(No Model.) 2 Sheets—Sheet 1.

W. J. McCOLLOM.

FIRE ESCAPE.

No. 486,493. Patented Nov. 22, 1892.

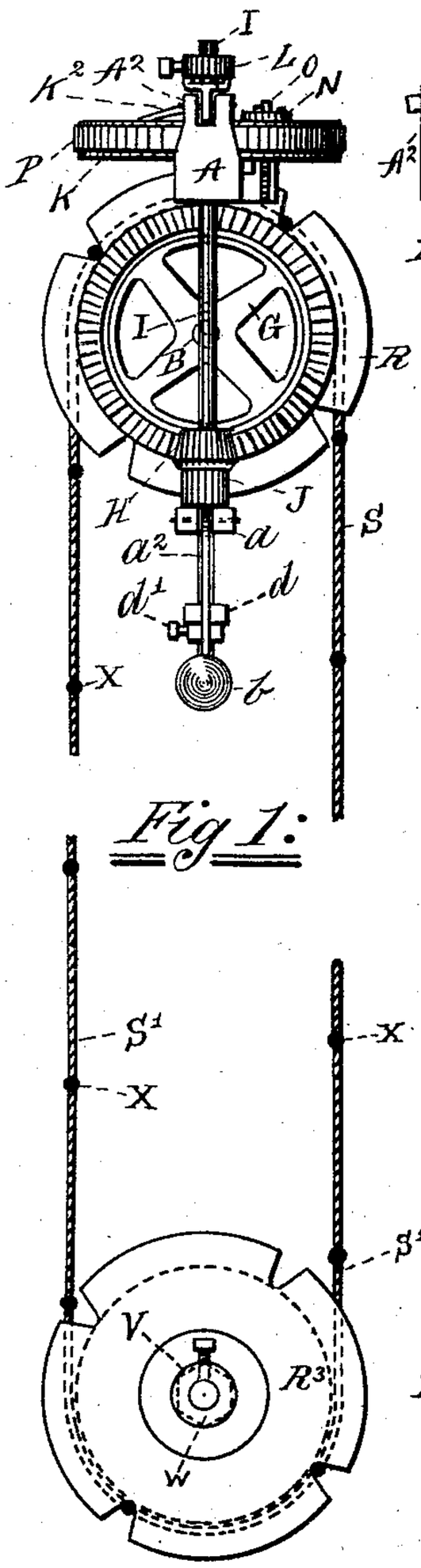
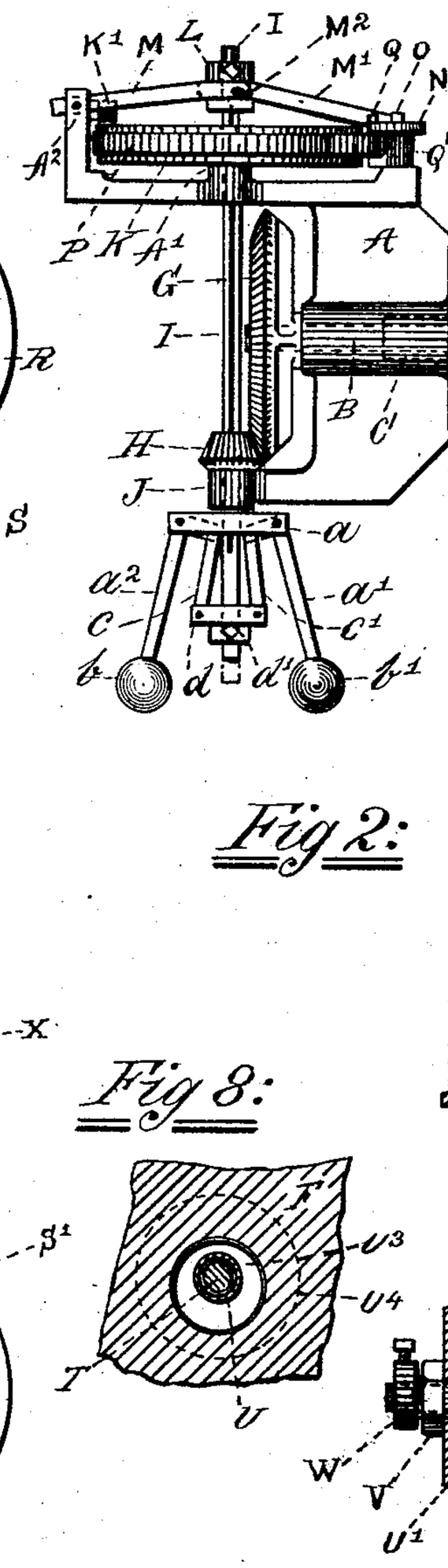


