(No Model.) 2 Sheets—Sheet 1.

J. E. GILLESPIE.

FOLDING EXTENSION LADDER AND TRUCK THEREFOR.

No. 345,427. Patented July 13, 1886

Fig. 3.

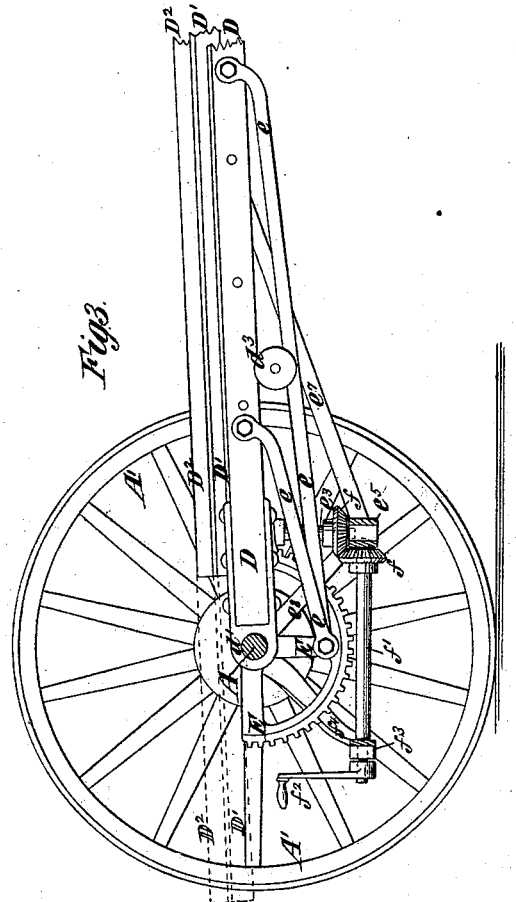


Fig. 2.

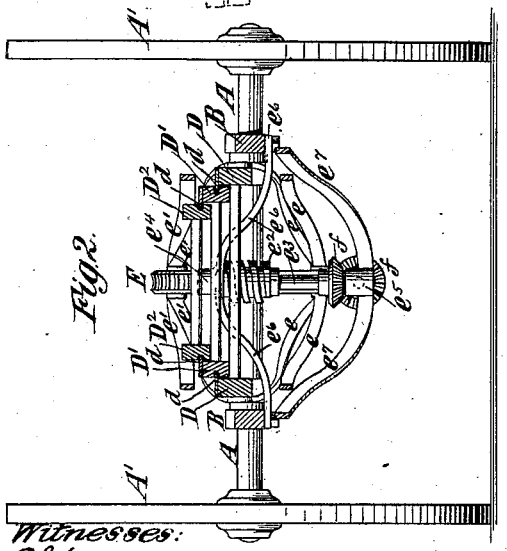
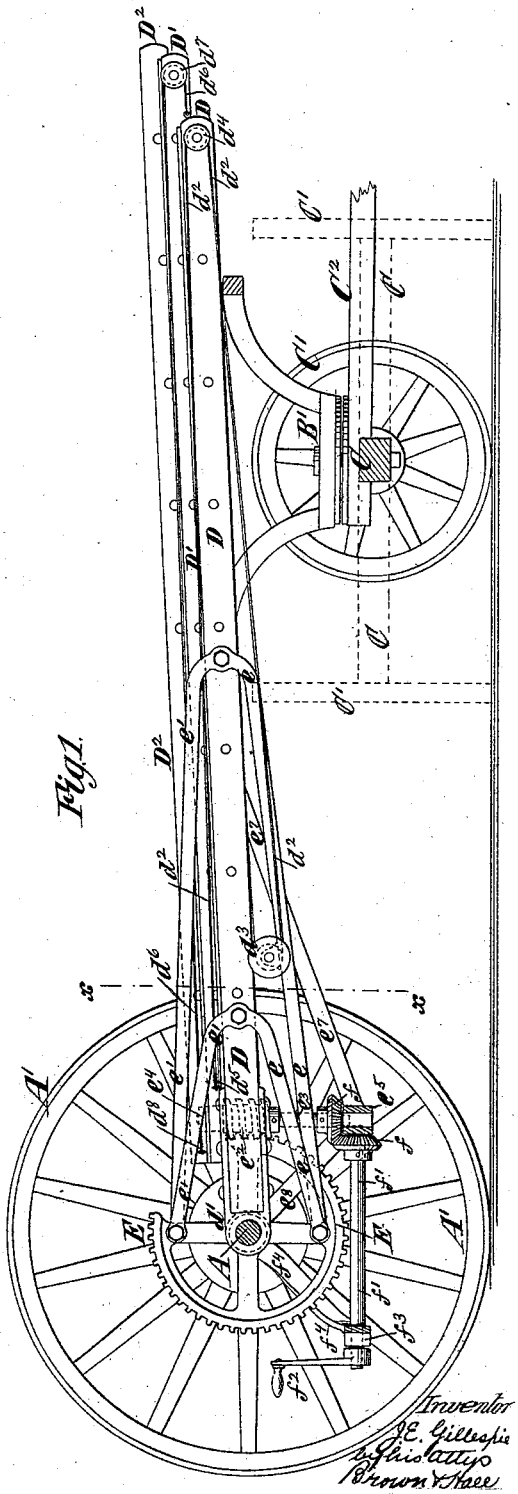


