2 Sheets—Sheet 1.

D. O. STRIFLER.

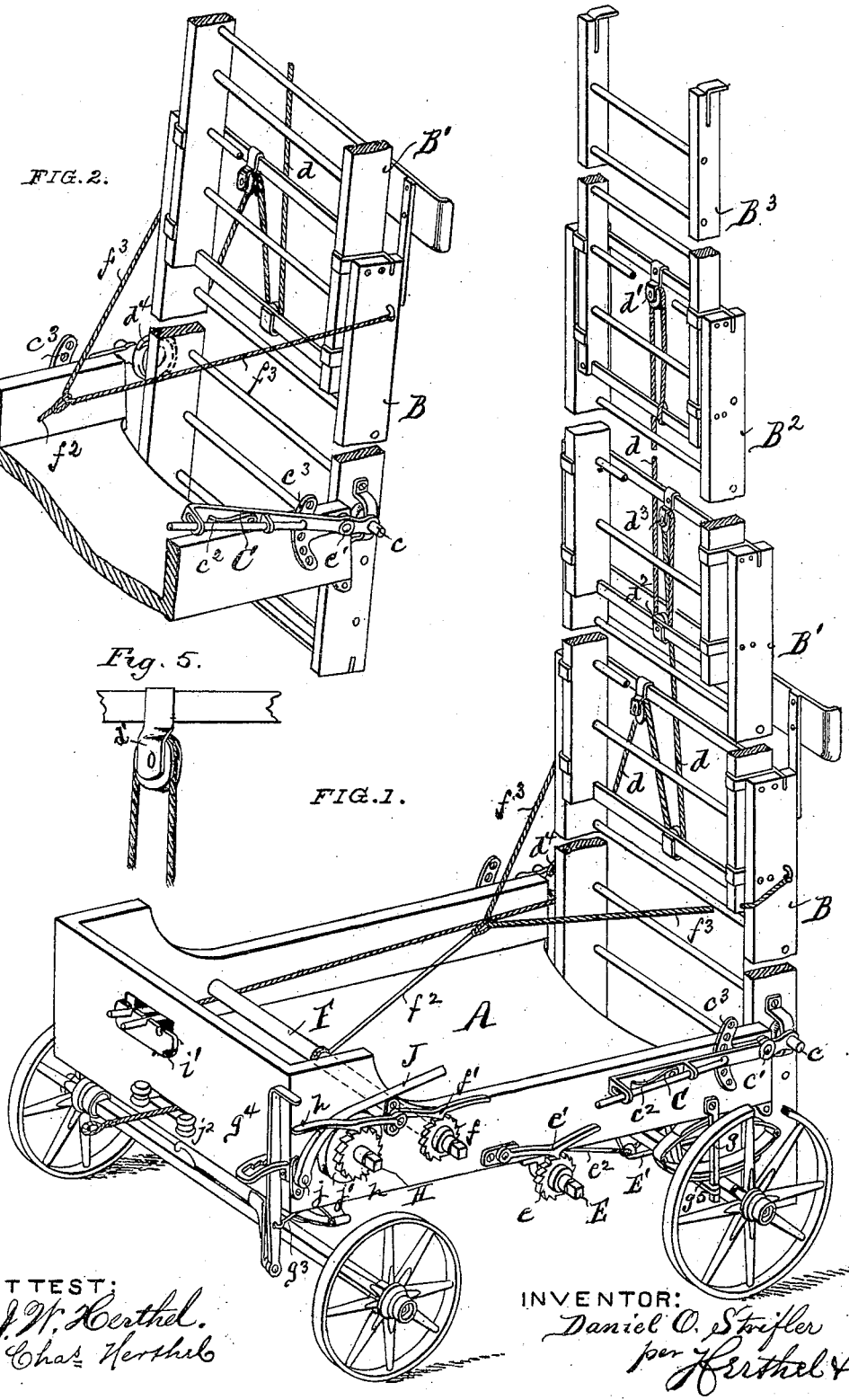
Fire-Escape.

No. 205,511. **Patented July 2, 1878.**

FIG. 2.

Fig. 5.

FIG. 1.



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2 Sheets—Sheet 2.

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FIG. 3.

