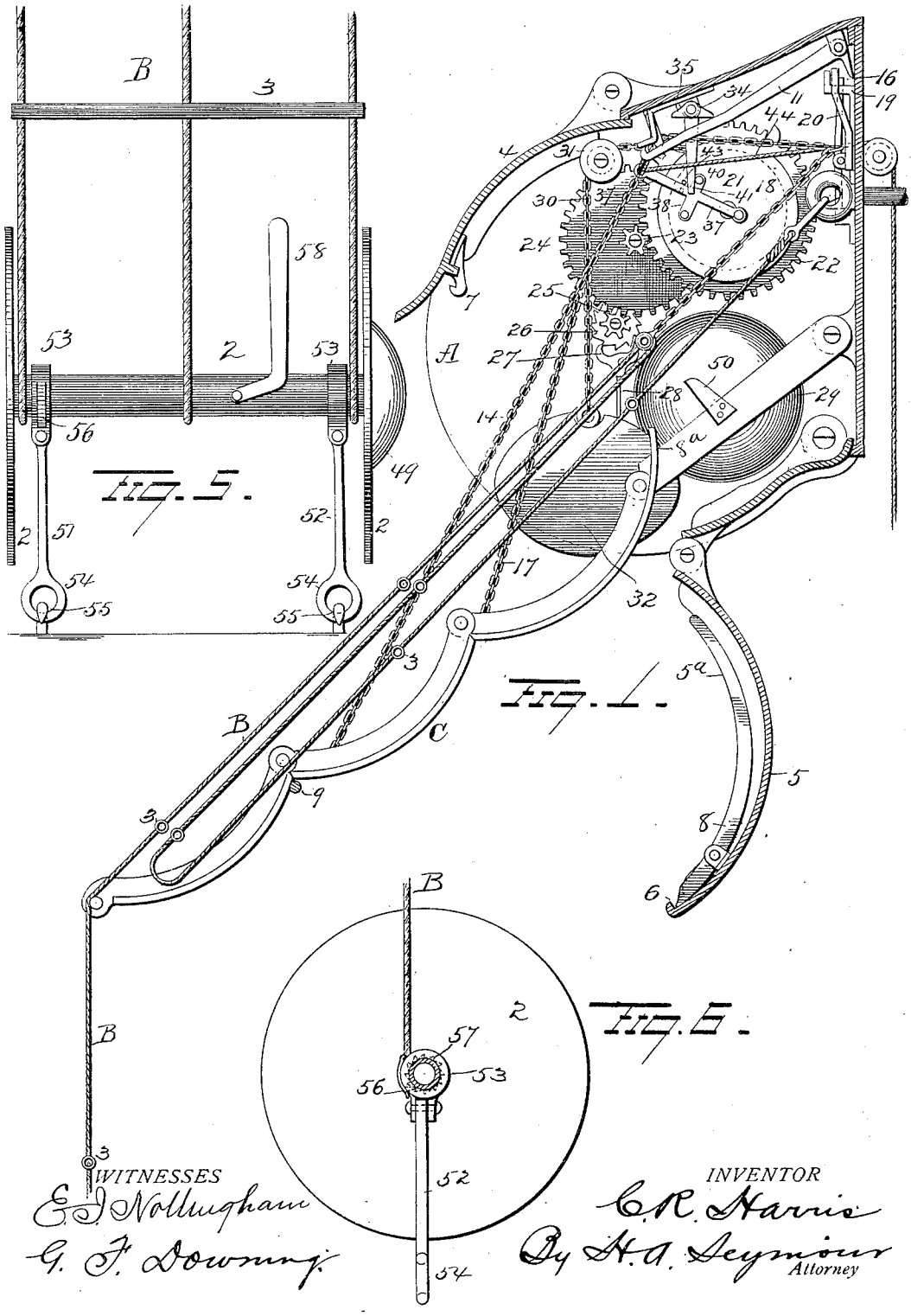
No. 657,735. Patented Sept. 11, 1900.

C. R. HARRIS.

FIRE ESCAPE.

(Application filed Apr. 25, 1899. Renewed Jan. 23, 1900.)

(No Model.) 5 Sheets—Sheet 1.



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

No. 657,735. Patented Sept. 11, 1900.

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(Application filed Apr. 25, 1899. Renewed Jan. 23, 1900.)

(No Model.) 5 Sheets—Sheet 2.

