(No Model.) 2 Sheets—Sheet 1.

W. HUBARTT.

FIRE ESCAPE.

No. 432,877. Patented July 22, 1890.

Fig. 2.

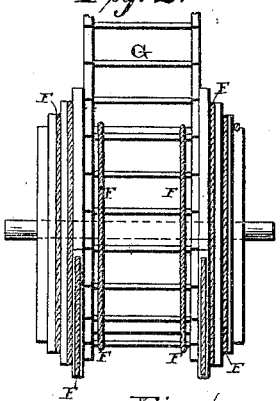


Fig. 3.

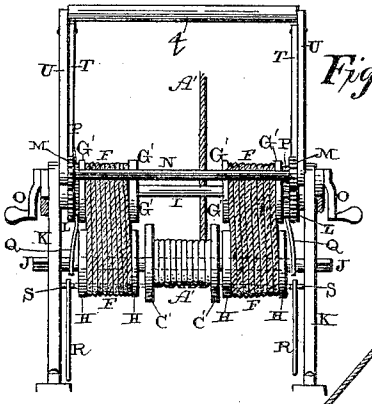


Fig. 4.

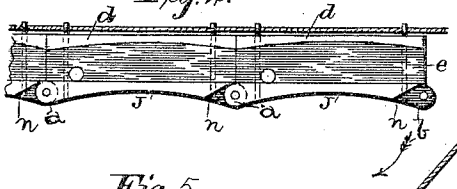


Fig. 5.

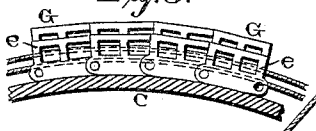


Fig. 6.

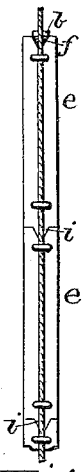


Fig. 1.

Witnesses:

E. P. Ellis,

B. Brockett.

Inventor:

Wm. Hubartt,

per

A. A. Lehmann,

Atty.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

W. HUBARTT.

FIRE ESCAPE.

No. 432,877. Patented July 22, 1890.

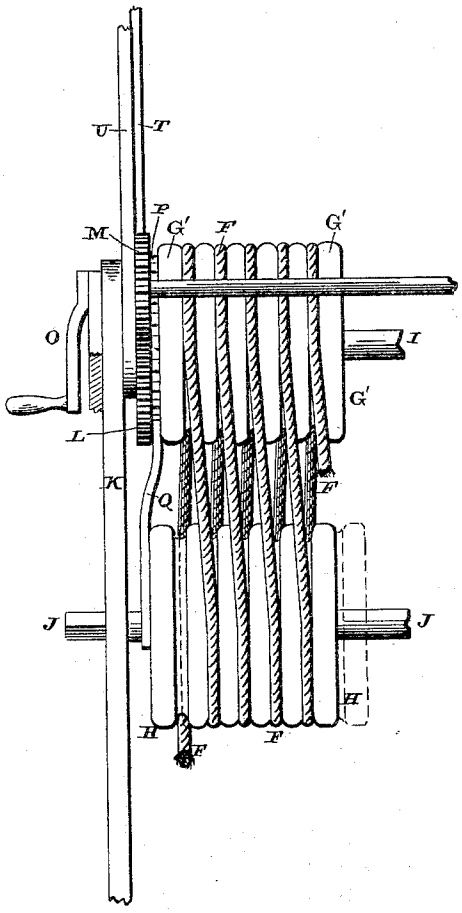


Fig. 7.

Witnesses:
E. P. Ellis,
Allen A. Pattison

Inventor:
Wm. Hubartt,
per
F. A. Lehmann,
atty

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM HUBARTT, OF NORTH PLATTE, NEBRASKA.

FIRE-ESCAPE.

SPECIFICATION forming part of Letters Patent No. 432,877, dated July 22, 1890.