Fig. 1.



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(No Model.) 2 Sheets—Sheet 2.

J. E. GILLESPIE.

FOLDING EXTENSION LADDER AND TRUCK THEREFOR.

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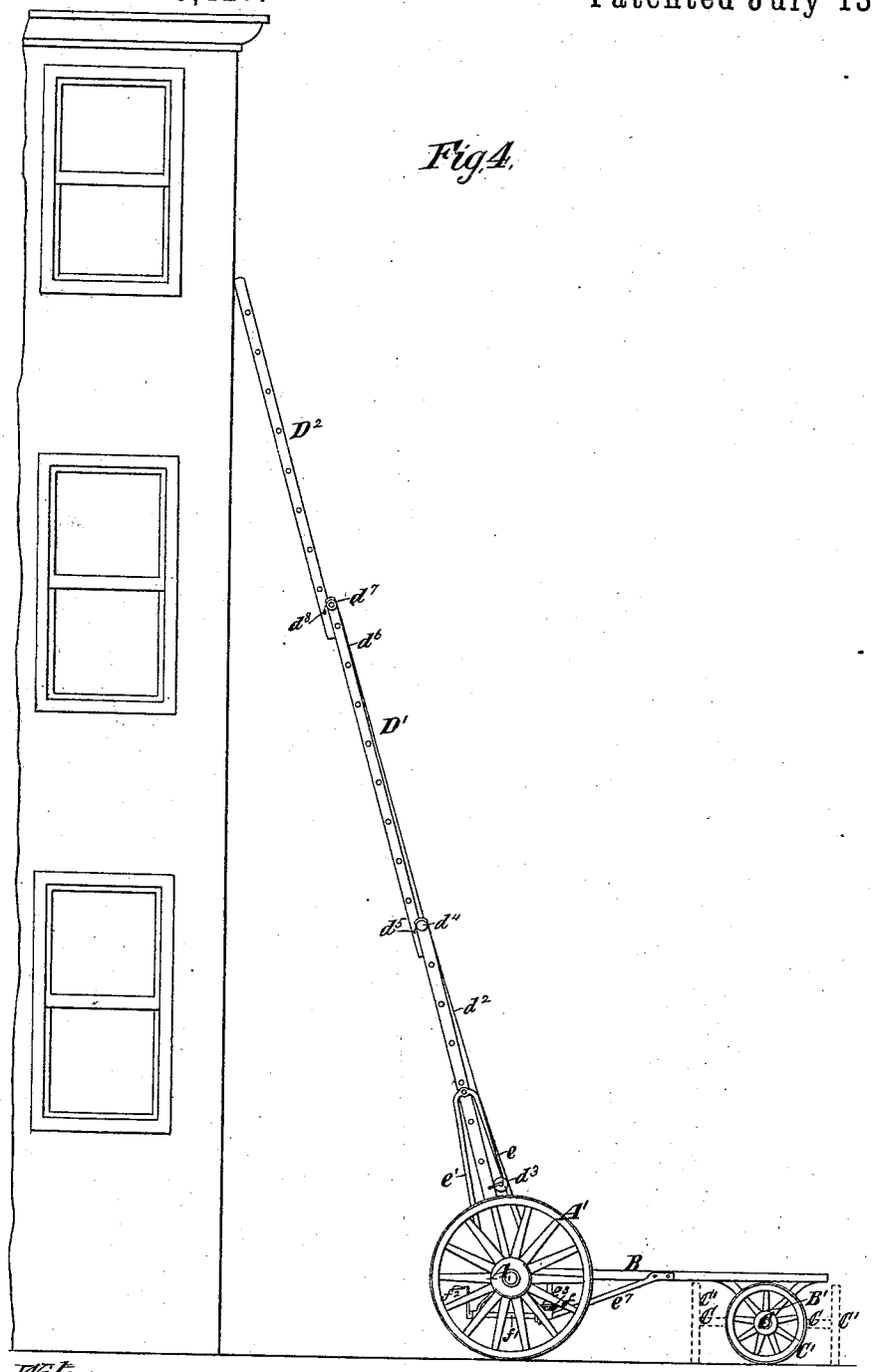
Fig 4.