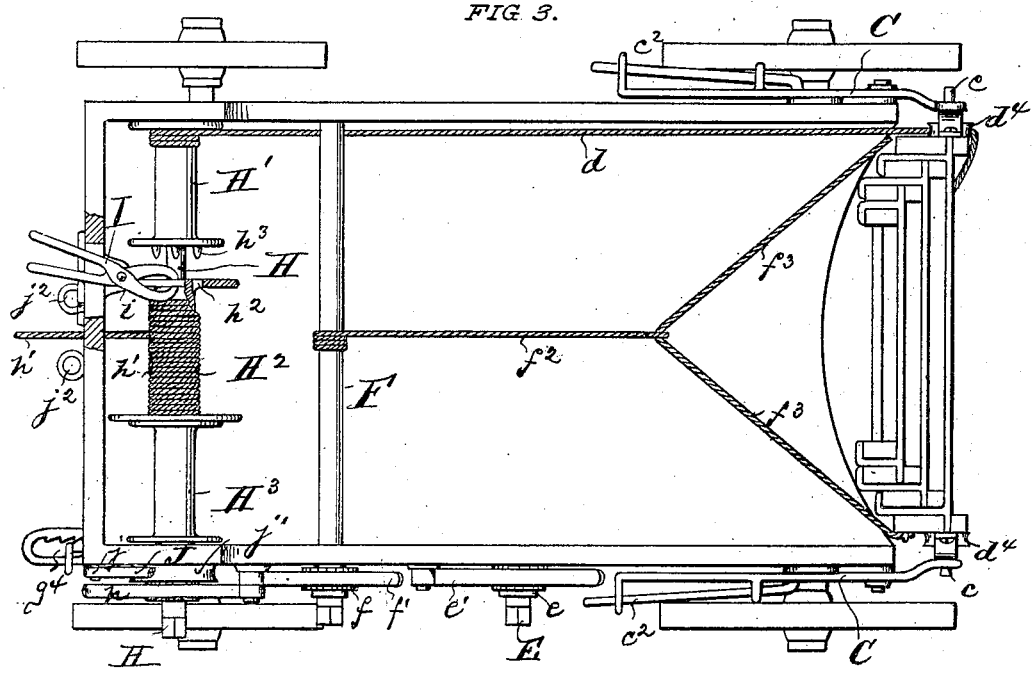
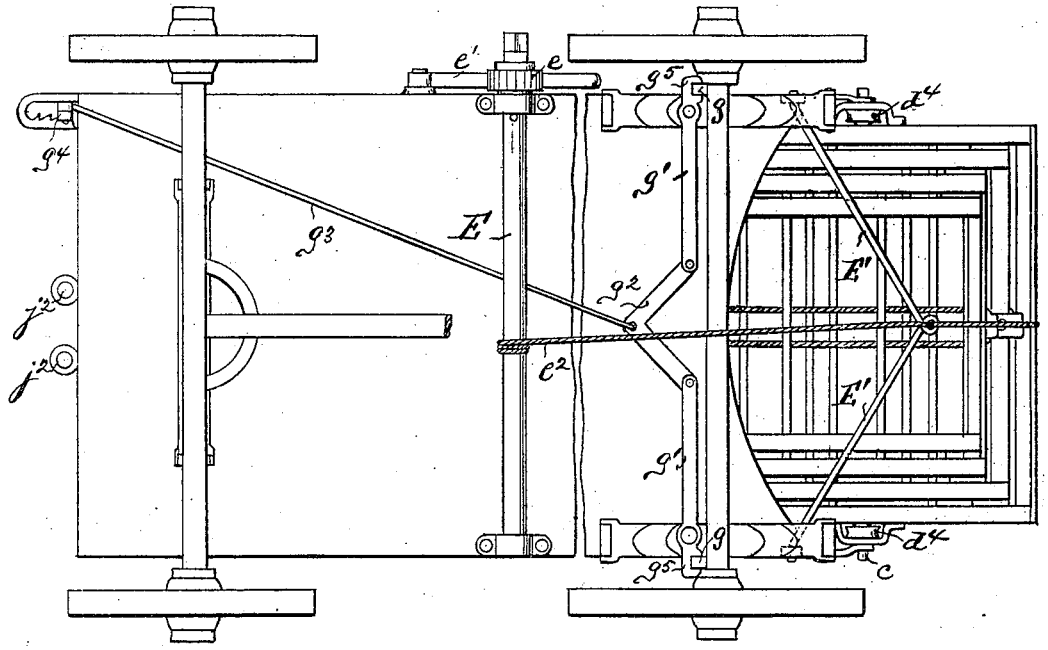


FIG. 4.



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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. **205,511**, dated July 2, 1878; application filed February 15, 1878.

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 improvement of the machine for which Letters Patent were granted me in the United States dated November 20, 1877, and being No. 197,232, and, like it, is designed for the use of a fire-department, the devices, however, by which the objects and purposes of the machine are accomplished being in many respects essentially different in the two machines, as will hereinafter more fully appear.

