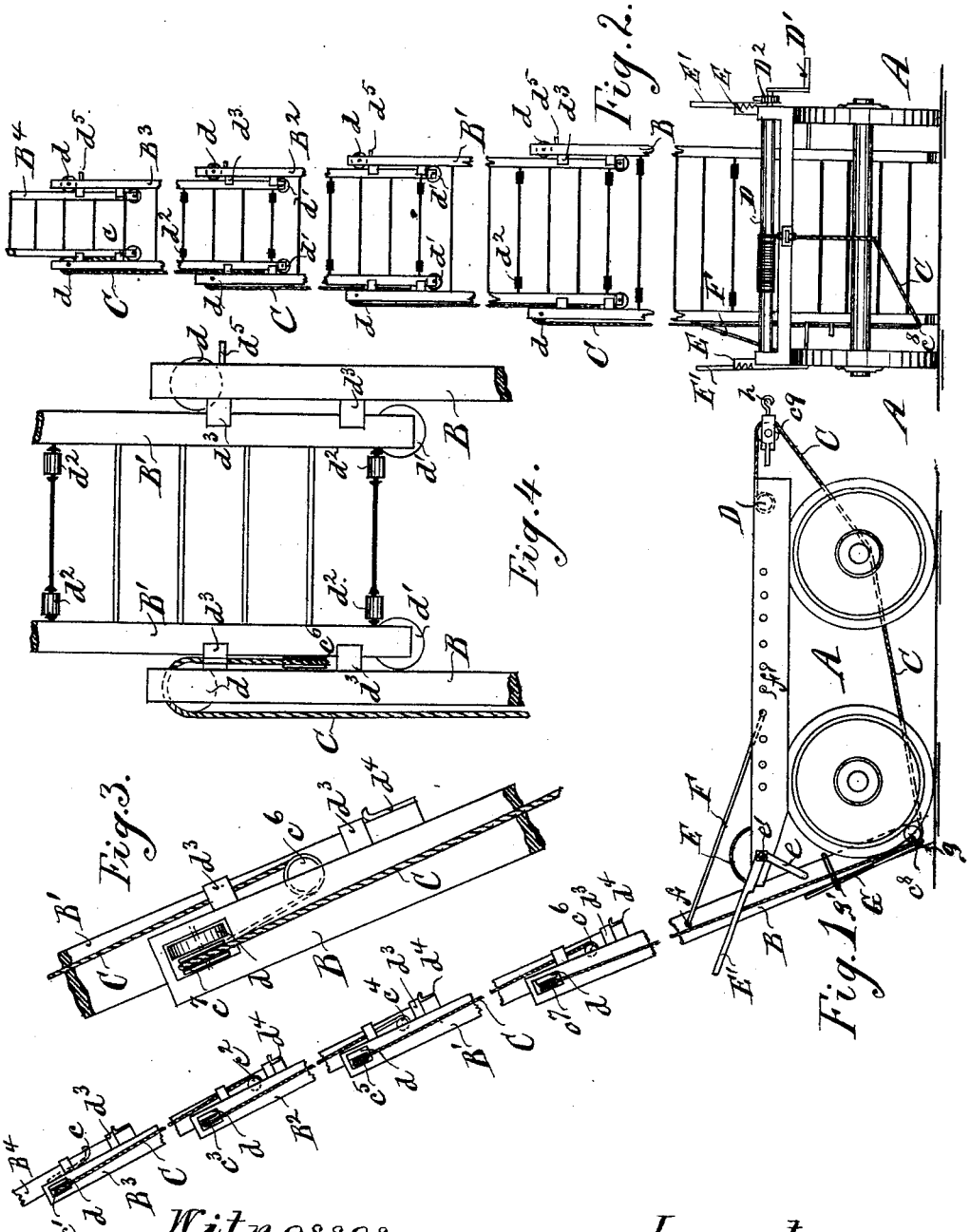
2 Sheets—Sheet 1.

D. O. STRIFLER,
Fire-Escape.

No. 197,232. Patented Nov. 20, 1877.