Application filed December 23, 1889. Serial No. 334,745. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM HUBARTT, of North Platte, in the county of Lincoln and State of Nebraska, have invented certain new and useful Improvements in Fire-Escapes; and I do hereby 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 it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in fire-escapes; and it consists in the arrangement and combination of parts, which will be more fully described hereinafter.

The object of my invention is to produce a fire-escape in which a jointed ladder is used, and which by means of suitable mechanism can be extended so as to run up opposite a building of any desired height, and which when not in use can be wound upon a reel, so as to occupy but very little space, and to so arrange the parts connected with the elevator-cage that the cage can be made to swing to any window or opening in the building under the ladder, and thus adapt it to carry up a fireman with his hose, so as to play upon the fire at any point.

Figure 1 is a side elevation of a fire-escape which embodies my invention. Fig. 2 is an end view of the reel upon which the ladder and the raising-ropes are wound. Fig. 3 is a front elevation of the spools. Fig. 4 is a detail view showing the construction of a wooden ladder. Fig. 5 shows the rope being wound upon the ladder. Fig. 6 is a detached top view of Fig. 4. Fig. 7 is an enlarged side view of two of the spools.

A represents a suitable truck, which is mounted upon wheels and adapted to be drawn through the streets like any ordinary fire-engine. Journaled upon the top of this truck is the shaft B, to which the reel C is rigidly secured. One of the boxes D of the shaft B is secured to the upper end of a vertical screw E, placed upon one side of the truck, so that should the truck stop upon any uneven place the screw can be made to raise or lower the box to which it is connected, and thus level up the reel so as to cause it to stand perfectly level.

Each end of the reel C is made conical and provided with a spiral groove, and in these spiral grooves are wound the ropes F, by means of which the ladder is raised into position and its descent regulated at the will of the operator. The ends of the reel are made conical, and the elevating-ropes F are made to wrap thereon as the ladder G, which is made of short pivoted sections, is raised into position. When the ladder G first begins to rise, as shown in Fig. 1, the ropes begin to wind upon the spiral grooves upon the ends of the reel, and when the ladder is raised to its full extent the ropes are wrapped entirely upon the conical-grooved ends of the reel. As the ladder is lowered and again wrapped upon the reel, the ropes unwind from its conical-grooved ends in proportion to the rapidity in which the ladder is wound upon the reel. By this construction the ropes are wound and unwound from the reel in proportion as the size of the reel increases or decreases as the ladder is wound upon or unwound from it. The upper ends of these ropes are wound upon the two spools G′ H, which are placed upon the shafts I J in the frame K, which is built upon the truck in front of the reel, as shown in Fig. 1. The lower spools H turn loosely upon their shaft J; but the upper spools G′ are rigidly secured to their shaft I and are made to revolve therewith. Secured to the shaft I at each end is a cogged wheel L, and meshing with these cogged wheels are the pinions M, placed upon the shaft N, which is provided with a crank or handle O at each end. When these cranks O are turned, the shaft I is made to revolve, and thus wrap or unwrap the elevating-ropes F upon the spools in proportion as the ladder is raised or lowered. When the ladder is wound upon its reel, the ropes F are wound upon the ladder in between the layers of the ladder, and when the ladder begins to be raised into position the ropes wind upon the spools and the conical ends of the reel and hold the ladder in its raised position. As the ladder is lowered, so as to be wrapped upon the reel, the gradual unwinding of the ropes from the conical ends of the reel regulate the speed at which the ladder shall descend. In order to control the in-and-out movement of the ropes as they pass from and