Fig 1:



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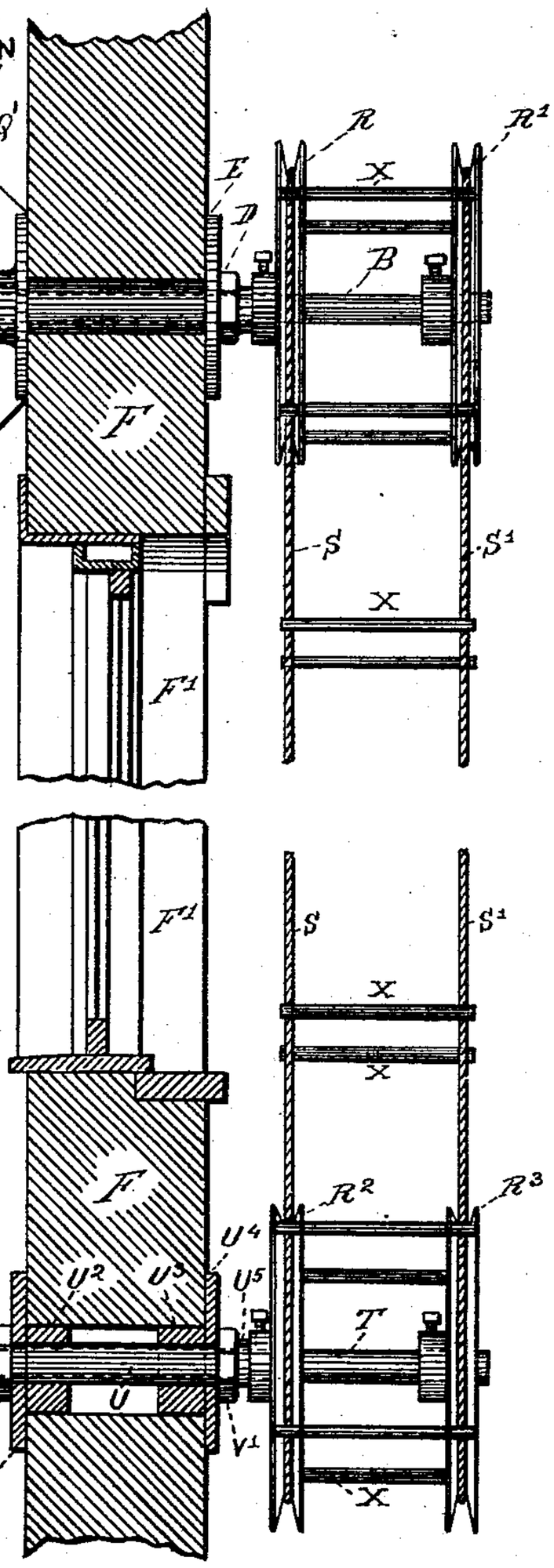

Fig 8:

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(No Model.) 2 Sheets—Sheet 2.

