No. 693,646. Patented Feb. 18. 1902.

J. W. GROFF.

FIRE ESCAPE.

(Application filed June 5, 1899.)

(No Model.) 3 Sheets—Sheet 1.

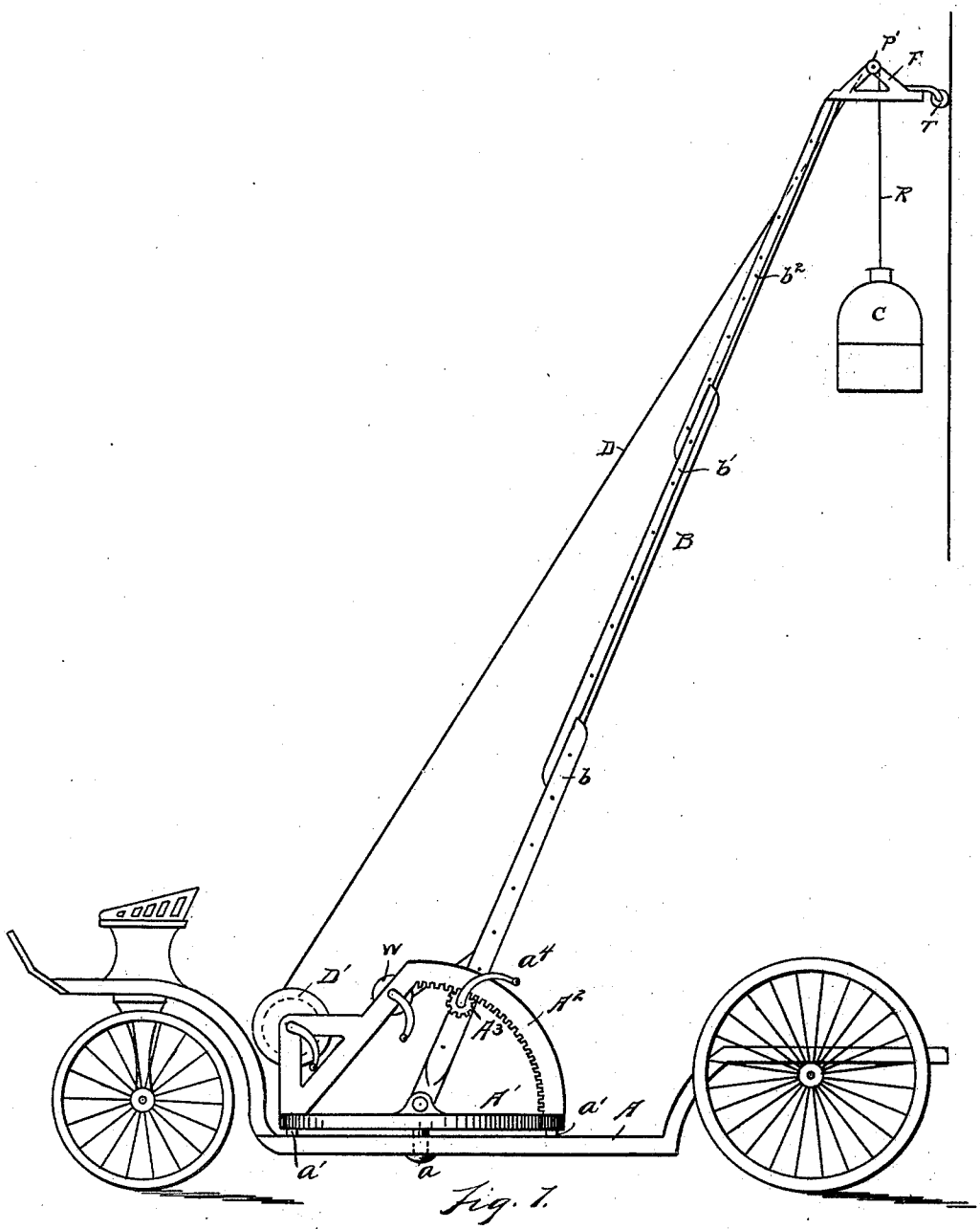


Fig. 1.

