2 Sheets—Sheet 1.

W. H. PACK.

Fire-Escapes.

No. 198,499. Patented Dec. 25, 1877.

Fig 1.

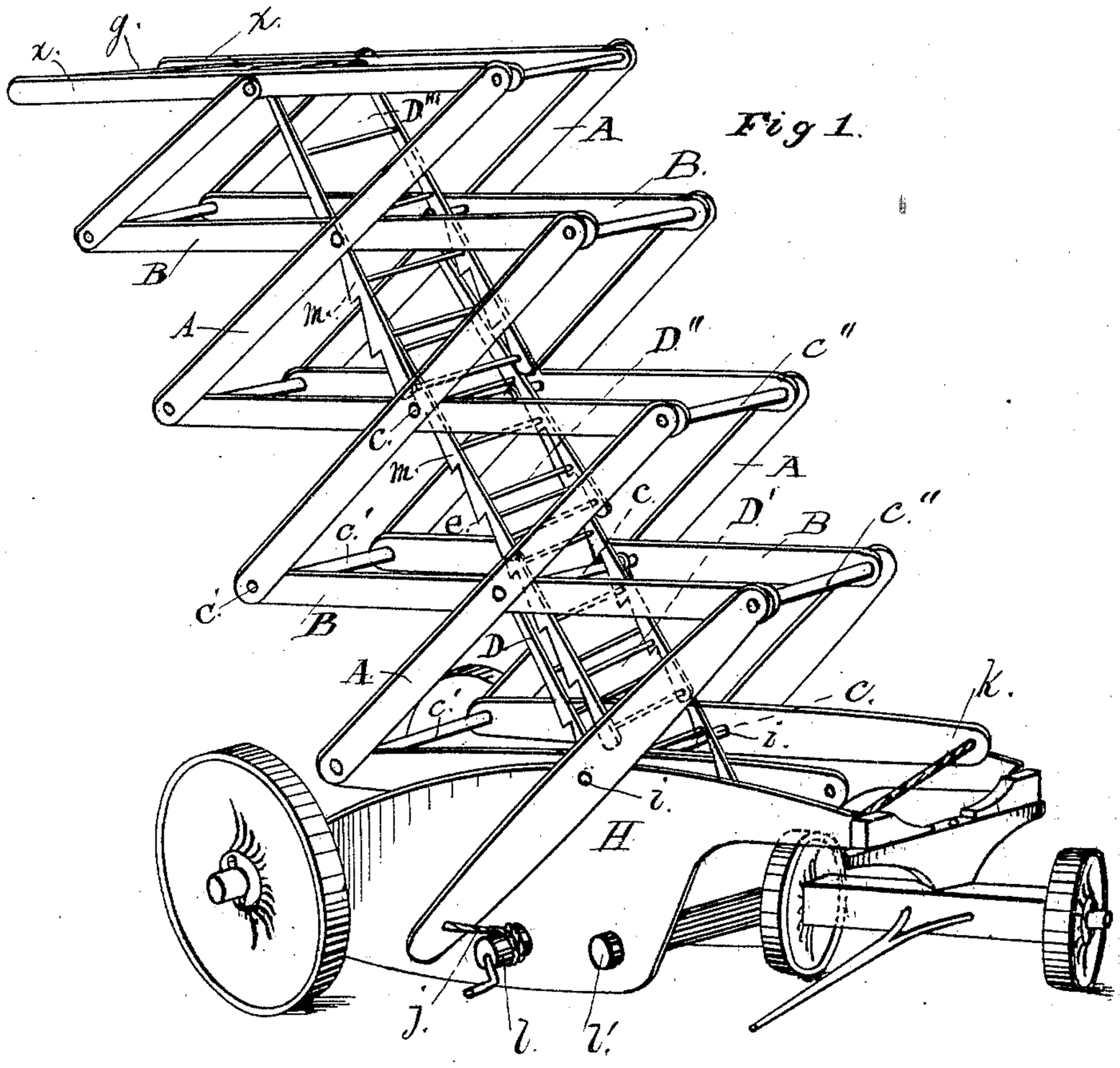
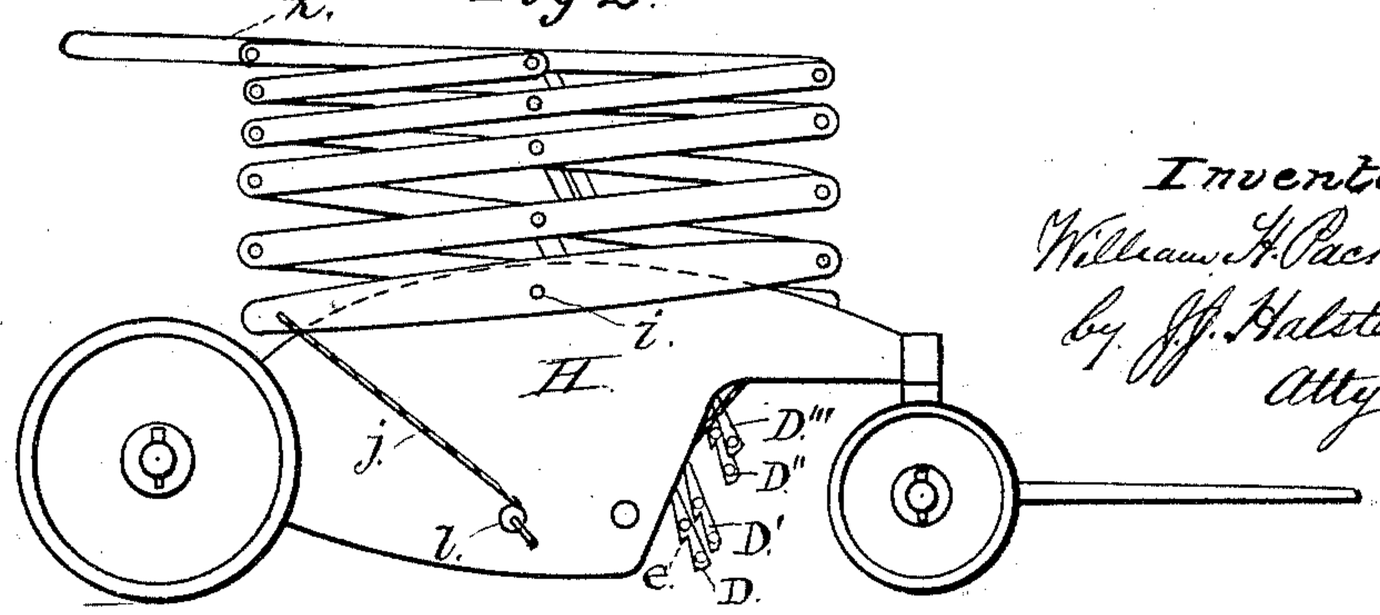