Witnesses;
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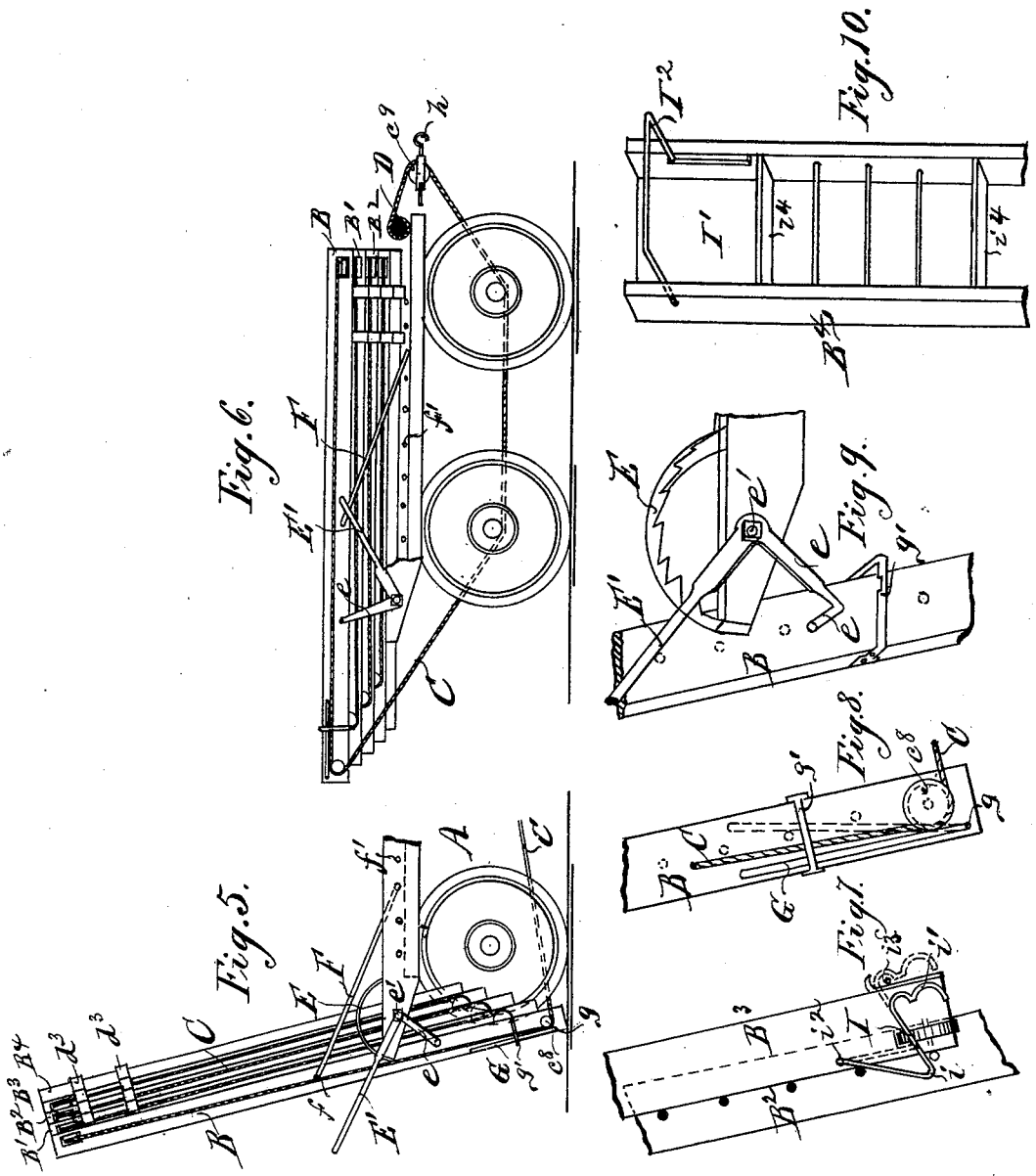

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UNITED STATES PATENT OFFICE.

DANIEL O. STRIFLER, OF ST. LOUIS, MISSOURI.