In the accompanying drawing, Figure 1 represents a perspective view of my fire-escape, the ladders thereof being shown extended. Fig. 2 is a perspective view of part of the carriage and parts of its ladders raised in extended position, and showing the hand-lever attachments to operate said ladders, as will hereinafter appear, Figs. 3 and 4 being respective top and bottom plans of my fire-escape. Fig. 5 is a detached view of one of the top pulleys of the extension-sections.

Similar letters of reference indicate corresponding parts.

A represents a suitable truck or carriage. Upon the carriage is mounted the series of ladders B B^1 B^2 B^3, &c., of different sizes, and arranged together so as to slide within each other when raised or lowered, and nest together when not to be used. The main ladder B (carrying the other ladders) has a projecting journal, *c*, which turns in the short arm of a spring-bar lever, C. (See Figs. 1, 2, and 3.) The ladder so journaled can freely turn when operated by the different hand attachments, as will hereinafter appear.

The spring-bar lever C constitutes a hand attachment, and it is constructed to operate for the purposes as follows: The short arm of the spring-bar lever engages the journal *c* of the ladder B, as just stated. At c^1 is the fulcrum for the lever C proper, its spring-lever c^2 properly engaging any of the holes in the segment-plate c^3, which is attached to the wagon. (See Figs. 1, 2.) By means of the said hand attachment C the ladders can be raised from or lowered onto the street, or adjusted to unevenness of surface, or adjusted and secured laterally, or made to incline, and otherwise assume safe positions, so that the top of the highest ladder can be shifted or made to reach from one window or high point to another, and that without lowering the extended ladders.

In my former patent the hand attachments used engaged teeth or ratchets of a segment-plate, and only secured the ladders in one direction. In case the ladders tipped sidewise or swung away from the perpendicular, serious consequences might result.

By the use of the present hand attachments C the ladders are locked in all directions, since its spring-lever c^2, by its projecting arm, engages the hole in the plate, and thus the weight of the wagon is utilized to afford a firm support for the ladder.

To raise and lower the ladders for extension purposes, I am aware that heretofore the rope has been passed up one side of the lower section of ladders over pulley at top thereof, thence down between the sections over a pulley at lower part of second section, thence again up between the sections, and so on, to finally connect to bottom of the highest sections. All the pulleys, however, being arranged at right angles with the rungs, the rope had to pass between or through the space of the rungs in order to be passed in the same space. This necessity incurred the disadvantages of not obtaining that complete extension of each section and the use of the larger sizes of pulleys, also cable, and safe operation of the tackle which I accomplish by my tackle, and which will now be fully described.

In my arrangement of tackle, I lay great stress upon the manner of placing the top pulleys with relation to the lower pulleys—that is, arranging all the top pulleys to be at right angle, or nearly so, to the face of the rungs, while the lower pulleys are parallel to the rungs. The rope *d* I fasten to the lower part of the top ladder B^3; thence it passes over a pulley, d^1, hung in a sheave which is secured on top of the second ladder, B^2. The sheave is twisted, in order to place its pulley d^1 so as not to be parallel, but at an angle, to the rungs sufficient to pass the rope from

one side of the rungs to the other. The rope next passes down the back of the second ladder B^2 over the pulley d^2, which is arranged parallel to the rungs, in order for the rope to pass down and up in the same space. The rope from the pulley d^2 passes upward over the pulley d^3 at top of ladder B^1. The arrangement of said pulley d^3 is similar to that described for d^1. The rope next passes down the back of ladder B^1, and so on in a similar manner with each successive ladder, the lower end of the rope passing over a pulley at d^4 on the spindle c; thence said rope passes over the top of the carriage, and finally connects with the windlass.

The advantages resulting from this arrangement of the tackle are, that large sizes of pulleys can be used; the pulling is on center line, and can be done with greater dispatch and ease; the cord will always remain sufficiently taut; it is not passed between the rungs; and each section can be fully extended.

I mount the ladders on or off their carriage by the hand attachment, as follows: E is a turn-shaft or windlass, arranged to turn underneath the wagon, and being properly controlled by a ratchet, e, and pawl, e^1. (See Figs. 1 and 4.) To the windlass E is secured one end of a chain, e^2, and this is further secured to a swing-bar, E^1, and, finally, said chain is fastened to the bottom of the bottom ladder. (See Fig. 4.) The swing-bar E^1 has both its ends journaled to the opposite sides of the wagon, and said bar is bent V-shaped, so as to bring its center point below the wagon-axle to connect with the chain e^2, as just stated. (See Figs. 1 and 4.) The swing-bar gives purchase to the tackle and facilitates the handling of the ladders. The windlass E, being operated from both sides of the wagon, winds the chain and causes the ladders to be lifted from the carriage to a position the case requires, the ladders turning upon their journal at c.

