No. 650,053. Patented May 22, 1900.

# M. SHIRES & J. Q. A. KENNEDY.

## FIRE ESCAPE.

(Application filed July 11, 1898.)

(No Model.) 2 Sheets—Sheet 1.

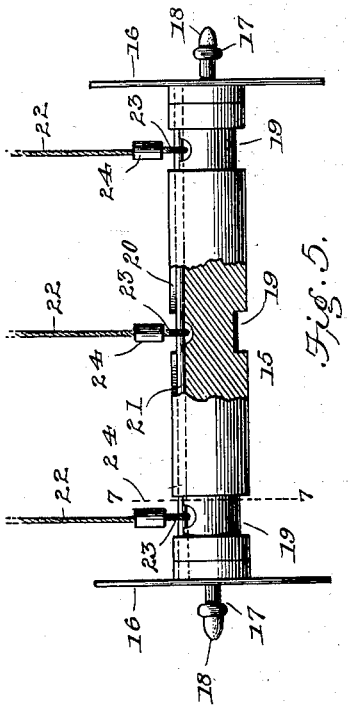

Fig. 5.

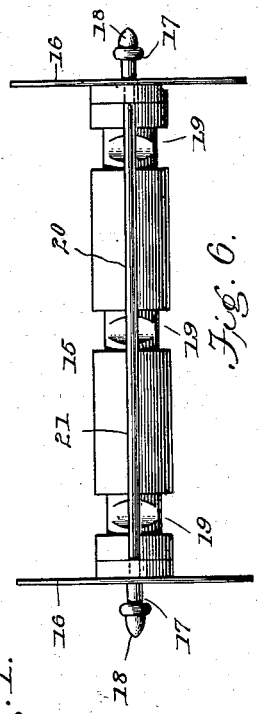

Fig. 6.

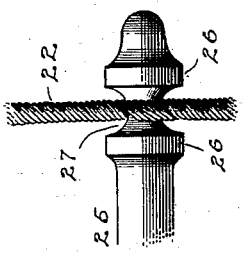

Fig. 8.

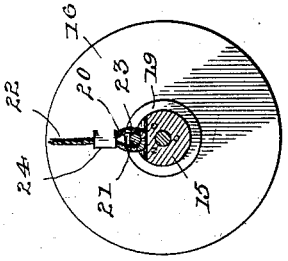

Fig. 7.