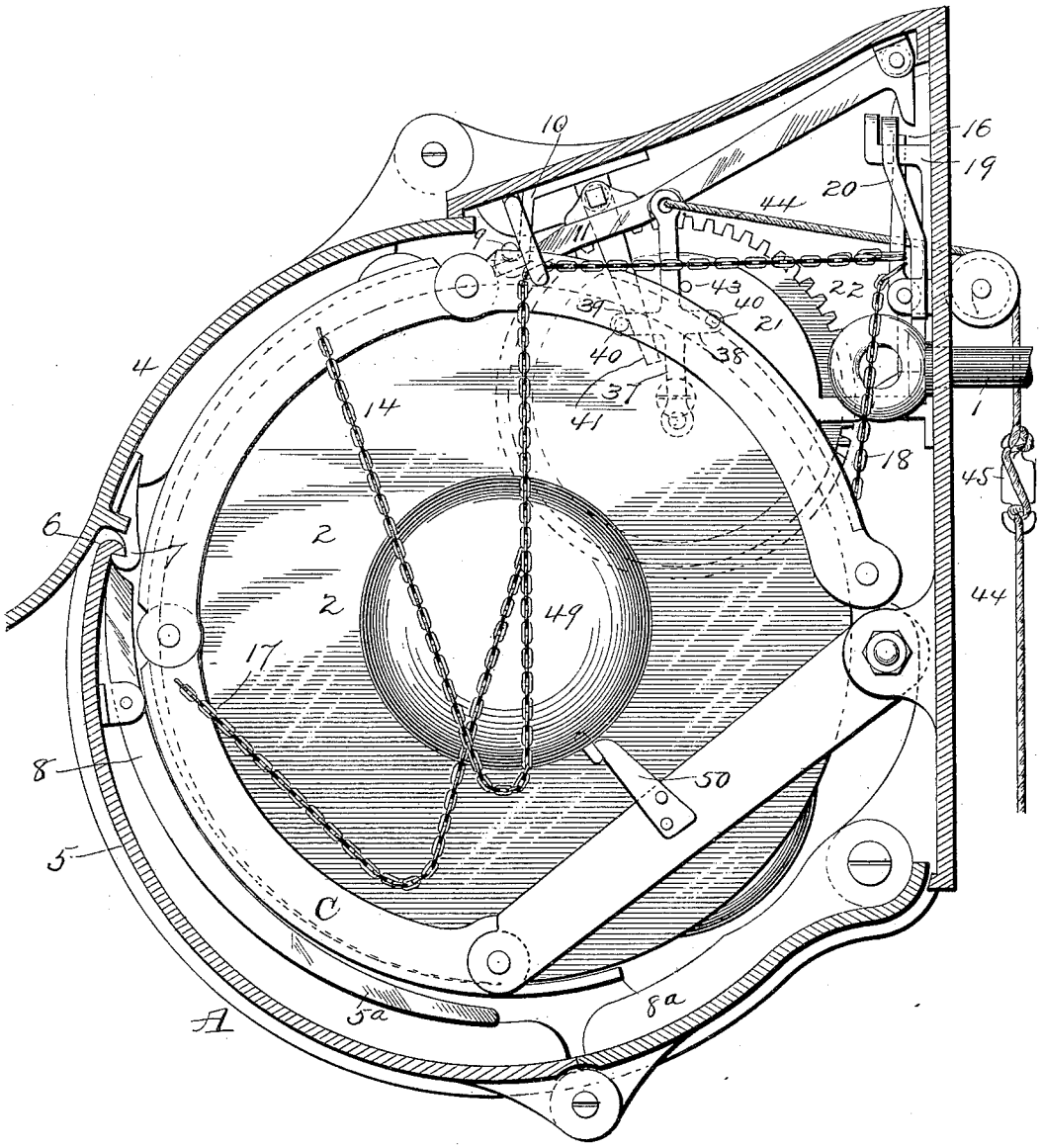


FIG. 2.

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(No Model.) 5 Sheets—Sheet 3.