WITNESSES

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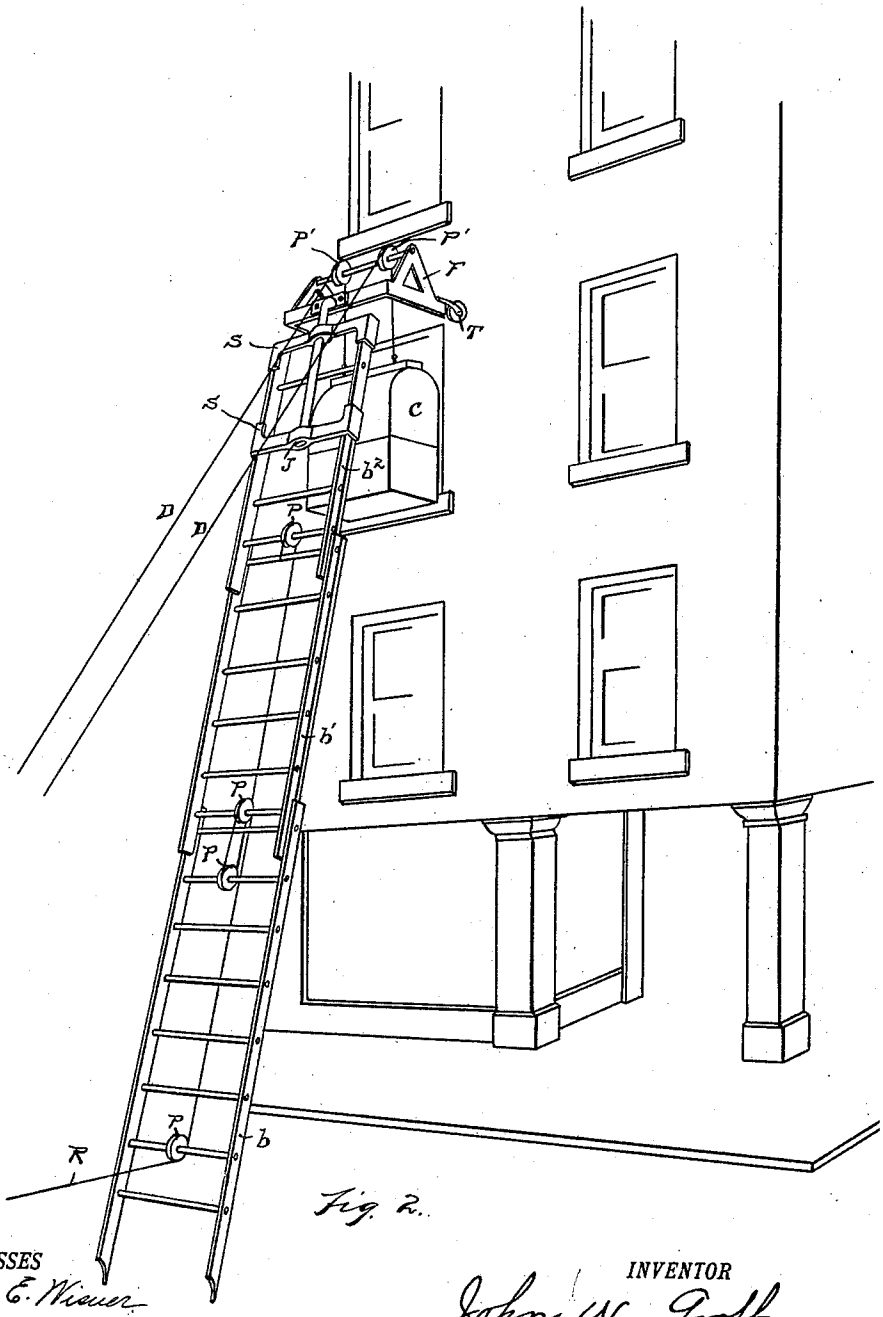


Fig. 2.