Fig 2.



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2 Sheets—Sheet 2.

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Fire-Escapes.

No. 198,499. Patented Dec. 25, 1877.

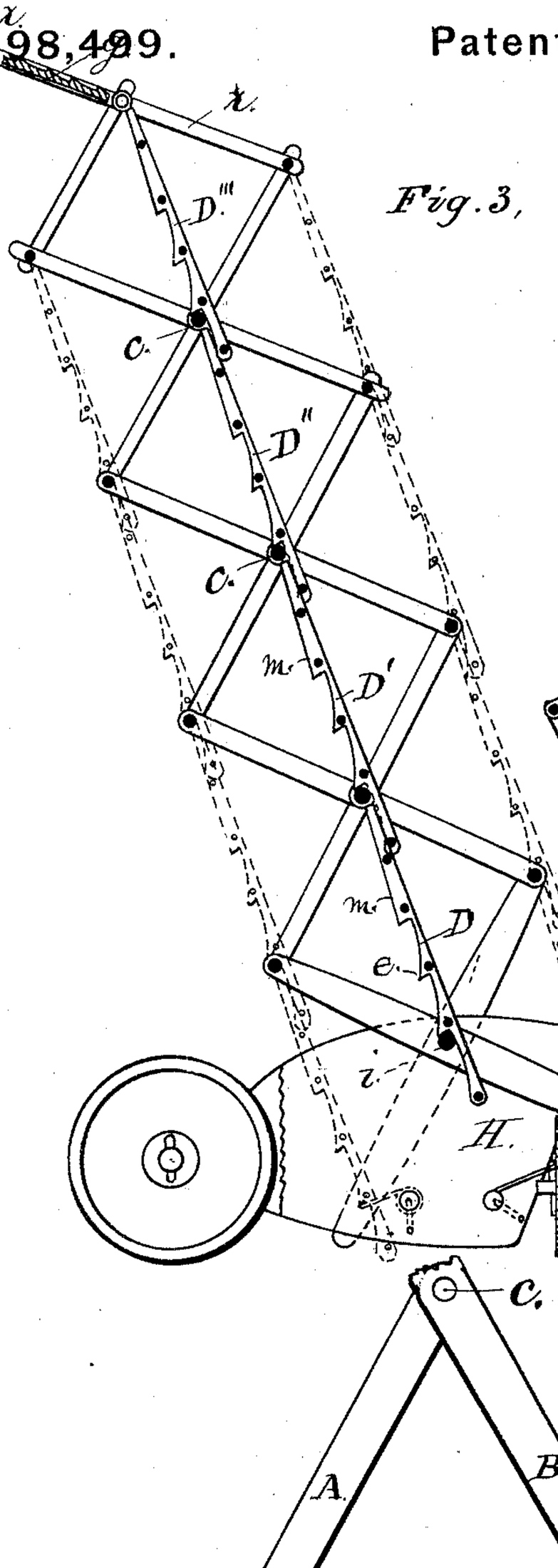


Fig. 3,

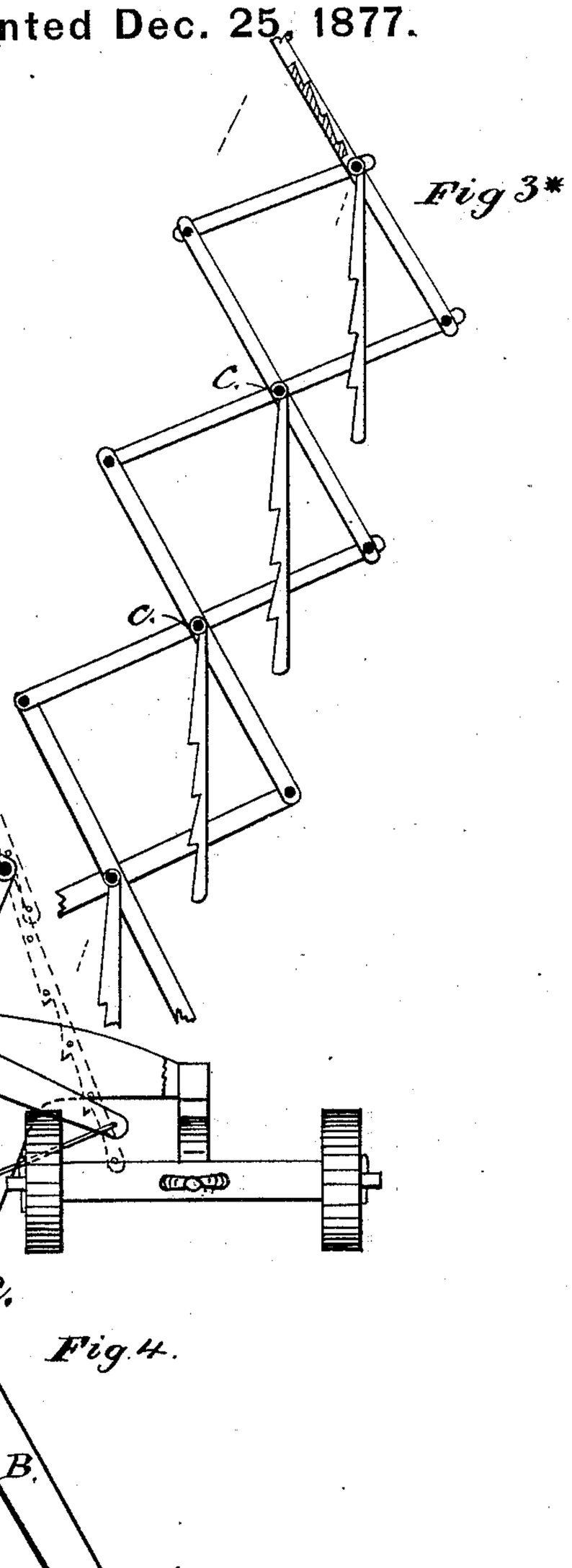


Fig 3*

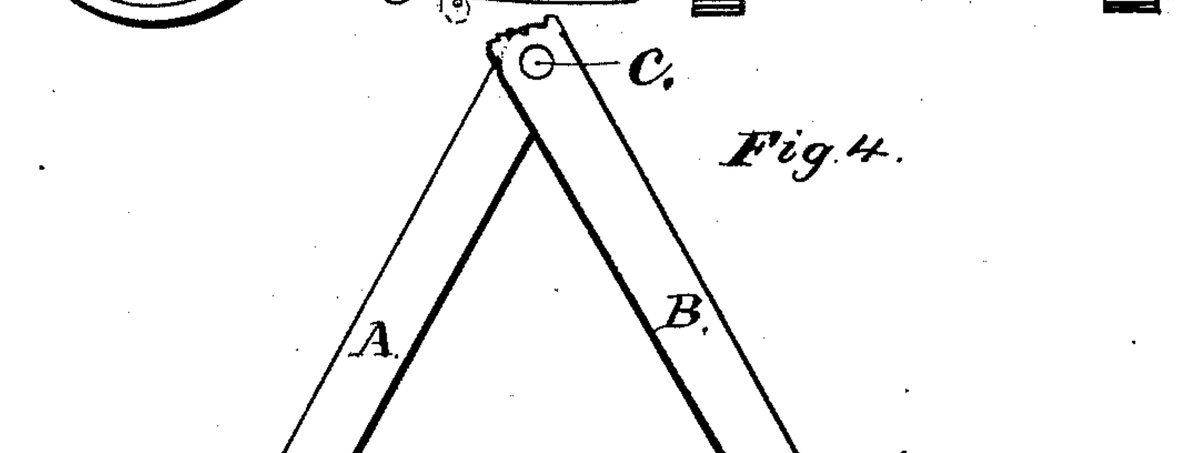
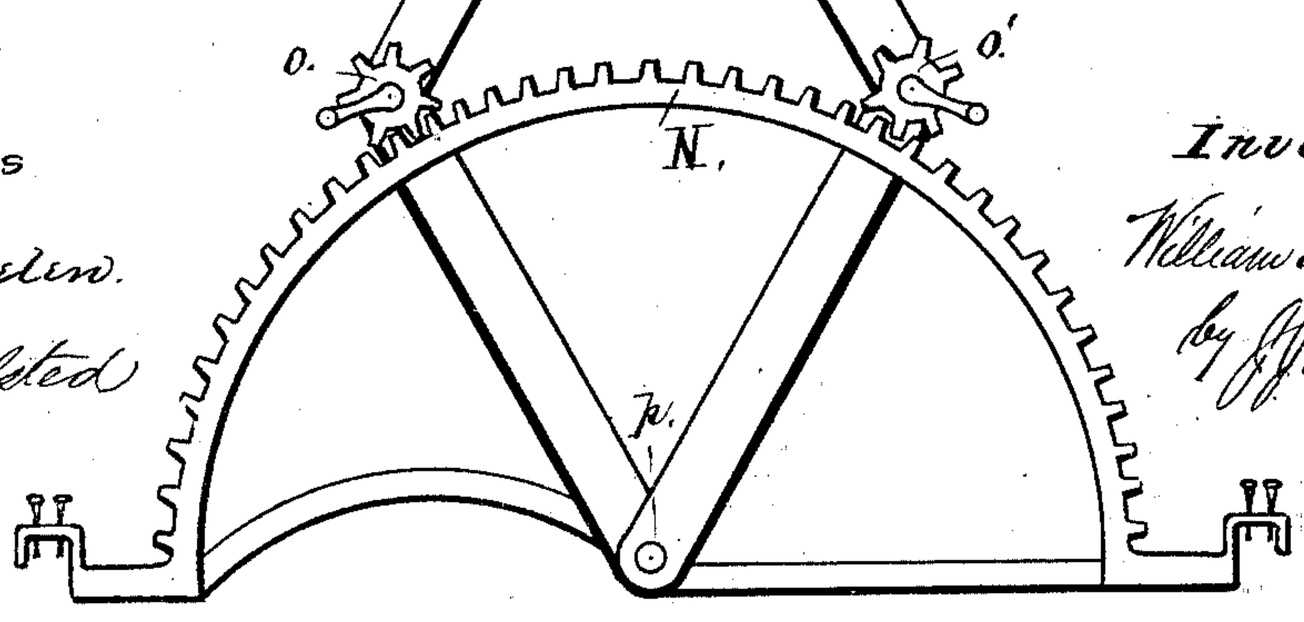