IMPROVEMENT IN FIRE-ESCAPES.

Specification forming part of Letters Patent No. **197,232**, dated November 20, 1877; application filed May 17, 1877.

To all whom it may concern:

Be it known that I, DANIEL O. STRIFLER, of St. Louis, in the county of St. Louis and State of Missouri, have invented an Improved Fire-Escape, of which the following is a specification:

This invention is an improved fire-escape, more specially designed for the use of a fire-department.

To carry out this invention a system of fire-ladders is nested together, and when extended reach to proper heights or the windows of a building, and all mounted upon a carriage.

The novel features of this invention consist in the peculiar construction and combination of parts, as will hereinafter be pointed out in the claims.

Of the drawings, Figure 1 is a side elevation of my apparatus, showing the ladders in extended position. Fig. 2 is a front elevation of Fig. 1. Figs. 3 and 4 are respective views, showing construction of detail parts belonging to the ladders. Figs. 5 and 6 are, respectively, side elevations, showing my apparatus—that is, the ladders thereof—nested together, and mounted in this condition on and off the carriage. Fig. 7 is a detail, showing the hook feature for securing the ladder-sections. Fig. 8 is a detail, showing the lever-brake forming part of the lowest ladder. Fig. 9 is a detail, showing the hand-crank attachment for mounting and dismounting the ladders. Fig. 10 is a detail perspective of the upper ladder and its improvements.

A, Figs. 1, 2, 5, 6, represents a suitable truck or carriage. B B^1 B^2 B^3 B^4 represent the fire-ladders. These are nested together in the following manner: The lower ladder, B, is the widest, the ladder, B^1, following is the next widest, and, in like manner, the succeeding ladders decrease in width, in order to adapt them to slide within each other when raised or lowered, and to nest together when mounted on and off the carriage, as shown in Figs. 5 and 6.

I accomplish the raising and lowering of the ladders (for extension purposes) by means of a rope or ropes arranged and connected to the ladders and carriage in the following manner: C is the rope or ropes, which can be of any suitable material possessing the required strength, durability, and adaptability. One end of the rope C, I secure at *c*, (see Figs. 1 and 2,) and carry the rope along the outside of the ladder B^4, to pass over a grooved roller at c^1, at top of the ladder B^3. From thence said rope passes down the outside of said ladder over a similar roller at c^2; from thence the rope is partially carried upward over a similar roller at c^3, at top of ladder B^2; from thence said rope passes down the outside of said ladder over a similar roller at c^4; thence partly upward over the roller at c^5, at top of ladder B^1; from thence it passes down said ladder over the roller at c^6; thence over the roller at c^7, at top of ladder B; thence down its side over the roller at c^8; from thence the rope is carried under the carriage, passing round the pulley at c^9, and, lastly, connects to the windlass D, which is mounted on the carriage, and all as shown in Figs. 1 and 2.

A continuous cord or tackle is thus arranged to connect all the ladders, one end of the rope extending from near bottom of the highest section down the side of each lower ladder or sections, the lower end of said rope connecting to the windlass.

The grooved rollers c^2 c^4 c^6 turn in a recessed bearing made in the sides of the respective ladders, so as not to interfere with their action for extension purposes. A similar arrangement of rope-connection, and also grooved rollers, can be provided on the opposite side of the system of ladders, if need be, and the manner in which the rope or ropes is operated will hereinafter appear.

To facilitate the raising and lowering of the ladders, I provide the further smooth-faced rollers at *d d d d* (see Figs. 1, 2, 3, 4) at top of the respective ladders B B^1 B^2 B^3, alongside of the grooved rollers, but so as to turn independently. Further, each of the rollers *d*, I make of larger diameter than that of the contiguous grooved roller, in order that the sliding action of the ladders (when raised or lowered) shall not interfere with the passage or operation of the rope. Hence, also, the same arrangement of smooth-faced rollers is provided on the opposite side, and on the same ladders. (See Figs. 2 and 4.)