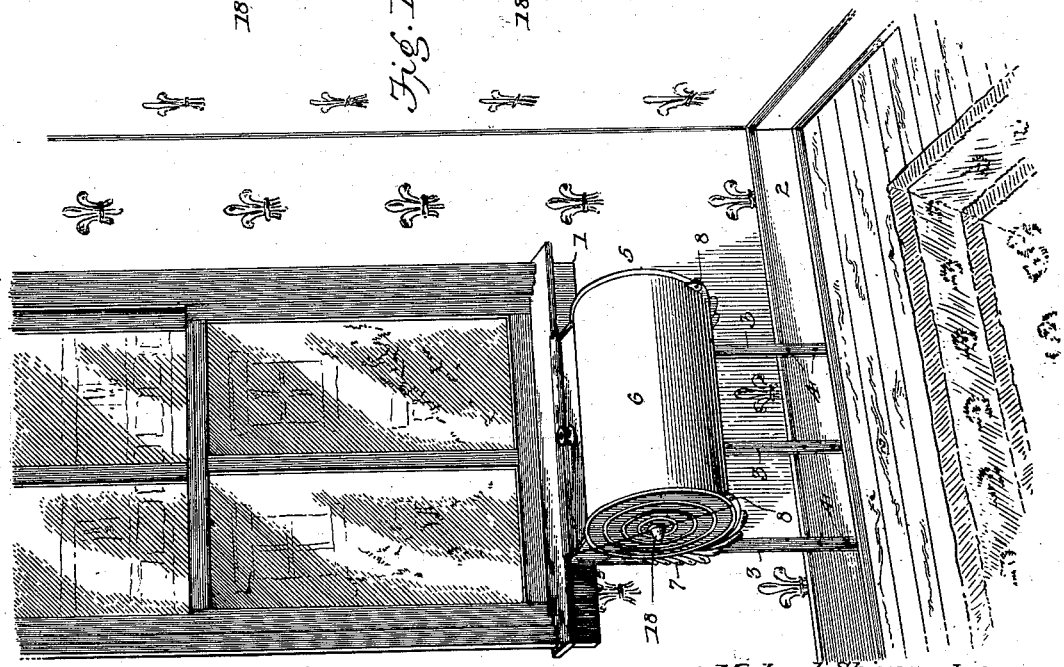

Fig. 1.

Witnesses.
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## FIRE ESCAPE.

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(No Model.) 2 Sheets—Sheet 2.

Fig. 3.

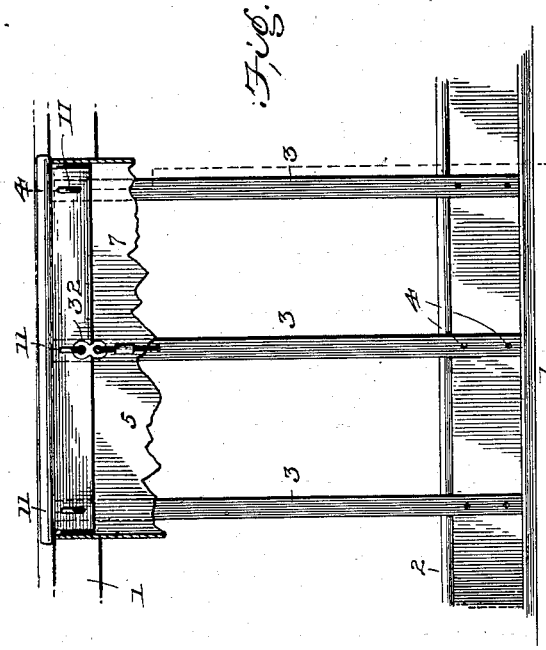


Fig. 4.

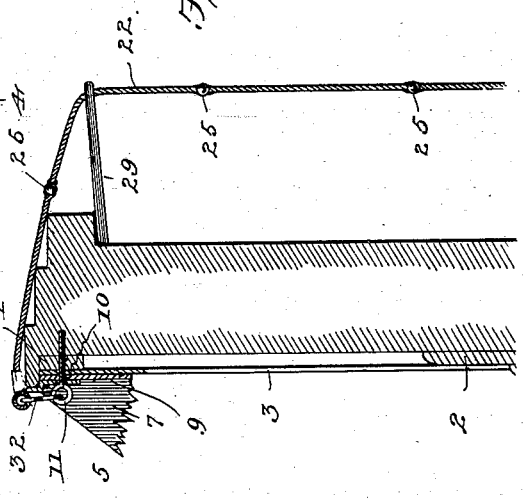


Fig. 9.