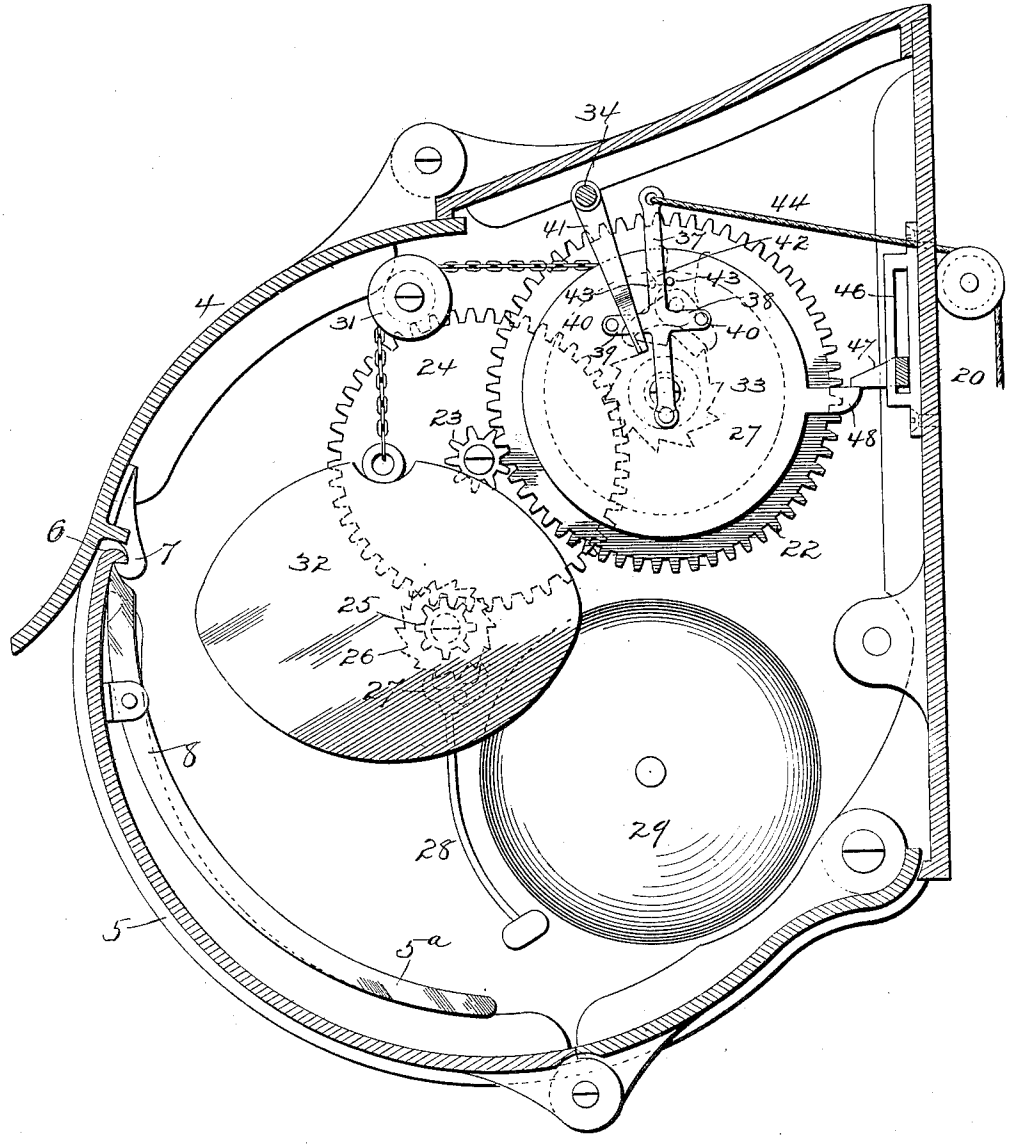


FIG. 3.