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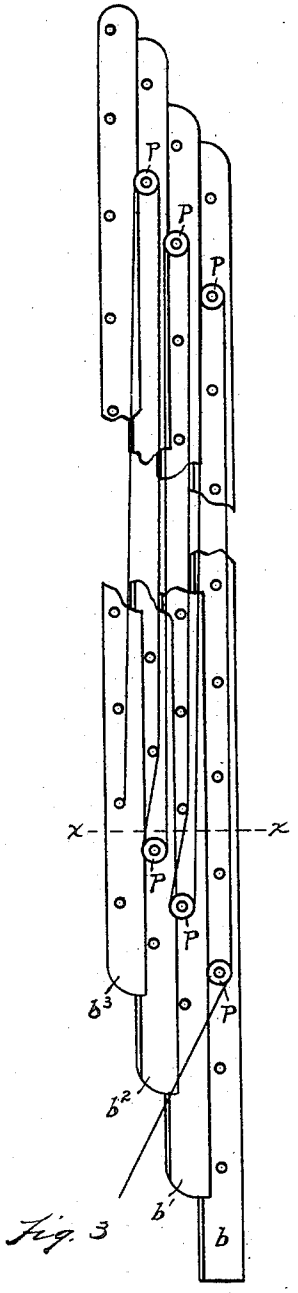


Fig. 3

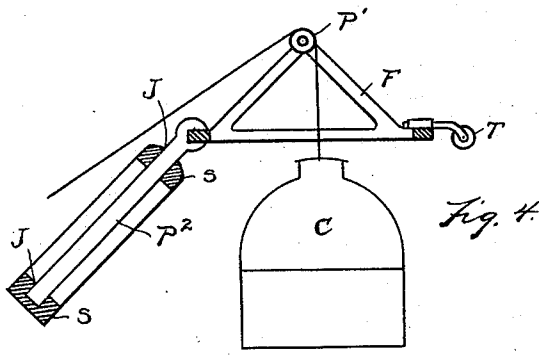


Fig. 4.

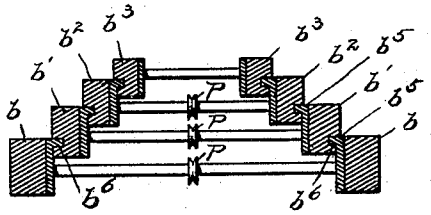


Fig. 5.

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UNITED STATES PATENT OFFICE.

JOHN W. GROFF, OF ALBION, MICHIGAN.

FIRE-ESCAPE.

SPECIFICATION forming part of Letters Patent No. 693,646, dated February 18, 1902.

Application filed June 5, 1899. Serial No. 719,414. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. GROFF, a citizen of the United States, residing at Albion, county of Calhoun, State of Michigan, have invented a certain new and useful Improvement in Fire-Escapes; and I declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to fire-escapes, and to that class thereof which employ extension-ladders which may be elevated by machinery; and it consists in the various elements and combinations hereinafter described and claimed.

In the drawings, Figure 1 is a side view of the fire-escape and the truck on which the same is mounted, together with a representation of elevating and operating machinery therefor. Fig. 2 is a perspective view of the upper portion, showing the cage and its arrangement in reference to a building when the apparatus is in operation. Fig. 3 is a detail view of the ladder when closed. Fig. 4 is a detail side view of a cage and supporting mechanism. Fig. 5 is a sectional view of Fig. 3 on line $x\,x$.

In the drawings, A represents a truck mounted upon wheels and which is used to transport the ladder and its elevating mechanism from point to point.

B represents collectively the extension-ladder; C, the cage; D, the rope for controlling the same; D′, the winch for controlling the rope.

Mounted upon the truck A is a turn-table A′. This revolves about a central pivot a upon bearings a'. Centrally pivoted upon this turn-table A′ is a foot of the lowest section of the ladder. Upon the turn-table A′ is mounted a segmental rack A^2, in which engages a pinion A^3, the pinion being journaled upon a bearing passing through both sides of the lower section b of the ladder, as shown in Fig. 1. This pinion and the shaft upon which it is journaled are controlled by cranks a^4. The ladder is composed of two or more sections b b' b^2, &c., it obviously not being limited to any special number of sections. These sections are constructed in a peculiar manner in order to more fully carry out the general principle of telescoping, which in itself is not new. As shown in Fig. 5, there are four sections, each being composed of two side pieces which are alike, these side pieces being connected in the usual manner by rounds, preferably made of gas-pipe. The inner faces of the sections, as shown at b^5 b^5, are made of angle-iron and are firmly fastened to the wooden side pieces in sections b' b^2 b^3. There are grooves b^6 b^6, into which the angles of the angle-iron enter, as shown in cross-section in Fig. 5. The grooves therefore constitute ways upon which the sections slide, in which friction-wheels may be used, if desired, the angle-irons holding them firmly in longitudinal position, and as the sections are not extended far enough so as to bring an undue strain upon the angle-iron the ladder can be extended without danger of its breaking, as the mode of attachment of one section to another makes a very strong but at the same time a very simple, easily constructed, and efficient sliding joint. Near the top and bottom of each section are arranged pulleys P, and a rope R is interwoven between these pulleys and the lower end carried to a winch W, erected on the turn-table, which winch is of the usual form and need not, therefore, be described in detail. This rope passes from the winch to the top pulley of the lower section b, thence to the bottom pulley of the second section b', thence to the top pulley of the second section, thence to the bottom pulley of the third section, thence to the top pulley of the third section, and thence to the bottom of the fourth section. There is therefore no pulley at the bottom of the first section and no pulleys on the top section. By winding up the rope on the winch W the first effect is to lift the top section up to the limit of the movement near the top of the next succeeding section. The movement of the second section stops at this point. The continued strain on the rope raises the succeeding sections successively until the last section is raised to the limit of its movement. It will be noted that the pulleys near the top of each section are not arranged at the extreme top, but are far enough below it so as to retain sufficient longitudinal connection between the sections to prevent undue lateral