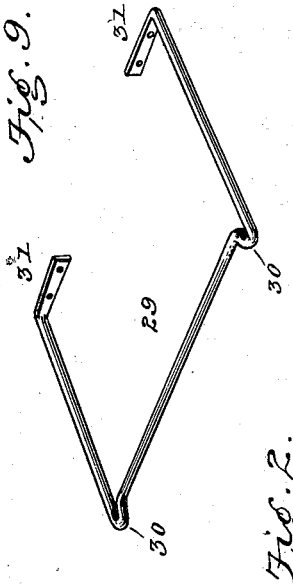
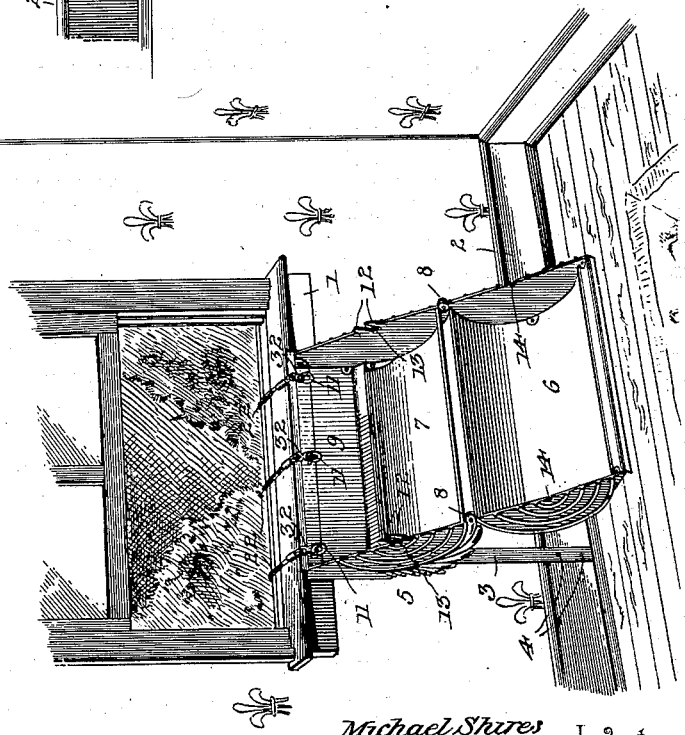


Fig. 2.



Witnesses
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# UNITED STATES PATENT OFFICE.

MICHAEL SHIRES, OF SPRING MILLS, AND JOHN Q. A. KENNEDY, OF JOHNSTOWN, PENNSYLVANIA, ASSIGNORS TO G. W. W. AMICK, OF JOHNSTOWN, PENNSYLVANIA.

## FIRE-ESCAPE.

SPECIFICATION forming part of Letters Patent No. 650,053, dated May 22, 1900.

Application filed July 11, 1898. Serial No. 685,682. (No model.)

*To all whom it may concern:*

Be it known that we, MICHAEL SHIRES, residing at Spring Mills, in the county of Centre, and JOHN Q. A. KENNEDY, residing at Johnstown, in the county of Cambria, State of Pennsylvania, citizens of the United States, have invented a new and useful Fire-Escape, of which the following is a specification.

Our invention relates to fire-escapes of that class which are to be applied to the wall of a room or apartment adjacent to and below the sill of a window and embodying a rolled flexible ladder designed to be thrown out of a window and to automatically uncoil in its flight through the air; and the present construction is more particularly designed as an improvement upon the fire-escape disclosed by our prior Letters Patent, No. 374,633, issued December 13, 1887.

One object of the present invention is to provide an improved means for attaching the ladder-cables to the roll-shaft in a simple, durable, and substantial manner; and a further object is to provide an improved construction by which the flexible ladder-cables may be compactly wound or rolled on the roll-shaft, so as to enable the rolled ladder to take up a very small space.

Another object of the invention is to provide an improved means for attaching the ladder-rung to the ladder-cable in a secure and substantial manner; and another object of the invention is to provide means by which the strain or pull of the ladder when unfolded for use is relieved from the window-sill to an appreciable degree by devices which are fastened to the washboard or floor and the window-sill of a room or apartment in which the fire-escape is situated.

With these ends in view the invention consists in the novel combination of elements and in the construction and arrangement of parts, which will be hereinafter fully described and claimed.

To enable others to understand the invention, we have illustrated the preferred embodiment thereof in the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a perspective view showing the structure applied to the window-sill and washboard on the inside of the room. Fig. 2 is a sectional perspective view of the escape unrolled for service. Fig. 3 is an elevation with the case partly broken away and showing the metallic braces by which the strain of the fire-escape is distributed on the washboard and window-sill. Fig. 4 is a vertical sectional elevation on the plane indicated by the dotted line 4 4 of Fig. 3 and showing the ladder-casing in cross-section. Fig. 5 is a sectional elevation of the roller-shaft with the ladder-cables attached thereto. Fig. 6 is a plan view of the roll-shaft shown by Fig. 5. Fig. 7 is a vertical cross-section through the roll-shaft on the plane indicated by the dotted line 7 7 of Fig. 5. Fig. 8 is an enlarged detail view of one end of the ladder-rung and a portion of the ladder-cable, showing the improved joint between the parts; and Fig. 9 is a detail perspective view of the bracket by which the ladder-cables may be held away from the face of the wall.