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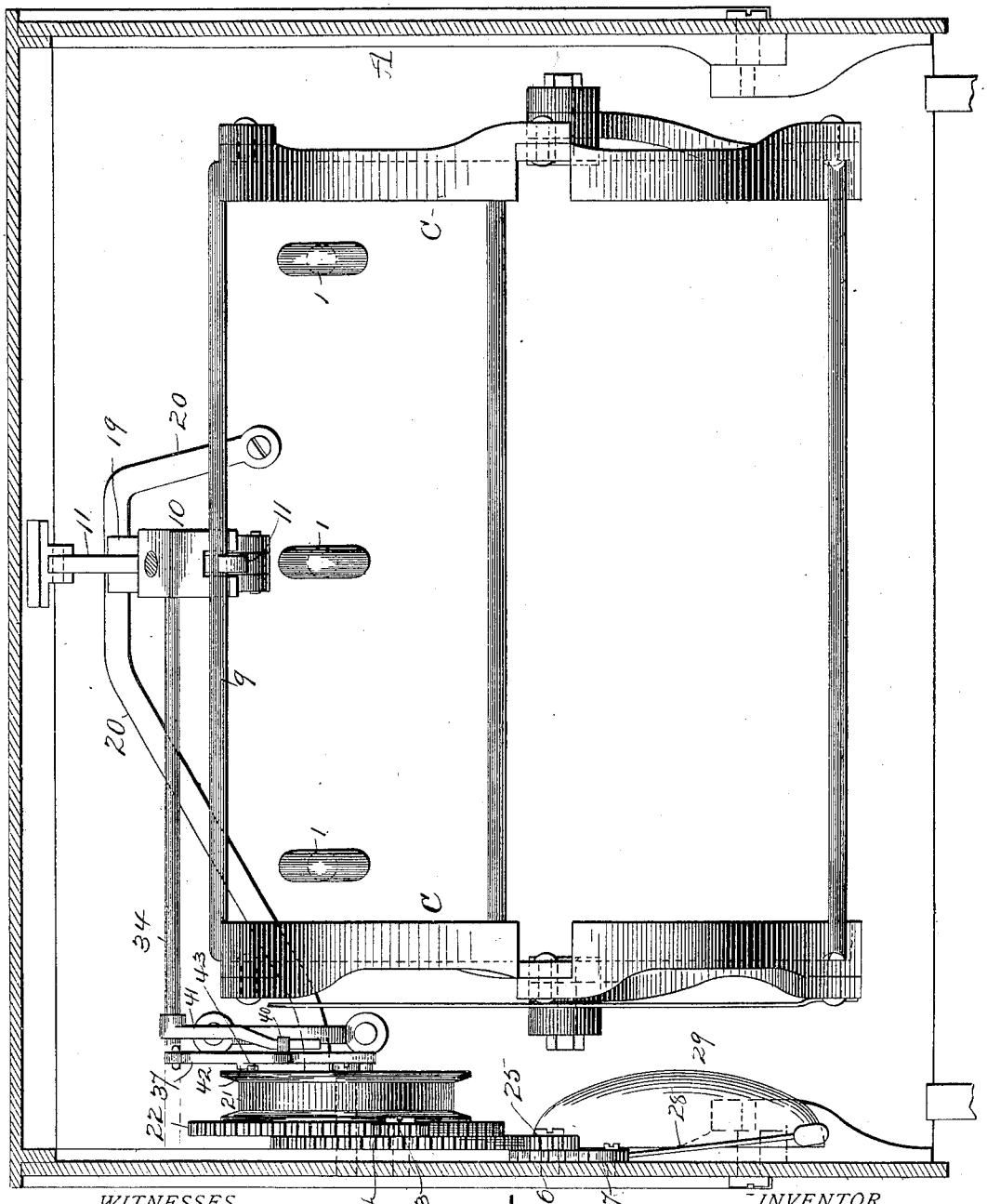
No. 657,735. Patented Sept. 11, 1900.

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FIRE ESCAPE.

(Application filed Apr. 25, 1899. Renewed Jan. 23, 1900.)

(No Model.) 5 Sheets—Sheet 4.



WITNESSES

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FIG. 4.

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

No. 657,735. Patented Sept. 11, 1900.

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FIRE ESCAPE.

(Application filed Apr. 25, 1899. Renewed Jan. 23, 1900.)

(No Model.) 5 Sheets—Sheet 5.

Fig. 7.

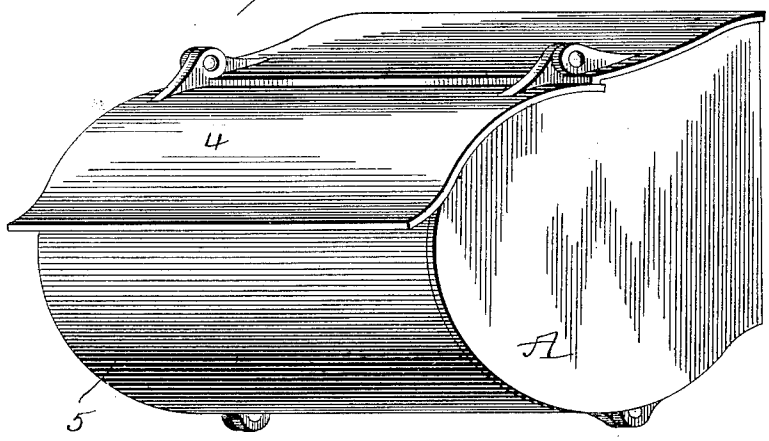


Fig. 8.

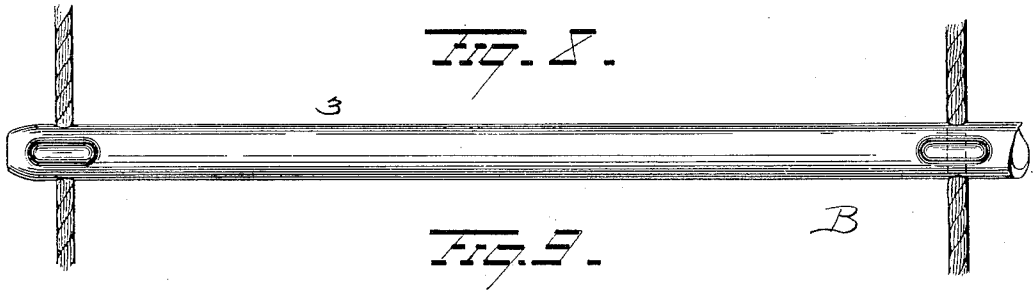


Fig. 9.