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UNITED STATES PATENT OFFICE.

JAMES E. GILLESPIE, OF WARWICK, NEW YORK, ASSIGNOR TO THE WARWICK MACHINE COMPANY, OF SAME PLACE.

FOLDING EXTENSION-LADDER AND TRUCK THEREFOR.

SPECIFICATION forming part of Letters Patent No. 345,427, dated July 13, 1886.

Application filed March 4, 1886. Serial No. 193,930. (No model.)

To all whom it may concern:

Be it known that I, JAMES E. GILLESPIE, of Warwick, in the county of Orange and State of New York, have invented a new and useful Improvement in Folding Extension-Ladders and Trucks Therefor, of which the following is a specification.

My invention relates to ladders which are largely used for fire purposes, and which are composed of sections sliding one on another, so as to admit of their ready extension, the lower section being pivoted or hinged, so as to provide for raising the ladder into a vertical or inclined position, and the whole being carried on a truck for transportation from place to place. In such ladders, as heretofore made, the lower or first section has been commonly pivoted or hinged near the front of the truck, and has folded or swung down rearward relatively to the truck, and said lower or first section has also been mounted on a turn-table on the front of the truck, so that the ladder, when raised, can be directed toward or against a building at any point around the turn-table.

An important object of my invention is to provide a ladder which may be sold at a small price, and which may be conveniently manipulated and securely held in place when raised; and one essential feature of my invention consists in pivoting or hinging the lower or first section of the ladder parallel with and adjacent to or directly on the rear axle of the truck, so that the ladder will fold forward relatively to the truck, and so that by cramping the front wheels of the truck the latter may be turned to give the ladder the desired direction, and by the cramped position of the front wheels will be prevented from running or moving ahead when the ladder is raised or swung backward beyond a vertical position, to bring it to a bearing against a building.

The ladder, if hinged or pivoted on the rear axle of the truck, may be raised and lowered by means of a toothed sector or segment journaled on the axle and connected by braces with the lower or first ladder-section, and this gear sector or segment may be operated by suitable gearing—such as a worm or screw—which may turned by a crank applied directly to its shaft, or by an independent shaft connected by bevel-wheels with the worm or screw shaft. The ladder-sections may be connected by cords or chains attached to them and passing over sheaves carried by them.

The invention consists in novel combinations of parts and features of construction, hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a longitudinal section in a plane just inside the wheels of a ladder and truck embodying my invention. Fig. 2 is a transverse vertical section on the plane of the dotted line $x\,x$, Fig. 1. Fig. 3 is a view of the rear portion of the ladder and truck similar to Fig. 1, but illustrating a modification of my invention; and Fig. 4 is an elevation, on a smaller scale, of a portion of a building and my ladder and truck, showing the ladder as elevated and resting against the building.

Similar letters of reference designate corresponding parts in all the figures.

A A′ designate the rear axle and wheels of the truck, and from this axle the side portions, B, of the fixed frame of the truck extend forward, and there have a turn-table or fifth-wheel connection, B′, with the forward axle, C, on which are the front wheels, C′, and from which extends the pole C^2, whereby the truck is drawn.

I have here shown a ladder comprising three sections, D D′ D^2, the first or lower section, D, being non-extensible and pivoted or hinged at the lower end, and the other sections, D′ D^2, having a tongue-and-groove connection, d, as shown in Fig. 2, with each other and with the first section, D, thus providing for their ready extension. The foot of the lower or first ladder-section is hinged or pivoted at d', adjacent to and parallel with the rear axle, A, and, preferably, directly upon the rear axle, as here shown.

Any well-known or suitable means may be employed for elevating the extensible ladder-sections D′ D^2. An arrangement of cords, chains, or other flexible connections attached to and passing over sheaves on the ladder-sections will be usually employed. As here shown, at each side of the ladder a cord or flexible connection, d^2, passes from a windlass, d^3, near the foot of the ladder-section D, forward over a sheave, d^4, at the front or upper end of the section D, and thence rearward, and is attached to the foot of the ladder-section D′ at d^5.