F represents a similar hand attachment, but to perform a different purpose. It is also a turn-shaft or windlass, turning in top of the wagon-bed, and also properly controlled by rachet f and pawl f^1. (See Figs. 1 and 3.) The said windlass F connects by the chain or rope f^2 to a loop, f^3, that, further, has both ends secured to near top of the main ladder, as clearly shown in Figs. 1, 2, 3. It is by means of the hand attachment f and its connections to the ladders that the same can be drawn forward or backward from a perpendicular line, and this action can take place when the ladders are extended or nested together, but mounted off the carriage. Hence, it will be noted the apparatus can be manipulated so that its ladders shall reach to or from a window or high point, or assume different angles with relation to the object said ladders are intended to reach.

It is apparent that, in the complete operation of the ladders by means of the spring-bar levers, a greater portion of the weight must be shifted to one or the other of the rear wagon-springs, causing same to close together, while the opposite spring would expand.

To overcome and control the action of the wagon-springs, I have provided the spring-lock, as follows: It consists of the rigid bar g, the locking-levers g^1 g^1, the bell-crank g^2, the connecting-rod g^3, and the hand-brake g^4. (See Figs. 1, 4.)

The bar g is rigidly attached to both sides of the wagon, projecting partly below the lower leaf of the springs.

The locking-levers g^1 g^1 are pivoted to the bottom of each of the springs, so that their short arms g^5, with their notch, (see Fig. 4,) can be made to press against the rigid bars. Said levers are further curved, so that their long arms can be pivoted to each end of the bell-crank g^2, which operates contiguous to the under side of the carriage.

The rod g^3 connects to the center of the bell-crank, and also with the hand-brake g^4, which is arranged in the front of the carriage. (See Figs. 1, 4.)

The spring-locking attachment operates simultaneously on both sides of the wagon—that is, by throwing the hand-brake forward, the locking-levers are caused to clutch against the bars g, locking both wagon-springs, or so that same have no spring action. Readjusting the hand-brake loosens the levers, and the springs can then perform their ordinary function.

The springs of the wagon are thus quickly and easily controlled, so that the ladders can be handled or operated and used with safety.

The main windlass, to which the tackle connects to raise and lower the ladders for extension purposes, can be stated to consist of a tight and loose pulley, constructed and arranged as follows:

H represents a turn-shaft (see Fig. 3) arranged in the front part of the wagon, and so that it can be operated by hand-cranks on both sides, and controlled by suitable brakes or ratchet-and-pawl attachments h. (See Figs. 1, 3.)

H^1 represents, in connection with the turn-shaft H, a tight pulley, and it consists of a hollow shaft, forming part of which are side disks. (See Fig. 3.)

The loose pulley H^2 is similarly constructed to that of H^1, and it is first placed on the turn-shaft H, and can be adjusted along said shaft. The tight pulleys H^1 H^3 are next placed on and secured rigidly to the shaft H, (See Fig. 3,) so as to turn with the same.

Both tight pulleys operate simultaneously, and hence the tackle can be duplicated, if necessary; also, said pulleys can be operated independent of the loose pulley.

It can here be added that, like my former patented machine, it is my object in the present device to be able to raise or extend the ladders by means of hand-power, and also to utilize the draft-team for the same purpose.

The tight pulleys H^1 H^3 are to be so operated by hand-power, while to the loose pulley H^2 the power of the draft-team is to be applied.

The tackle to extend the ladders is therefore connected to either one or both of the tight pulleys H^1 H^3. A separate rope attachment, h^1, however, is necessary on the loose pulley, in order that the draft-team can be used to extend the ladders.

I term the pulley H^2 a "loose pulley," in contradistinction to the rigid pulleys H^1 H^3, and because said pulley H^2 can be connected or disconnected from the said rigid pulleys. For this purpose the side disk of the loose pulley H^2 has holes h^2 fitted to engage the pins h^3, which project from the side disk of the tight pulleys. (See Fig. 3.)

Further, to adjust the loose pulley into or out of engagement with the tight pulley, and, still further, to prevent the said loose pulley, when free or inactive, from turning with the turn-shaft, (and thus produce an uncoiling or entangling action of the rope h^1,) I have provided a pair of locking-levers, I. (See Fig. 3.)