Like numerals of reference denote like and corresponding parts in each of the several figures of the drawings.

1 designates a portion of the window-sill, and 2 is the washboard to which are to be applied the vertical metallic bars 3, which serve to distribute the strain of the fire-escape ladder on the window-sill and to strengthen the latter when weight is imposed on the ladder by a person descending or ascending the same. A series of these vertical bars 3 are employed between the sill and washboard, and the lower ends of the bars are firmly and solidly secured to the washboard by the screws 4 or their equivalents. The upper ends of the vertical brace-bars are provided with openings through which are adapted to be passed the eyebolts that serve to attach the ladder-casing in position beneath the window-sill and to fasten the ladder-cables to the casing and the sill, as will presently appear.

The casing is indicated in its entirety by the numeral 5, and it is constructed in two sections 6 and 7, each section consisting of a pair of semicircular heads or end pieces, which are of cast metal, and a semicylindrical wall or shell, preferably of sheet metal

and rigidly joined to the cast-metal end pieces or heads. The sections 6 7 are joined together at one edge by the hinge 8, and the lower or base section 7 of the casing is formed with a vertical face 9, which is adapted to be applied against the upper perforated ends of the vertical brace-bars. In this vertical face 9 of the lower base-section 7 of said casing are provided the openings or slots 10, which are adapted to coincide with the apertures in the vertical brace-bars, and through the slotted portion of the casing and the apertured brace-bars is passed the series of eyebolts 11, which correspond in number to the brace-bars and have their threaded shanks embedded in the sill 1, whereby the bolts are adapted to fasten the casing and the brace-bars to the window-sill.

The lower base-section 7 of the casing has its heads provided on the upper edges thereof with the lugs 12, that extend above said edges of the casing-heads, and in these lugs and the casing-heads are provided the notches 13. The upper section of the casing is provided in the lower edges of its end pieces with the notches 14, which are adapted to aline or coincide with the notches in the heads of the lower casing-section, and these alined notches in the two casing-sections are adapted to form bearings for the journals of the roll-shaft. This roll-shaft 15 is of comparatively-small diameter, and at its ends said shaft is equipped with the heads 16, which confine the flexible ladder as it is coiled on said shaft. The roll-shaft is further provided with the journals 17, which are in axial relation to the shaft and extend from the heads 16 thereof, the extremities of the roll-journals being headed, as at 18. The roll, with the ladder coiled thereon, is adapted to fit in the notches of the lower base-section of the casing, and the upper hinged section of the casing is then closed over the latter to have the notches 14 in the end pieces of said casing-section fit the roll-journals, thus confining the roll and the flexible ladder within the sectional casing. The roll-shaft is provided with a series of circumferential grooves 19, which are spaced apart a distance equivalent to the spaces between the ladder-cables, and said roll-shaft is further provided with a straight longitudinal groove 20, which intersects with the circumferential grooves. To attach the ladder-cables to the roll-shaft, we employ a fastening-rod 21, which is housed or contained within the longitudinal groove 20 of the roll-shaft, so as to lie within a cylindrical surface of the roll, and this rod 21 is suitably attached to the solid ends of the roll or the heads thereof by fitting in suitable apertures in the roll ends or the heads. The rod 21 extends across the circumferential grooves 19, and it serves to attach all of the ladder-cables to the roll-shaft.

The flexible ladder contemplates the employment of a series of longitudinal cables, preferably of wire, and a plurality of rungs which are attached to the cables in a peculiar way, and the ladder-cables 22 are provided at their ends with loops 23, which are formed by bending or doubling the ends of the cables upon themselves and uniting them securely to the cables by the couplings or joints 24, said joints being composed of metal which is cast around the double ends of the cables, although this is not strictly necessary. The ladder-rungs 25 are of metal, and each rung is provided with pairs of collars 26, which are spaced apart on the rungs corresponding to the ladder-cables, and the collars of each pair are arranged on the rung to provide an annular groove or channel 27. The ladder-cables are woven or entwined around the grooved portions of the rungs, so as to be confined between the collars 26, thus holding the cables against sliding displacement on the rungs.