The outside face of the frame of the inner

ladders bears against the rollers d, which materially lessens the friction, and eases the raising and lowering action of all the ladders. The grooved rollers turning independently, and not coming in contact with the moving ladders, the free operation of the rope can take place. I also provide a similar arrangement of independent acting rollers at d^1 d^1 d^1 d^1, (see Figs. 2, 4), on both sides of the inside ladders, to obtain a roller-bearing for said ladders. Also, for the same purpose, the iron rungs or braces of the ladders B B^1 B^2 B^3 have, at d^2, on each side, rollers for the edges of said ladders to roll upon, (see Figs. 2, 4,) and thus all the outside faces of moving-ladders bear upon rollers, which greatly facilitates their action for the purposes intended.

d^3 are guides, having one end secured to the inside ladders, the other end partly extending like a hook over the face of the next ladder. (More clearly shown in Figs. 3, 4.) Said guides can also have rollers. d^4 (see Fig. 3) are stops, which, when coming in contact with any of the guides d^3, estop any further extension of the ladders. Likewise, on the sides of the ladders B^1 B^2 B^3, stops or pins d^5 (see Figs. 2, 4) are provided, which limit the lowering of the ladders.

A system of ladders thus arranged with relation to each other, and the carriage for their conveyance, I mount on and off their carriage, as the case may require, by means of a hand-crank attachment. For this purpose, E is a ratchet segment-bar. (See Figs. 1, 2, 5, and 9.) Engaging the ratchet-bar is a hand-lever, E', that controls the operation of the crank-arms e e, (see Fig. 9,) the fulcrum of the lever being at e', and the arm of crank being secured to the side of the ladder, all shown in Fig. 9. Both sides of the lower ladder have this hand-crank and ratchet attachment to the carriage, and both can be operated simultaneously. It is by means of this attachment to the ladders and carriage that the former (the entire nest of ladders) can be readily mounted on or off the carriage. A still further use for the hand-crank attachment is here to be noticed—viz., to adapt the position of the ladders, preparatory to further extension, to any unequal bearing-surface that may exist. Thus, by adjusting the required hand-crank, one side of the ladders can be raised and the other side lowered, and vice versa to accommodate the bearing-surface; also, by said attachment, the ladders can be let down into the gutter, or placed on the pavement, and otherwise positioned so as still to be perpendicular, notwithstanding that the wagon or truck may be on uneven ground.

F (see Figs. 1, 2, 5, 6) is a hand-lever, having one end pivoted at f to the lower ladder, and its other hook end fitted to engage any of the series of holes at f' in the side or sides of the carriage.

The object of the lever F is to enable the operator to adjust the bunch of ladders to assume the required inclination for extension purposes; also, to swing the ladders to another position, after they are down, to get at another window or location as to height.

It is necessary to fasten the rope or ropes so as to prevent slipping or disengagement of parts, and for the better manipulation or using of the ladders, as well as the entire apparatus. For this purpose I pivot at g a hand-brake, G, (see Figs. 1, 5, and 8,) the lower end of said brake being adapted to come in contact with the rope passing over the lowest grooved roller c^3.

g' (see Fig. 9) is a bracket secured to ladder B, and having a notch, so that by causing the brake G to impinge tightly against the rope, said brake can be in this condition secured or held in the notch or catch, and, when disengaged from same, the brake can also be disengaged from the rope, and this latter be then free to act. This brake G is important in its function, for when the ladders are extended, as per Figs. 1 and 2, and also when the same are in lowered condition, as per Fig. 5, and otherwise when the apparatus is in the condition shown in Fig. 6, and for moving from one place to another, said brake must be applied to fasten or secure the rope.

The mounting or dismounting of the ladders, and also the raising and lowering of the same, can be accomplished by hand-power applied to the windlass D. This turns in proper bearings on the carriage, and at opposite ends is provided with a hand-crank, D^1, and pinion D^2, in which a pawl engages. The pawls fasten the windlass, and also serves to secure the rope or ropes.

It is more specially my object, by means of the same rope or ropes, to accomplish the raising and lowering of the ladders by utilizing the draft-team, which, as apparent, is a necessity for the conveyance of the apparatus. To accomplish this end, the pulley c^3 operates in a sheave that has a hook, h, (see Figs. 1 and 6,) the other end of the sheave being suitably constructed to engage temporarily any point of fastening at the front of the carriage.