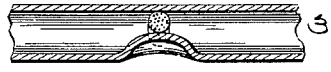
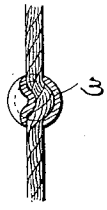


Fig. 10.



WITNESSES

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UNITED STATES PATENT OFFICE.

CHARLES R. HARRIS, OF WILLIAMSPORT, PENNSYLVANIA, ASSIGNOR TO THE HARRIS SAFETY COMPANY, OF NEW YORK, N. Y.

FIRE-ESCAPE.

SPECIFICATION forming part of Letters Patent No. 657,735, dated September 11, 1900.

Application filed April 25, 1899. Renewed January 23, 1900. Serial No. 2,516. (No model.)

To all whom it may concern:

Be it known that I, CHARLES R. HARRIS, of Williamsport, in the county of Lycoming and State of Pennsylvania, 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 appertains to make and use the same.

My invention relates to an improvement in fire-escapes, one object of the invention being to provide a fire-escape of the flexible-ladder type with releasing means adapted to be operated automatically when a fire occurs in the building to which the escape is attached.

A further object is to so construct a fire-escape of the type above mentioned that when released it will be projected and made to descend some distance outwardly from the wall of the building to a point several feet above the sidewalk and then be automatically brought close to the building and permitted to descend to the ground.

A further object is to provide the lower end of a flexible fire-escape ladder with an alarm adapted to be automatically set into operation when the ladder is released and to ring during the descent of the ladder.

A further object is to so construct a fire-escape that it can be normally inclosed within a casing and so that it can be operated from any floor of the building to open the casing, project the ladder and cause it to descend, operate a gong in the casing, and cause the operation of an alarm at the lower end of the ladder to be sounded during the descent of the ladder.

With these objects in view the invention consists in certain novel features of construction and combinations and arrangements of parts, as hereinafter set forth, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view illustrating positions of the parts when the reel shall have been released and before it shall have reached the ground. Fig. 2 is a transverse sectional view through the casing, showing some of the operating mechanism in elevation and some in dotted lines. Fig. 3 is an end view with the casing shown in section. Fig. 4 is a front face view with the casing shown in section. Figs. 5, 6, 7, 8, 9, and 10 are detail views.

A represents a casing, preferably made of metal and secured to the upper part of a building by means of heavy eyebolts 1. The casing will preferably be made ornamental in appearance and may be secured under or in the cornice of the building without detracting from the architectural appearance of the latter. Within the casing a flexible ladder B and the various operating devices coöperating therewith are normally inclosed and protected from the weather, one end of the ladder *per se* being securely fastened to the eyebolts 1, which, as above stated, secure the casing to the wall of the building.

The ladder B is composed, preferably, of three wire cables, having tubular rungs 3 securely fastened thereto at intervals, and the ladder thus constructed is wound upon a reel 2 and placed in the casing, wherein it is normally inclosed by means of doors 4 5. Each tubular rung is provided at three points with transverse holes for the passage of the cables, and the wall of the rung is depressed at each point where the cables pass through, so as to bend said cables and cause them to conform to the curved contour of the inner wall of the rung, thus obviating all possibility of the rungs slipping on the cables. The door 4 is made with a lip or water-shed which overhangs the upper edge of the door 5, and the latter is provided with shoulder 6, which constitutes a keeper for the engagement of a hook or catch 7 on the door 4. A lever 8 is pivotally attached near one end to the inner face of the door 5, the short arm of said lever being adapted at its free end to be disposed under the end of the hook or catch 7 and the long arm 5^a of said lever being curved and made to project some distance downwardly within the casing to be engaged, in a manner hereinafter explained, and moved to release the door 5.