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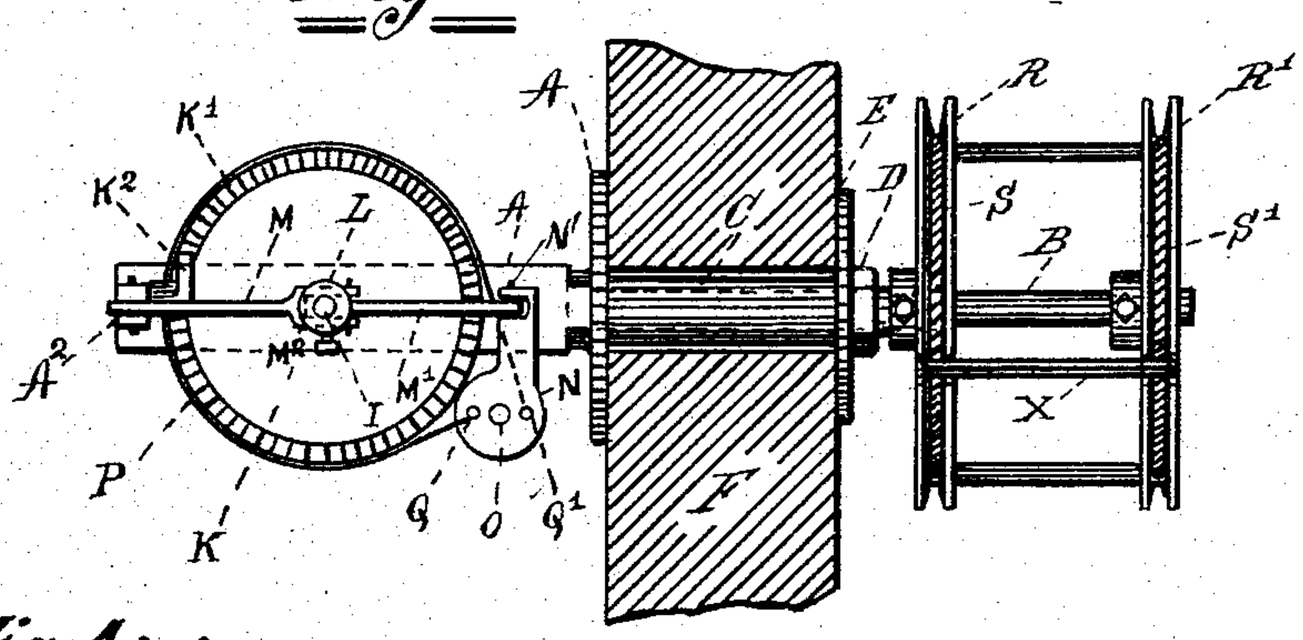
Fig 3:



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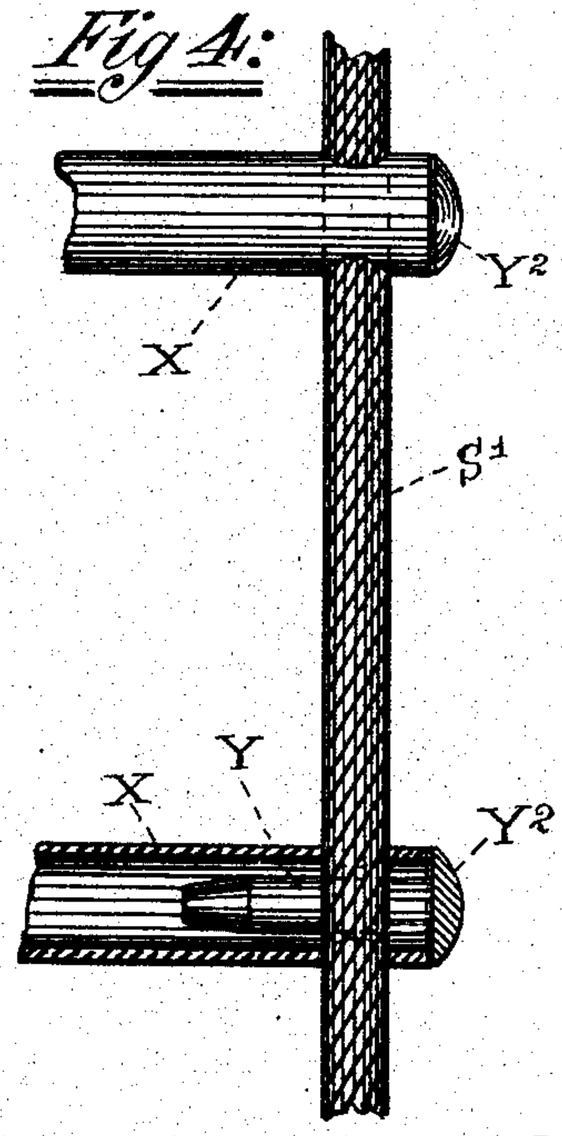