Fig. 4.



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UNITED STATES PATENT OFFICE.

WILLIAM H. PACK, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN FIRE-ESCAPES.

Specification forming part of Letters Patent No. **198,499**, dated December 25, 1877; application filed May 14, 1877.

To all whom it may concern:

Be it known that I, WILLIAM H. PACK, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Fire-Escapes; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My improvement belongs to that class in which "lazy-tongs" are used as a means for raising and lowering ladders. In all such with which I am acquainted either the members or levers composing the lazy-tongs are, some of them, made into ladders, or else they support flexible ladders extending from end to end of such levers, and thus unfolding with and as part of the lazy-tongs when the same is raised and extended, or folding up with it when the same is lowered; or where ladders suspended from their upper ends have been employed, they have caused undue strain on the joints by being hung to one side of the center or axis of the lazy-tongs, and they could not be swung free of each other for lowering without the use of a cord or cords connecting the whole series of ladders, and which thus needed to be pulled away from each other by the cord, and held by it in this position during the act of lowering the apparatus.

The objections to this mode of construction are many, among which the following may be named as the most serious ones:

First. The person ascending or descending the zigzag ladders must travel a zigzag path, because the ladders are necessarily in a zigzag line; and as he reaches the lower end of each section of the ladder, which is at one of the outermost angles of the tongs, he must, in order that each ladder shall incline toward instead of from him, turn half-way around, so as to change his course and travel in the reverse direction, which is not only inconvenient and dangerous, especially for ladies and children, but also necessitates the leaving a large opening at the foot of each to enable the person to pass through to the top of the next ladder.

Second. The strain on the apparatus having zigzag ladders is excessive, because, when the weight of the person (say, one hundred and fifty pounds) is at the outermost joint of the lazy-tongs the leverage is very great, being the same as if he were supported on the end of a lever projecting horizontally from a vertical line passing through the lowermost axis or support of the structure, and this, when the extended tongs are themselves in a slanting position, may throw the center of gravity beyond the base of the carriage and tend to overturn the whole.

Third. With the ladders severally suspended one above the other, the apparatus has heretofore been arranged so that the whole structure could be given an inclination in one direction only when raised, the several ladders not being able, in any position of the structure, by their own gravity, each to swing free of the others.

By my construction I avoid these and other difficulties, and secure advantages not hitherto attained.

Figure 1 is a perspective view of a fire-escape, illustrating my invention; Fig. 2, an elevation on a reduced scale, the lazy-tongs being closed; Fig. 3, a side view when extended farther than in Fig. 1; Fig. 3*, a side view showing the structure extended and inclined in a direction opposite that shown in Figs. 1 and 3, and illustrating the positions of the ladders as they detach themselves and hang free of each other and of all obstructions, ready to be lowered and while being lowered; and Fig. 4, a modification of the raising and lowering devices.

A A and B B are the crossing bars or beams, preferably made of iron, composing the two sets of lazy-tongs, and the two sets are connected by rods *c* at their centers, and other rods, *c′ c″*, at their outer ends.