To project the ladder when in service beyond the face of the wall and to keep the strands of the ladder in spaced relation to each other at the place where they pass over the window-sill, we employ a bracket 29, which is fastened rigidly to the sill on the outside of a building, as shown by Fig. 4, said bracket extending outwardly in a horizontal direction from the sill for the reception of the ladder-cables. In Fig. 9 of the drawings this bracket is represented as consisting of a stout metallic bar 3, which is bent to provide the offsets 30, and the free ends of said bar are extended inwardly to form the short arms 31, that are adapted to bear against the sill and to be attached thereto by screws or other suitable devices. This horizontal bracket is thus designed to be fastened rigidly to the sill on the outside of the building for the ladder-cables to rest thereon, and the offsets of said bracket are spaced to form guards for the cables, so as to prevent them from slipping off the ends of the cross-bar.

The loops or eyes 29 at one end of the ladder-cables are attached to the roll-shaft by the fastening-rod 21, which passes through the series of eyes to attach the ladder-cables by a single device to the roll-shaft, and the other ends of the ladder-cables are loosely connected with the fixed eyebolts 11 by the links or swivels 32, which may be of any approved construction.

When the ladder is not in use, it is coiled compactly on the roll-shaft, and the entire structure is placed in the lower section of the casing for the journals 17 of the roll-shaft to rest in the notches of the lower casing-section, after which the upper hinged casing is lowered to inclose the ladder within the casing. To use the apparatus, it is only necessary to raise the hinged section of the casing in an upward and outward direction and then remove the ladder from said casing. The ladder may be thrown out of the window, and it uncoils as it drops toward the ground. The ladder is adapted to be coiled in an exceedingly-compact condition upon the roll-shaft,

because the cables thereof may enter more or less into the annular grooves of the roll-shaft, and thus the diameter of the flexible rolled ladder is quite small to enable it to be compactly housed within the casing.

We are aware that changes in the form and proportion of parts and in the details of construction may be made by a skilled mechanic without departing from the spirit or sacrificing the advantages of the invention, and we therefore reserve the right to make such modifications as clearly fall within the scope of the invention.

Having thus described the invention, what we claim is—

1. In a fire-escape, a roll-shaft provided with a series of circumferential grooves and with a longitudinal groove which intersects the circumferential grooves, in combination with a ladder the cables of which are provided with loops or eyes, and a single fastening-rod fitted in the loops of all the ladder-cables and attached to the roll-shaft to lie within the longitudinal groove thereon, substantially as described.

2. In a fire-escape, a flexible ladder having each of its cables provided at one end with a loop or eye, a roll-shaft provided with circumferential grooves to receive said cables and their loops, and a single fastening-rod attached to the roll-shaft to intersect the grooves thereof inside of the peripheral plane of the roll and passing through the eyes of all the ladder-cables, whereby the ladder may be coiled compactly on said roll-shaft with the rungs lying against the roll, substantially as described.

3. In a fire-escape, the combination with a flexible ladder having a series of cables, of a roll-shaft provided with the intersecting annular and longitudinal grooves, and a single fastening device which is secured to said roll-shaft in the longitudinal groove thereof and is engaged with the series of ladder-cables, substantially as described.

4. In a fire-escape, a fixed bracket bent from a single piece of metal and provided on its cross-bar with end offsets, forming ladder-guards, combined with a flexible ladder having its spaced cables fitted between said offsets and passing over the bracket to be held thereby away from a wall, substantially as described.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in the presence of two witnesses.

MICHAEL SHIRES.
JOHN Q. A. KENNEDY.

Witnesses for Shires:
J. W. HAZELL,
A. GRENOBLE.

Witnesses for Kennedy:
HORACE R. ROSE,
C. H. SUPPES, Jr.