Within the casing one end of a platform C is pivotally attached. The platform C is made in sections having rule-joint hinged connections with each other and adapted to be normally coiled or folded within the casing, so as to inclose the reel and ladder wound

thereon. Flanges 8ª, projecting from the platform, normally engage the peripheries of the reel-heads, so that when the platform is released these flanges will serve to force the reel and the ladder thereon out of the casing, the ladder unwinding as the reel descends. To retain the platform in this position, it is provided with a cross-bar 9, adapted to rest on a bracket 10, secured to the casing, and to be held against outward movement by means of the hooked end of a latch-lever 11. Chains 14 are secured at their forward ends to the respective sides of the platform, and at their rear upper ends said chains are loosely connected with a bar 16, having a pivotal connection at its lower end to the casing. Other chains 17 are attached at one end to the first-mentioned chains and at the other ends to the sides of the platform rearwardly of the connections of the first-mentioned chains therewith. Another chain 18 is loosely attached at one end to the hinged bar 16 and at its other end with a rung of the ladder at a point several feet from the upper end of the ladder. The upper end of the bar 16 passes through a slotted arm 19, secured to the casing, and between the said upper end of the pivoted bar and the slotted arm a lever 20 is disposed to normally lock the bar 16 in its vertical position, so that when the platform and ladder shall have been released the former will be stopped by the chains 14 17 and made to assume a position at an angle of forty-five degrees, as shown in Fig. 1, and so that a portion of the ladder will be held up by the chain 18 to prevent the lower end of the ladder carrying the reel falling near enough to the ground to injure any one who might be passing. By causing the platform to project outwardly from the building when first released the ladder will be permitted to descend quickly without danger of engaging the window-cornice, balconies, or other protuberances on the building. Means will be provided for causing the ladder to approach the building after having descended to a point about seven feet above the ground and at the same time to further descend until the reel reaches the ground. These results are accomplished by releasing the chains which hold up the platform and ladder from the bar 16.

A drum 21 is mounted in one end of the casing A and provided with a gear-wheel 22, which transmits motion to a pinion 23, mounted on a suitable stud on the end wall of the casing. A gear-wheel 24 is mounted to rotate with the pinion 23 and transmits motion to a pinion 25, carrying an escapement-wheel 26. A pallet 27 coöperates with the escapement-wheel and carries a hammer 28 to strike a bell 29, secured to the casing when the apparatus is operated. A chain 30 is wound on the drum 21 and secured at one end thereto, the other end of said chain being passed over a pulley 31 on the casing and provided at its free depending end with a weight 32, which constitutes a motor for driving the drum and gearing connected therewith. In order to permit the drum to be rotated to wind the weighted chain thereon without imparting motion to the gearing, said drum is connected with the stud on which it is mounted by means of a ratchet device 33.

A shaft 34 is mounted in the upper part of the casing and provided with a cross-head 35, disposed directly over and bearing upon the latch-lever 11 at a point between the ends of the latter. A lever 37 is pivotally attached to the face of the drum below the axis of the latter and projects some distance upwardly, said lever being provided at a point between its ends with laterally-projecting arms 38 39, each having a pin 40 at its free end. An arm 41 is secured to the shaft 34 and has its free end disposed between the pins 40 on the arms 38 39 of lever 37, so that when said lever is moved in one direction or the other one of the pins will engage said arm 41 to turn the shaft 34, to which the arm is secured, and thus turn the cross-head 35 in one direction or the other, thereby moving the latch-lever 11 to release the platform C, attached thereto. When the platform is thus released, it will fall upon the long arm of the lever 8 and turn said lever on its fulcrum, thus causing the short arm thereof to push the hook or catch 7 from the shoulder or keeper 6 and release the door 5. When the door 5 is thus opened, the platform will be projected outwardly at an angle of about forty-five degrees, as shown in Fig. 1, and the reel on which the ladder is wound will be permitted to roll out and fall, unwinding as it descends, until the reel reaches a point within about seven feet from the ground, as hereinbefore intimated.

The lever 37 is provided with a shoulder 42, normally disposed between two pins 43, projecting from the face of the drum, and to the free end of said lever a cord 44 is attached. The cord 44 is extended down through the building and fastened at its lower end to a fixed object, looped at intervals, each loop being held by means of a fuse 45, so that in case of fire one or more of the loops will be opened by the melting of a fuse, and the cord be thus slackened. When the cord is slackened in this manner, the lever 37 will be released, and as the drum 21 is prevented from rotation by the engagement of the shoulder 42 on the lever with the pins 43 on the drum the drum will also be released. As the drum turns, one of the pins 43 by its engagement with the shoulder 42 on the lever 37 will cause said lever to turn on its fulcrum a distance limited by the size of the shoulder and the length of time the pin is in engagement therewith while said pin is moving through a comparatively-small arc of a circle. The lever 37 being thus moved, the pin on the arm 38 will engage the depending arm 41, and thus automatically operate the locking devices which hold the platform to permit the latter to be projected and the ladder to be dropped, in the manner hereinbefore explained.