The hook h can readily be hooked to the whiffletree, and when this latter is disengaged from the carriage-front it is plain the draft can operate the rope for the extension of the ladders.

In Fig. 7, I represents my hook, that is intended to secure and hold fast the inside ladders when extended. This hook I is of the constructive shape shown in Fig. 7, so as to have the projecting hold at i and the curved catches at i'. Said hook is pivoted at i^2, and when it is in the position shown in the full lines (see Fig. 7) its hold at i engages the contiguous rung of the ladder, and thus the same is held fast. When disengaged the hook assumes the position shown in dotted lines, (see Fig. 7,) and is held by a pin, i^3.

I prefer to make the top ladder as per Fig. 10—that is, to have its back I^1 boarded, or closed by boarding, at least most of the ladder's length, and to have, also, a swinging

brace, I^2, and, further, the full steps at i^4. The brace I^2 is to serve as a holdfast for the party, and the steps i^4 as a seat, and the closed back I^1 to prevent any action of the person while occupying the ladder from interfering with the raising or lowering action of the same; also, it is a safeguard, offering protection to the person.

My apparatus, being thus constructed in all its parts, appears for use in the condition shown in Fig. 6. It can here be stated that the raising and lowering action on part of the ladders, according to my arrangement of tackle, is as follows: The smallest ladder, B^4, will first be extended its full length; then the next section, B^3, follows, carrying B^4 with it; next follows B^2, carrying B^3 B^4 with it; and, lastly, B^1 follows, carrying the top sections with it. In lowering the ladders the action is vice versa, the section B^1 first descending, carrying the top sections with it; next follows B^2, &c., until all the ladders are nested below. The apparatus having been conveyed to the place of the fire, or locality where it is to be used, the ladders are first dismounted, as per Fig. 5. In this condition the draft can, by pulling the rope, cause the ladders to be raised to their full height. The brake G is then applied to maintain said ladders in a permanent condition. A fireman or operator can ascend at the same time by taking his position in the ladder B^4. The apparatus assumes the same condition when lowered as per Fig. 5, and when mounted on the carriage as per Fig. 6.

My invention possesses the advantages of being quickly operated. The same rope attachment is used for extension or lowering or mounting purposes, and that whether hand or draft power is used. The hose can be carried to the top at same time the ladders are raised, and in every respect, by its use, it facilitates a better control to extinguish a fire, and save property or life.

What I claim is—

1. The herein-described tackle, secured at *c* to a top-ladder, and passing said rope along the outside of said ladder to pass over a grooved roller at c^1, top of the next ladder, thence passing down its side over a roller at c^2, and thence over a roller of a succeeding ladder, and so on, as herein shown and described, in combination with a system of ladders that nest within each other, and with the carriage carrying a windlass, by means whereof the mounting and dismounting, and raising and lowering, of said ladders can be accomplished, as and for the purposes set forth.

2. The hand-brake G, pivoted at *g*, and arranged with relation to a rope, C, passing over a roller, c^3, on a ladder, B, having the holdfast g', to operate as and for the purpose set forth.

3. The pulley c^9, the hook *h*, in combination with the rope C and series of ladders, to operate as and for the purpose set forth.

4. The rollers *d*, arranged with relation to the grooved rollers over which the rope passes, and made of larger diameter than said grooved rollers, and operating in combination with a system of ladders, as and for the purposes set forth.

5. The hand-crank attachment, consisting of segment ratchet-bar E, lever E′, crank-arms *e*, in combination with a ladder, (or system of ladders,) and a carriage A, to operate as and for the purposes set forth.

6. The hook I, having the hold at *i*, and catches at i^1, the pin i^3, in combination with two or more ladders, as and for the purpose set forth.

In testimony of said invention I have hereunto set my hand.

DANL. O. STRIFLER.

Witnesses:
WILLIAM W. HERTHEL,
JOHN W. HERTHEL.