D D′ D″ D‴, &c., are the ladders, which are severally swung or hung at their upper ends upon one of the central rods *c*. Each of these ladders—preferably about ten, and each of about ten feet in length—has its side rails *m* notched with teeth *e*, adapted to catch and hook upon the center rod *c*, next beneath the

one on which it is suspended, so that, whether the lazy-tongs be extended partially or to its full extent, each ladder may be free to become engaged by its hook-teeth with one of the rods *c*, the teeth of the several ladders being, of course, so spaced that all the ladders may so engage or become secured to the rods.

It will be seen that when a single one of the ladders thus secures itself it alone serves to lock the whole lazy-tongs to its extended position, and when the latter inclines a little in the proper direction the whole series of ladders will lock, and serve as one continuous straight ladder; and even if some should fail to lock, or should become unlocked, it would be unimportant, as they are all in the same continuous line.

The topmost crossing-bars *x x* I prefer to make longer than the others, as shown, that they may be projected into an upper window of a building, and they should have a platform, *g*, connecting them, to facilitate in some cases the exit of the person from the window to the ladder. This platform may be so hinged as to assume a horizontal position when projected into the window.

When the apparatus is lowered and closed up, each ladder lies or laps nearly vertically upon the one next beside or beneath it, the lower end of each being free, and the outer ladder is even then in position for use.

The whole is mounted on a carriage, H, as shown, the lazy-tongs having their lowermost support in the carriage-frame, as seen at *i i*; and the outer ends of the lowermost crossing-bars A B may be connected severally to ropes or chains *j j* or *k k*, connected with a windlass or crank-shaft, *l* or *l'*. By this means, either or both cranks being used, the tongs will be raised or lowered; but if one be turned faster or slower than the other, it will tend to incline the extended tongs either to one or the other side, as may be desired, or to any required degree. By this means the toothed side rails *m* may be swung onto or automatically swung off from the central rods, on which their teeth engage at will, and when so swung free each ladder will remain free and disengaged from all the other ladders or any impeding object by the mere force of its own gravity; and the upper end of the apparatus may be guided into any window desired.

The apparatus, unlike any other lazy-tongs construction known to me, is available as a short ladder, even when the tongs are entirely closed, as also when extended any distance, however little or much.

Instead of the chains, a single toothed segment, N, may be employed, (see Fig. 4,) the same being secured to the carriage in a position with its arch uppermost, pinions *o o'*, each having a crank, being applied severally at the outer angles or joints of the lowermost section of the tongs. The turning of either crank or both will extend or collapse the apparatus. The whole is pivoted and supported at *p*, as well as partially sustained by the pinions.

As the lazy-tongs are supported upon the frame or carriage at the center or axis of the beams or bars which compose the lower members of such tongs, as seen at *i* or *p*, it will be observed that, while the structure may be inclined with equal facility either to one side or the other when raised or when lowering, yet that in the act of raising it may be raised in a vertical line, and that when in such line it is evenly balanced both sides of the central or axial cross-bars, because the ladders are hung directly at and upon such centers, and not off to one side of the center. There are no ropes connected with any of the ladders which can either trip or embarrass the person ascending or descending, or become entangled in the ladders or other parts, and thus detract from the efficiency or ready use of the apparatus, which is very simple, and with few parts to get out of order.

Whatever may be the means employed for raising or lowering, pawls and ratchets or other detents may, if desired, be used in connection therewith to prevent back-motion of the crank-shafts.

The notched and suspended ladders may be hung upon the outer rods *c'* or *c''*, or both, (see dotted lines, Fig. 3,) as well as upon the central rods *c*, thus affording two additional sets of ladders, similar to those above described.

I claim—

1. In a fire-escape, the combination, with lazy-tongs pivoted to the carriage at their lowermost central axis, and connected at their other central axes by cross bars or rods *c*, the series of pendulous ladders, severally hung centrally of the lazy-tongs upon such central axial rods, as and for the purposes set forth.

2. In combination with the lazy-tongs, the series of hooked pendulous ladders, severally hung from the central rods, which form the axes of the tongs, and adapted and arranged to be automatically engaged with or disengaged from such axial rods by the mere act of raising or lowering the tongs, substantially as shown and described.

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