to the conical ends of the reel and prevent them from being misplaced or crossed upon the spools, all of the spools G′ H are provided with grooves, as shown in Fig. 7, and these grooves cause the rope to be carried in from the conical grooves on the ends of the reel upon the ladder and be wound up with the ladder as the ladder is wound upon the reel. The lower spools H being loose upon the shaft J, as before described, they are allowed to move back and forth, as shown in dotted lines in Fig. 7, and thus follow to some extent the in-and-out movement of the ropes as they pass to and from the conical ends of the reel. The operators standing upon the truck at each end of the shaft N have only to turn the cranks O and the winding of the ropes upon the spools G′ H will cause the ladder to be raised, and as the ropes unwind from the spools the ladder slowly descends and is wrapped upon the reel. Placed upon the shaft I inside of the cogged wheel L is a ratchet-wheel P, and with these ratchet-wheels P a dog Q upon the shaft J engages, so as to hold the ladder at any desired height. In order to assist in holding the ladder in a raised position, two hooks R are hung upon a separate shaft S, and these hooks are made to engage at their lower ends with any desired round of the ladder, and thus assist in holding the ladder rigidly in a raised position.

The ladder is prevented from moving forward beyond a vertical position by means of a roller *t*, which is connected to the upper ends of the supports U, which have their lower ends journaled upon the shaft N, and these supports U are held in position by means of the braces T, which have their lower ends connected with the shaft I.

The ladder can be raised in a vertical position to its full height; but owing to these braces T U it cannot fall or move outward toward the front end of the truck. When the ladder is wrapped upon its reel, these braces T U can be folded down on top of the ladder, so as to be out of the way.

Pivoted upon the shaft N is a boom V, which extends forward beyond the front end of the truck any suitable distance, and which is braced at its outer end by means of the brace W, which is secured at its lower end to the front axle. Journaled upon the outer end of this boom V is a spool X, provided with a crank or handle, and around which the rope Y is wrapped. This rope Y is fastened to the upper end of the ladder G, as shown, and regulates the angle at which the ladder shall extend and supports it securely from its upper end while in a raised and inclined position. No matter at what angle the ladder G is inclined this rope holds it rigidly in position under any and all circumstances.

To the upper end of the ladder is secured a hook or catch, so as to catch over a window-sill, and thus help to support the ladder in position when raised against the side of the house.

Journaled in the upper end of the ladder is a pulley Z, over which passes the rope A′, which is connected at one end to the elevator-cage B′ and at the other end to the spool C′, rigidly secured to the middle of the shaft J. By turning the shaft J by means of cranks or handles, which are to be applied thereto, the cage B′ can be raised to any window, door, or opening in the building for the purpose of lowering people to the ground, or for the purpose of carrying up firemen and their hose, so as to play upon the fire from any desired point. This cage B′ will be of any desired construction, and has journaled upon its inner side two spools D′, upon which the ropes G″ are wound. The other ends of the ropes G″ are fastended to two sliding or rolling carriages I′, which move upon the ladder and which move upward upon the ladder as the cage is drawn upward. The ropes G″ prevent the cage from swinging freely in the air and regulate the distance that it shall move toward the building in front of which it is being elevated. If no ropes G′ are used, the cage becomes unmanageable, especially if a wind should be blowing, and by striking against the side of the house it is made more difficult for it to be raised and dangerous for the occupants. The person in the cage has but to control the spools D′, and the position of the cage can be regulated at will in relation to the building.

As the ladder is shown in Fig. 1, it is made wholly of steel sections, which are pivoted together at their lower corners by forming upon one corner the apertured ears similar to *a* of Fig. 4, and upon the opposite corner the apertured projection similar to *b*, Fig. 4, which fits between the said ears, and each section provided with the vertical portion *e*, which locks the ladder rigid against movement in one direction when it is raised, as shown in Fig. 1; but in case it should be desired to make the sections of wood, as shown in Fig. 4, the metallic hinges J′ are secured to their inner sides, and these hinges are slightly longer than the sections they unite together. The ends of the sections of the ladder, through the lower corners of which the rounds are passed, are made square at their ends above the rounds, so that when the ladder is raised these square ends abut together and keep the ladder rigid. Each of these sections is provided with an opening *f* at one end and at its opposite end with a lug or projection *i*, which fits in the opening *f* of the adjoining section when the ladder is raised, thus holding it rigid against any twisting movement and relieves the pivots of a severe strain they otherwise would be subjected to. Where the ladder has the sections *e* formed of wood, as shown in Fig. 4, the straps *d* are secured to the upper edges of the sections and these strips provided with the openings *f* and projections *i*, above described, and for the same purpose. By cutting the hinges away at one of their lower corners, as shown at *n*, the sections can be folded backward in the direction