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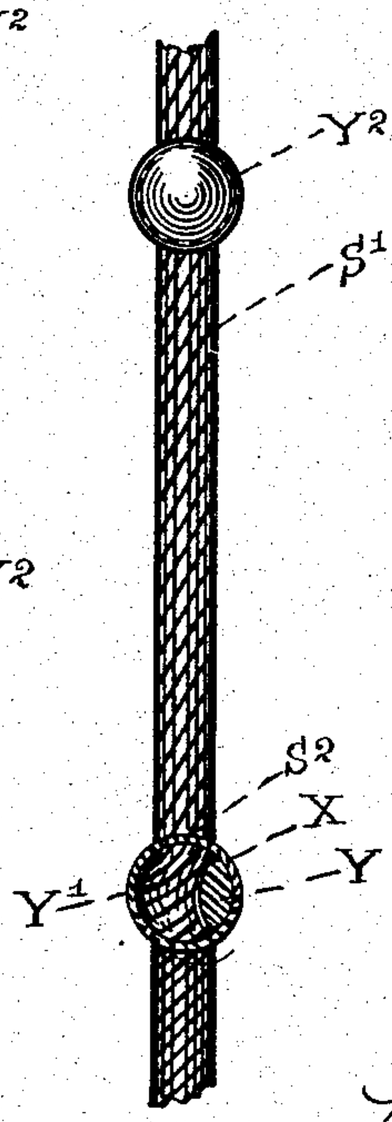

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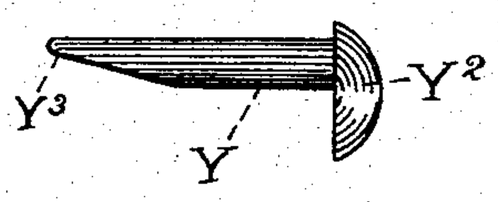

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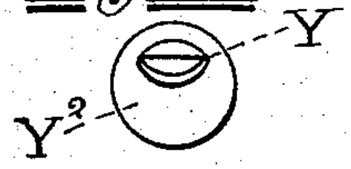

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UNITED STATES PATENT OFFICE.

WILLIAM J. McCOLLOM, OF PATERSON, NEW JERSEY.

FIRE-ESCAPE.

SPECIFICATION forming part of Letters Patent No. 486,493, dated November 22, 1892.

Application filed March 17, 1892. Serial No. 425,280. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM J. McCOLLOM, a citizen of the United States, residing in the city of Paterson, county of Passaic, and State of New Jersey, have invented certain new and useful Improvements in Fire-Escapes, which are intended to be attached to the walls and near the windows of hotels, factories, dwellings, or other structures and operated automatically by the added weight of the persons escaping from the building, of which the following is a specification.

The object of my invention is to provide a means by which the occupants of a burning building may readily and easily escape from the window of any floor or story by means of an endless ladder made of incombustible material, one side of which descends at a uniform speed controlled by a regulating device to be hereinafter described, motion being imparted by the weight of one or more persons standing on the rungs forming the endless ladder, whereby they are safely lowered to the ground, obviating the necessity of descending ladders, ropes, cables, &c., as heretofore. It is obvious that a basket may be hooked onto the ladder for children, or for the infirm and aged may be secured to it with cords which would not be possible when using a ladder or rope, &c. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation of the endless ladder or fire-escape, showing automatic regulating apparatus for controlling speed. Fig. 2 is a side view of the same, part of which is sectional, showing method of securing to walls. Fig. 3 is a plan view showing arrangement of brake. Fig. 4 is a sectional view of one end of ladder-rung, showing method of securing the rungs to side ropes. Fig. 5 is a cross-section of the same, illustrating the bend given to the side rope inside the hollow rung by the securing-wedge. Fig. 6 is a side view of the wedge, showing covering-cap. Fig. 7 is a plan view of the same. Fig. 8 is a cross-sectional view of bearing of lower sprocket-wheel of ladder, showing eccentric adjustment.

Similar letters refer to similar parts in all the figures.

I will now proceed to describe more fully the construction of my improved fire-escape.