vibration or strain, it being obvious that no section will be raised upon another higher than the top pulley of the section upon which it is raised. A second winch D′ is adapted to wind up the ropes D D, which pass over pulleys P′ P′ upon the top of a framework F, which is carried by the upper section of a ladder. The upper section has two strong cross-bars S S, which centrally carry journals J J. Pivoted in these journals is a strong pintle P^2, to which is attached at its upper end the framework F. The ends of the ropes D D carry the cage C. It will be noted that the framework F is adapted to swing on the pintle P^2, and therefore no matter what angle the ladder may assume with reference to the face of the building the face of the cage and of the framework F can be made to conform to the face of the building within reasonable limits. The outer face of the framework F preferably carries at the corners friction-rollers T T. These act as buffers and means of adjustment of the ladder against the front of the building when in use.

The cage C is preferably made of metal, is large enough to hold several persons, and has an opening or door C′ in its outer face, so that when the same is adjusted in front of a window persons can pass through the window into the cage without difficulty.

The operation of my invention is as follows: On arriving on the scene of a fire in a building the truck A is suitably placed, and the ladder carrying the cage to the top is elevated, in the manner hereinbefore described, by means of the winch W. The cage is thereafter controlled by the winch D′. The friction-rollers T T rest against the wall of the building, with the cage adjusted to come in front of any desirable window, and the door therein being opened people inside may pass into the cage and by closing the door be lowered to the ground in safety, passing through flames bursting through windows below them if that be found necessary. Without changing the position of the truck the framework F will adjust itself to the face of the building on the swinging of the ladder from side to side by virtue of its pivotal arrangement with the top of the ladder, and thus the cage is brought parallel with the face of the building regardless of the angular position of the ladder. This is a very great convenience, as it extends the range of the ladder along the front of the building without moving its base, and thereby requiring a new adjustment. It is obvious also that the ladder may be used for the carrying up of hose, as the hose can be attached to the cage and used therefrom, being hoisted by power instead of being drawn up by the main strength of firemen, as is now ordinarily the case.

What I claim is—

1. The combination of an extension-ladder, means for supporting it, means for causing it to extend, a framework carried at the upper extremity of the ladder by a pivotal joint and adapted to automatically adjust itself to the side of a building a cage suspended from said framework with the side facing the building in substantially a parallel plane with the adjustable face of the framework, and means for raising and lowering the cage independently of the means for raising and lowering the ladder, substantially as described.

2. The combination of an extension-ladder, means for causing it to extend, a pivoted framework carried to the top of said ladder, a cage suspended from said framework, means for raising and lowering the cage independently, and for raising and lowering the ladder, and adjusting-rollers projecting from and carried by the framework, substantially as described.

3. The combination of an extension-ladder, a cage adapted to be raised and lowered from its upper end, means for raising and lowering it independently of the means for raising and lowering the ladder, a truck upon which the ladder is mounted, means for horizontally revolving the foot of the ladder upon said truck, and means whereby the face of the cage is at all times enabled to adjust itself automatically parallel with the front of the building against which said ladder may be raised and adjusted, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

JOHN W. GROFF.

Witnesses:
O. L. DAVIS,
M. D. WEEKS.