The locking-levers I have their fulcrum at i on a bearing-plate, i'. (See Figs. 1, 3.) Said plate in its front face has notches (see Fig. 1) for the engagement of the ends of the locking-levers, which project outside the front of the carriage. (See Figs. 1, 3.)

The inner ends of the locking levers can be operated to clutch or loosen their hold on the disk of the loose pulley, so that same can be permitted to turn or be prevented from turning, and, also, by means of said hand locking-levers, said loose pulley can be adjusted into or out of engagement with the tight pulleys.

The cord on the loose pulley is of the proper length, so that the team can extend the ladders; and here it will be noted that in so using the draft-team it is still the tackle that connects to the tight pulleys that extend the ladders.

J is a friction-brake, consisting of a hand-lever having its fulcrum at j and bearing against a disk-wheel, j^1, that is rigid on the turn-shaft H. (See Figs. 1, 3.)

By means of the brake J and wheel j^1 the windlass can be properly controlled to lower the ladders.

To the front of the carriage, at j^2, are provided two rollers or pulleys, so that the rope used or drawn by the team can be operated more readily, and this more specially when the pulley is directed sidewise.

My improved fire-escape can be constructed of durable parts, so as to possess strength and safety.

The construction is, further, such as to adapt the apparatus to be used also for narrow streets, and in all cases the handling and use of the ladders can be accomplished in most decisive, quick, and safe manner.

What I claim is—

1. The herein-described tackle, in which the rope is secured to the lower end of the top ladder, B^3, and passes over the pulley d^1, placed at the top of the second ladder, B^2, so as not to be parallel with the rungs of said ladder, B^2; thence passes down the back of said ladder, over the pulley d^2, placed parallel with the rungs and at the bottom of said ladder B^2; thence passes upward over the pulley d^3, similarly arranged to that of d^1, but at the top of the third ladder, B^1; thence passes down the back of said ladder, and so on in a similar manner and in center line of all the ladders, and in combination therewith, as herein shown and described, as and for the purposes set forth.

2. The herein-described tackle, consisting of the rope secured to the lower end of the top ladder, B^3, and passing over the pulley d^1, placed at the top of the second ladder, so as to be not parallel with the rungs of said ladder B^2; thence passing down the back of said ladder, over the pulley d^2, placed parallel with the rungs and at bottom of said ladder B^2; thence passing upward and over the pulley d^3 (similarly arranged to that of d^1) at the top of the third ladder, B^1; thence passing down the back of said ladder, and so on in a similar manner and in center line of all the ladders nested within each other, and in combination with a carriage carrying a windlass, by means whereof the raising and lowering of said ladders is accomplished, in the manner and for the purposes set forth.

3. The windlass E, controlled by ratchet and pawl, the chain e^2, the swinging bar E′, consisting of a V-shaped bent bar, its center point brought below the wagon-axle and connecting to said chain, the opposite side of the bar E′ being journaled to the truck, which carries a nest of ladders, all said parts being combined to operate substantially as and for the purpose set forth.

4. The combination of the windlass E, chain e^2, the swinging bar E′, the windlass F, rope f^2 f^3, the sections of ladders journaled at c, all said parts mounted on a carriage, as herein shown and described, to operate substantially as set forth.

5. The hand attachment consisting of the lever C, having its fulcrum at c^1, engaging the bearing c of the ladders, the spring-lever c^2, engaging any of the holes in a plate, c^3, all said parts being combined with ladders mounted on a carriage, to operate in the manner and for the purpose set forth.

6. The wagon-spring lock consisting of the hand-lever, connecting-rod, locking-levers, rigid bars, in combination with a spring-wagon.

7. The loose or movable pulley H^2, having holes h^2 and carrying the rope h^1, in combination with the tight or rigid pulleys H^1 H^3, the turn-shaft H, the tackle connection to a system of ladders mounted on a carriage.

8. The pair of locking-levers I, in combination with the adjustable pulley H^2, the pulleys H^1 H^3, the turn-shaft H, the rope h^1, and

tackle, ladders, and carriage, all constructed and combined as set forth.

9. The friction-brake J, disk-wheel j^1, turn-shaft H, carrying pulleys H^1 H^3 H^2, rope h^1, tackle, ladders, and all mounted on a carriage, and combined to operate as and for the purpose set forth.

In testimony of said invention I have hereunto set my hand in presence of two witnesses.

DANIEL O. STRIFLER.

Witnesses:

WILLIAM W. HERTHEL,

JOHN W. HERTHEL.