Secured to the main or outside wall of a building, near the ceiling of the upper story, and held in position by the lock-nut D, is located the upper mechanism and regulating device of the escape, a suitable hole being formed in the wall F to receive the hollow tube C, within which the horizontal shaft B revolves freely. The outer end of the shaft B is provided with two sprocket-wheels R R′, located a suitable distance apart and secured by set-screws or keys in the usual manner, the notches in the wheels R R′ being spaced to suit the distance between two of the rungs X, attached to the endless wire rope S S′, as shown in Fig. 2. The tube C is secured to and forms part of a cast-iron bracket A, which has a flange extending laterally each side sufficient to give firm contact with the wall inside the building, a loose flange E being used on the outside of the wall, which, being placed upon the tube C at its end, is tightened to the wall by the nut D, which is secured on a thread formed on the end of the tube C. On the inner end of the shaft B is secured by set-screw a miter-wheel G, which is in gear with the pinion H. The pinion H by means of a connecting-sleeve, which forms a bearing in the enlarged part T of the bracket A, is a part of the slotted arm *a*, to which the lever-arms of the governor-balls *b b′* are pivoted. The lever-arms of the governor-balls are connected at their ends by the links or rods *c c′* to the slotted arm *d*, which is firmly secured by set-screws to the vertical shaft I. Vertical shaft I has a feather or keyway cut lengthwise to accommodate a feather or key located in the bore of the pinion H, through which the shaft I slides up and down freely and which forms its lower bearing. The upper end of the shaft I is located in the bearing or hub A′ and is provided with a brake-wheel K, upon the outer circumference of which a steel band P is located, one end of which is secured to a pin Q and the other to a pin Q′, located in the double lever N, which is pivoted upon the bracket A by the stud O, Figs. 2 and 3. At the outer end of the shaft I and secured to it by set-screw is a double collar L, within and between which the clevis or joints M^2 of the levers M M′ are retained loosely. The outer end of the lever M is jointed to the bracket A^2 of the frame A and

the outer end of the lever M′ is jointed to the double lever N by a pin.

Upon the upper face of the brake-wheel K ratchet-teeth K′ are formed, which engage the pawl K^2 when the reverse side of the ladder is used and stops its action. The brake-wheel K is provided with a feather or key similar to the pinion H to enable the shaft I to rise and fall and yet rotate it.

The endless ladder is constructed by means of two endless wire ropes S S′, to which are secured transversely at distances equal to the notches formed in the sprocket-wheels tubular rungs or treads X X, at each end of which holes are drilled, through which the ropes S S′ are passed. When the rungs X are in their proper respective positions, a wedge Y is driven into each end of the tube X, the taper end or point of which, coming in contact with the outer circumference of wire rope S or S′, located in the holes S^2 of the rung X, forces it on one side, forming the kink or bend Y′, which secures the rung X to the rope S or S′ firmly. The wedge, which has a parallel part and which is of an oval form in cross-section or such form as to coincide with the inner diameter of the tubular rung X and the curve formed in the wire rope when the bend, kink, or curve is formed, is then driven firmly home. The head Y^2, which is formed eccentrically on the end of the wedge Y, coming in close contact with the end of the tube X, forms a weather-tight cap or cover to the end of the tube or tread, as in Fig. 4.

Located in a hole cut or formed in the wall F a suitable distance from the ground is a hollow tube U, to which are secured the eccentrics U^2 U^3, which are located on feathers formed on the tube U, and which eccentrics are provided with the enlarged collars U′ U^4, of which they form a part. Each end of the tube U is threaded to suit the lock-nuts V V′, which, being tightened, clamp the tube U by the plates or collars U′ U^4 firmly to the wall F. A shaft T passes loosely through the tube U and is provided at its outer end with the two sprocket-wheels R^2 R^3, similar to those before described and properly secured to the shaft T by set-screws or keys. A loose collar U^5 is located between the sprocket-wheel R^2 and the nut V′ on the shaft T, which adjusts the distance the wheels R^2 R^3 project from the wall F laterally. A collar W, secured to the shaft T by a suitable set-screw, adjusts and secures the shaft T in position loosely.