indicated by arrow in Fig. 4 until the projection *b* is in contact with the ears *a* formed upon the farthest end of the adjoining section. These wooden sections are adapted to be wound upon a reel or formed into a roll, as may be desired. Should it be desired to remove any part of the ladder, it is only necessary to remove the pivots and a portion of the ladder can be taken away.

Having thus described my invention, I claim—

1. The combination of the elevator-cage, the ladder, the rope A′, the spool upon which the rope is wound, spools mounted upon the cage, ropes G″ connected thereto, and a sliding frame placed upon the ladder, substantially as shown.

2. The combination of the ladder and a suitable mechanism for raising and lowering it, a rope Y, connected at its upper end to the top of the ladder, and a suitable boom or frame-work for supporting the spool, substantially as set forth.

3. The combination of the frame K, mounted upon the truck in advance of the reel, the three shafts I J N, journaled therein, suitable wheels placed upon the shafts I and N, the spools G′, rigidly secured to the shaft I, the spools H, loosely connected to the shaft J, the elevating-ropes wound upon the spools, the reel, and the ladder, substantially as specified.

4. In a flexible ladder, the combination of the reel having conical grooves in its ends, the ladder which is wound thereon at its center, spools having their inner ends substantially opposite the sides of the ladder and their outer ends substantially opposite the conical grooves of the wheel, and two ropes, each rope respectively having one of its ends secured in the conical grooves, then passed around its corresponding spool, and its opposite end secured at the lower end of the ladder, whereby each rope passes from the ladder to the conical grooves as it is being raised, and vice versa when being lowered, substantially as shown and described.

5. In a flexible ladder, the combination of a reel having conical grooves, a flexible ladder wrapped thereon, and an elevating-rope having one end secured to the ladder and passed around an elevating-spool and its opposite end secured in the conical grooves, the said conical grooves corresponding with the increased circle formed by the ladder as it is being wound upon the reel, whereby a continuous elevating-rope can be passed from the conical grooves to the spool and from the spool to the ladder, substantially as shown and described.

6. A section for flexible ladders, consisting of a plate having apertured ears and projections at their lower corners and with vertical portions *e*, the ends of which engage above the said ears and projections, whereby it is locked against movement in one direction, substantially as shown.

7. A section for flexible ladders, consisting of a plate having a hinge at each lower corner, a projection at one of its upper corners, and an opening for a similar projection upon the upper corner of the adjacent section, whereby the sections are locked together against twisting, substantially as described.

8. A section for flexible ladders, consisting of a plate having two ears at one lower corner and an apertured projection at its opposite lower corner and cut away at *n*, for the purpose described.

9. In a fire-escape, the combination of the reel having a conical end provided with a spiral groove, two grooved spools placed adjacent thereto and a rope having one end secured in the spiral groove, then passed around the spools and its opposite end secured to the ladder, whereby the in-and-out movement of the rope to the spools is not misplaced or crossed, substantially as described.

10. In a fire-escape, the combination of the reel having a conical end provided with a spiral groove, two grooved spools placed adjacent thereto, one of the spools being allowed longitudinal movement upon its shaft, and a rope having one end secured in the spiral groove, then passed first to the said movable spool, then around both spools, and its opposite end secured to the ladder, substantially as and for the purpose described.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM HUBARTT.

Witnesses:
E. P. ELLIS,
M. P. CALLAN.