A similar connection, d^6, is attached to the upper end of the section D, and passes thence over a sheave, d^7, at the upper end of the section D′, and rearward to the foot of the section D^2, to which it is attached at d^8. Consequently it will be seen that when the windlass d^3 is turned to raise the ladder-section D′ the movement of the sheave d^7 will project the section D^2 forward on and beyond the section D′. If additional ladder-sections be employed, they may be operated by similar connections.

E designates a gear segment or sector, preferably having oblique or worm teeth, and journaled on the axle A. The sector or segment E (shown in Figs. 1 and 2) represents about three-fourths of a circle, and is connected by lower and upper braces, e e', with the lower or first ladder-section, D. Through these braces the ladder is raised by the turning of the sector or segment E about the axle, and through them, also, the ladder is supported in an inclined position. If desired, the sector or segment E need only represent about half a circle, as shown in Fig. 3, and this will admit of the lower portions of the ladder-sections projecting rearward of the axle A, as shown by dotted lines, and for a given length of truck will give a longer ladder than that shown in Fig. 1, without any greater forward projection when folded or swung down on the truck. In this arrangement the lower braces, e, only are used.

As here represented, the worm sector or segment E is operated by a screw or worm, e^2, on a shaft, e^3, which is here shown as upright and journaled in upper and lower bearings, e^4 e^5. The upper bearing, e^4, is formed in a yoke or cross-bar, e^6, which connects the side portions, B, of the truck-frame, as shown in Fig. 2, and the lower bearing, e^5, is connected by braces e^7 with the side portions, B, and by braces e^8 with the axle A. The shaft e^3 is turned through bevel-gears f by a shaft, f', on which is a crank, f^2, and which is supported at one end in the part forming the bearing e^5, and at the other end in a bearing, f^3, connected by braces f^4 with the axle A or the frame portions B. This gearing not only serves to raise and lower the ladder, but also holds it securely at any angle of elevation.

When the ladder is to be used, the truck is backed up to a building, and the ladder may be swung upward beyond a vertical position, so as to incline rearward against the building, as shown in Fig. 4. By cramping the front wheels and turning the truck the ladder may be given any desired position, and by leaving the front wheels cramped, as shown by dotted lines in Figs. 1 and 4, they serve to brace or lock the truck to prevent its running forward away from the building when strain comes on the ladder.

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

1. The combination, with a truck, of a ladder carried thereby and pivoted or hinged at its foot adjacent to and parallel with the rear axle of the truck, substantially as herein described.

2. The combination, with a truck, of a ladder having its foot hinged or pivoted on the rear axle thereof, and folding forward relatively to the truck, substantially as herein described.

3. The combination, with a truck having a fifth-wheel or turn-table connection between its front axle and body, of a ladder having its foot hinged or pivoted adjacent to the rear axle of the truck, and folding forward relatively to the truck, substantially as herein described.

4. The combination, with a truck having a fifth-wheel or turn-table connection between its front axle and the body, of a ladder hinged or pivoted directly on the rear axle, and folding forward relatively to the truck, substantially as herein described.

5. The combination, with a truck and a ladder hinged or pivoted adjacent to the rear axle, and folding forward on the truck, of a gear sector or segment journaled concentrically to the axis of the ladder-pivot and connected by braces with the ladder forward of its pivots, substantially as herein described.

6. The combination, with a truck and a ladder pivoted on the rear axle, and folding forward on the truck, of a gear sector or segment journaled on the axle and connected by braces with the ladder forward of the axle, and gearing engaging said sector or segment for raising and lowering the ladder, substantially as herein described.

7. The combination, with a truck and a ladder pivoted on the rear axle, and folding forward on the truck, of a gear-sector journaled on the axle and upper and lower braces extending from said sector above and below the ladder and connected with the ladder forward of the axle, and gearing engaging said sector for raising and lowering the ladder, substantially as herein described.

8. The combination, with the truck and the ladder pivoted on the rear axle, and folding forward on the truck, of the gear-sector E, connected by braces with the ladder and journaled on said axle, the worm and worm-shaft e^2 e^3, and the operating or crank shaft f' and gearing f, connecting it with the worm-shaft e^3, substantially as herein described.

9. The combination, with a truck and a ladder comprising the section D, pivoted on the rear axle, and folding forward on the truck, and the extensible sections D′ D^2, of the means for operating the extensible sections, consisting of the windlass d^3 and sheaves d^4 on the section D, the sheaves d^7 on the section D′, and the cords or flexible connections d^2 d^6, passing over the sheaves and attached to the sections, substantially as herein described.

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Witnesses:
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FREDK. HAYNES.