I will describe now more fully the use and operation of my new fire-escape. The apparatus before described being in position and ready for use, the balls *b b′* on the governing apparatus hanging down, the brake-strap P being free and clear of the brake-wheel K, a person presumably escaping from fire passes through the window F′ in the wall F and stepping on the nearest rung X of the endless ladder, holding onto one of the rungs X above him or her, the additional weight placed on that side of the endless ladder causes it to descend and rotate the sprocket-wheels R R′ and R^2 R^3 with their shafts T and B. The shaft B being in motion, by the revolution of the wheels R R′ communicates rotary motion to the pinion H by means of the bevel-wheel G. The pinion H, forming a part of the slotted arm *a*, causes the regulating apparatus, consisting of the balls *b b′*, arms or levers *a′* a^2, and lower slotted arm *d*, to revolve also, and the arm *d*, being secured to the vertical shaft I by the set-screw *d′*, imparts rotary motion to the shaft I, brake-wheel K, and collar L. The added weight of the person escaping causes the shaft I to revolve rapidly; but by the mechanism described the balls *b b′* on the arms A′ A^2 fly outward by the centrifugal force and by means of the links C C′ depress the arm *d*, which, being secured to the vertical shaft I by the set-screw *d′*, forces it downward through the pinion H and brake-wheel K, the feathers or keys in which still keep the shaft I revolving. The movement downward of the shaft I with its double collar L, secured to its upper end, forces the center or clevis M^2 of the levers M M′ downward, and as the end of the lever M is held in the arm A^2 of the bracket A the movement extends laterally the arm or lever M′, which, being connected by the pin N′ to the arm of the double lever N, partly rotates the lever N on its pin O. This motion throws inward the pin Q, which holds one end of the brake-strap P, and outwardly the pin Q′, secured to the other end of the strap P, by this means reducing its diameter and closing it around the brake-wheel K sufficiently to retard any undue velocity of the shafts I and B with their gear H G and sprocket-wheels R R′, thus enabling the person descending to travel at a safe and uniform speed, the adjustment of which is made by raising or lowering the arm *d* on the shaft I, fastening the same in a suitable position by the set-screw *d′*. More than one person using the ladder at the same time will cause the balls *b b′* to become more extended and consequently place a greater amount of pressure upon the brake-wheel K by means of the strap P, as before described, enabling perfect control to be maintained with regard to speed whatever the load. When the persons using the ladder alight, the mechanism ceases revolution and the balls *b b′*, dropping down by the operation described, release the band P from the wheel K. On the upper face of the wheel K the teeth of the ratchet K^2 engage the pawl should any number of persons attempt to descend by the other side of the endless ladder and so prevent the descent of those in peril. Also, that side of the ladder, being held firmly by the pawl, may be used when all have escaped as a ladder to gain access to the building. The lower sprocket-wheels R^2 R^3 are carrying-wheels, and with their shaft T and the eccentrics U^2 U^3 keep the ladder rigid or taut both vertically and laterally.

Should the ladder become slack by wear or

temperature, the tube U, with its eccentrics U^2 U^3, is turned slightly round, so that the distance between the shafts B and T may be increased a sufficient distance to take up the necessary amount of slackness.

It is obvious that this apparatus may also be used as a rapid and safe lowering device for use in warehouses, mills, &c., as well as a fire-escape.

Having described the construction and operation of my newly-invented fire-escapes, what I claim as new, and desire to secure by Letters Patent, is as follows:

1. A rotating endless ladder the sides of which are formed of wire rope or other flexible material and the hollow rungs of tube located at suitable distances apart, secured by wedges which are formed with pointed ends and flat heads, the body or shank being oval in section and located eccentrically with respect to the head, the wedge forcing the part of the side rope inserted in suitable holes formed in the end of tubular rung into a bend or curve, securing the same in a thorough manner, substantially as specified.

2. The combination, with the wall of the building perforated as described, of the sprocket-wheels R^2 R^3 with shaft T, tube U, eccentrics U^2 U^3, collars U', U^4, U^5, and W, and lock-nuts V and V', constructed substantially as shown, and for the purpose specified.

3. In a fire-escape, wheels carrying an endless ladder, in combination with a friction-wheel, friction-strap, a ratchet cut into the friction-wheel, and a pawl to engage therewith to arrest the backward motion of the shaft carrying said endless ladder, as specified.

4. In a fire-escape, an endless ladder, in combination with shafts, sprocket-wheels, the wall of building, one shaft placed at the upper story and the other at the lower story of the building, shafts having suitable bearings, and eccentric-supports in the wall for one bearing to allow of the ladder being adjusted tightly or loosely and then securely fastened by the nuts, as specified.

5. The combination, with an endless wire-rope ladder having tubular rungs and the device Y for securing rungs to said rope, of the shafts B and T, the sprocket-wheels R R' R^2 R^3, secured on said shafts, the bearings C and U, the eccentric adjustment U^2 and U^3, and the controlling mechanism, as shown and described.

WILLIAM J. McCOLLOM.

Witnesses:

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EUGENE A. MINET.