Should it be desired to release the escape manually, this can be accomplished by pulling the cord 44, whereupon the lever 37 will be turned and the pin on the arm 39 of said lever made to engage and move the depending arm 41, thus setting free the platform and ladder. When the cord is pulled, the engagement of the shoulder 42 on the lever 37 with one of the pins 43 on the drum will cause the latter to be turned until the shoulder rides off of said pin, whereupon the drum will be released and be rotated in the reverse direction by the weight.

One end of the lever 20 (by means of which the bar 16 is locked) is adapted to move in a guide 46, secured in the casing, and is provided with an inwardly-projecting lug 47, normally disposed in the path of an arm 48 projecting from the drum. After the platform shall have been projected and disposed at an angle of forty-five degrees and the ladder stopped with the reel seven feet above the ground the continued rotation of the drum will cause the arm 48 thereon to engage the lug 47 and raise the lever 20, thereby releasing the bar 16 and the chains attached thereto. This will permit the platform to drop close to the building and the ladder to continue to descend until the reel reaches the ground.

From the construction and arrangement of parts as above described it will be seen that when the devices are first operated the ladder will be made to descend some distance outwardly from the wall of the building and that the ladder will be stopped such distance from the ground as not to be liable to strike a person who might be there and who was not aware of the existence of a fire and the consequent necessity for a fire-escape. It will also be seen that soon after the platform and ladder shall have thus been automatically released the ladder will be allowed to assume a proper position for use.

It is quite desirable that a warning be given not only to persons on the ground, but to persons in the building that the ladder is descending to position for immediate use. For this purpose a spring-actuated bell 49 is attached to the reel on which the ladder is wound, and the motor mechanism of the bell is provided with a lug adapted to normally engage an arm 50 on the platform, and thus retain the bell mechanism at rest when the platform and ladder are inclosed within the casing. As soon, however, as the platform is released the arm 49 will leave the arm 50 and the bell will commence to ring and will continue to ring during the descent of the ladder and for fifteen minutes after the reel shall have reached the pavement.

It is desirable that the ladder be drawn taut when in use, and for this purpose arms 51 52 are connected with the shaft of the reel 2 by means of collars 53, and said arms are provided with eyes 54 at their free ends to engage hooks 55, secured in the pavement. The arms 51 52 are pivotally attached to the collars 53, so that they may be normally folded within the reel when the apparatus is not in actual use. The collars 53 may be mounted loosely on the shaft of the reel and one (or both) of them provided with a dog 56 to engage ratchet-teeth 57 on said shaft, and the latter will be provided with a lever 58, (preferably pivotally connected thereto, so that it can be normally folded within the reel,) by means of which the reel can be turned to wind a portion of the ladder thereon to draw the latter taut.

Various slight changes might be made in the details of construction of my invention without departing from the spirit thereof or limiting its scope, and hence I do not wish to limit myself to the precise details herein set forth.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a fire-escape the combination with a casing and a flexible ladder, of means for lowering the ladder at a distance outwardly from the building to which the apparatus is attached, means for stopping the ladder before it reaches the ground and means for subsequently lowering the ladder to the ground and disposing it close to the building.

2. In a fire-escape, the combination with a casing, of a flexible ladder having one of its ends secured therein, a reel on which said ladder is wound, an automatically-operating bell and means for normally holding the clapper at rest and releasing it when the ladder is discharged from the casing.

3. In a fire-escape, the combination with a casing having a door, a latch for said door and a lever adapted to engage said latch, of a flexible ladder in the casing, and means for automatically operating said lever to open the door of the casing when the ladder is released.

4. In a fire-escape, the combination with a casing having a door and a latch for said door, of a pivoted lever adapted to engage said latch, a sectional platform normally disposed within the casing and adapted when released to engage said lever and cause the door of the casing to be opened, and a ladder normally disposed within the casing and adapted to be discharged over said platform.

5. In a fire-escape, the combination with a casing and a flexible platform normally disposed therein, of means for releasing said platform and causing it to project outwardly and downwardly from the casing and a flexible ladder secured at one end within the casing and adapted to be discharged over said platform.

6. In a fire-escape, the combination with a casing, of a sectional platform secured at one end to the casing and adapted to be coiled therein, a flexible ladder secured at one end in the casing and normally coiled within and inclosed by the coiled sectional platform.

7. In a fire-escape, the combination with a casing, of a platform secured at one end thereto, means for projecting said platform and stopping it at an angle to the building to which the casing is secured, a flexible ladder adapted to be projected over said platform and means for dropping the platform alongside the building.

8. In a fire-escape, the combination with a casing having a door and a latch for the door, of a platform normally within the casing, a flexible ladder normally within the platform, means for projecting the ladder outwardly from the building and simultaneously opening the door of the casing and releasing the ladder, means for stopping the ladder before it reaches the ground and means for subsequently releasing the platform and ladder automatically to cause the platform to drop and the ladder to fall to the ground.

9. In a fire-escape the combination with a casing, of a sectional platform normally inclosed therein, a latch normally engaging said platform, a lever for operating said latch, a cord attached to said lever, devices between the lever and latch for operating the latter to release the platform, and a flexible ladder secured at one end within the casing and normally inclosed by said platform.

10. In a fire-escape, the combination with a casing, of a sectional platform secured thereto and normally inclosed therein, a latch adapted to engage said platform, a cross-head engaging said latch, an arm for moving said cross-head, a lever for operating said arm to release the platform, means for operating said lever and a ladder normally inclosed by said platform.

11. In a fire-escape, the combination with a casing, of a sectional platform secured at one end thereto and normally inclosed therein, of a latch for said platform, a drum, a weighted cord on the drum, a lever pivoted to the drum and adapted to operate said latch, an automatically-detachable connection between said lever and drum, a cord connected with said lever, and a ladder normally inclosed by said platform.

12. In a fire-escape, the combination with a casing, of a sectional platform secured to and normally inclosed within said casing, a latch for said platform, a drum, means for rotating said drum, a lever pivoted to the drum, two pins projecting from said lever, an arm depending from the latch and disposed between said pins, pins on the drum, a shoulder on the lever and disposed between the pins on the drum, a cord attached to said lever and a ladder secured at one end within the casing and normally inclosed by said platform.

13. In a fire-escape, the combination with a casing, of a sectional platform secured thereto and normally inclosed therein, a latch for the platform, a flexible ladder secured within the casing and inclosed by the platform, means for operating said latch, a latch-bar, chains secured to the platform and attached to said latch-bar for limiting the first movement of the platform, a chain secured at one end to the ladder a few feet removed from its fixed end, said last-mentioned chain attached at its other end to said latch-bar, a lever normally holding said latch-bar fixed and means for automatically operating said lever to release the latch-bar and the chains attached thereto.

14. In a fire-escape, the combination with a casing, of a sectional platform secured thereto and normally inclosed therein, a latch for said platform, a drum, a motor therefor, means connected with the drum for operating said latch, a ladder secured within the casing and normally inclosed by said platform, a latch-bar, a lever holding said latch-bar normally fixed, chains secured at one end to the platform and attached to the latch-bar, a chain attached at one end of the ladder several feet from its fixed end and an arm on the drum for tripping said lever to release the latch-bar after the platform and ladder shall have been released by the first-mentioned latch.

15. In a fire-escape the combination with a casing, of a sectional platform secured thereto and normally disposed therein, a flexible ladder secured within the casing and normally inclosed by said platform and a reel on which the ladder is wound also normally inclosed within the platform and adapted to be released with the discharge of the platform.

16. In a fire-escape, the combination with a casing, of a sectional platform secured thereto and normally inclosed therein, a reel normally inclosed by said platform, a flexible ladder wound on said reel and secured at one end within the casing, means for releasing said platform, and a flange on the platform and adapted to engage the reel to force it out of the casing when the platform is discharged.

17. In a fire-escape, the combination with a flexible ladder adapted to be secured at one end to a building, of a reel on which said ladder is wound, ratchet-teeth on the shaft of said reel, a collar mounted on said shaft, a dog carried by said collar and adapted to engage said ratchet-teeth, a link pivotally attached to said collar and adapted at its free end for attachment to a hook secured in the ground, and means for rotating the reel.

18. In a fire-escape, the combination of tubular rungs, cables passing transversely through the rungs, each rung having an internal projection crowding the cables out of line with the holes in the rungs through which they pass.

19. In a fire-escape, the combination of tubular rungs, cables passing transversely through the same, the wall of each rung being depressed and crowding the cables out of line with the holes through which they pass.

20. In a fire-escape, the combination with a casing, a flexible ladder therein, tripping devices and a motor, of a cord connected at one

end with said tripping devices and fastened at its other end, and a fuse connected with said cord, whereby when the fuse melts, the motor and tripping devices will be released and effect the opening of the casing and release of the ladder.

21. In a fire-escape, the combination with a casing and a flexible ladder therein, of releasing devices for the ladder, a cord connected at one end with said releasing devices and fixed at its other end, said cord being looped at intervals and fusible devices connected with said loops whereby the cord will be slackened and permit the operation of said releasing devices when one of said fusible devices releases a loop in the cord.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

CHAS. R. HARRIS.

Witnesses:
E. G. WILHELM,
L. B. HARTMAN.