

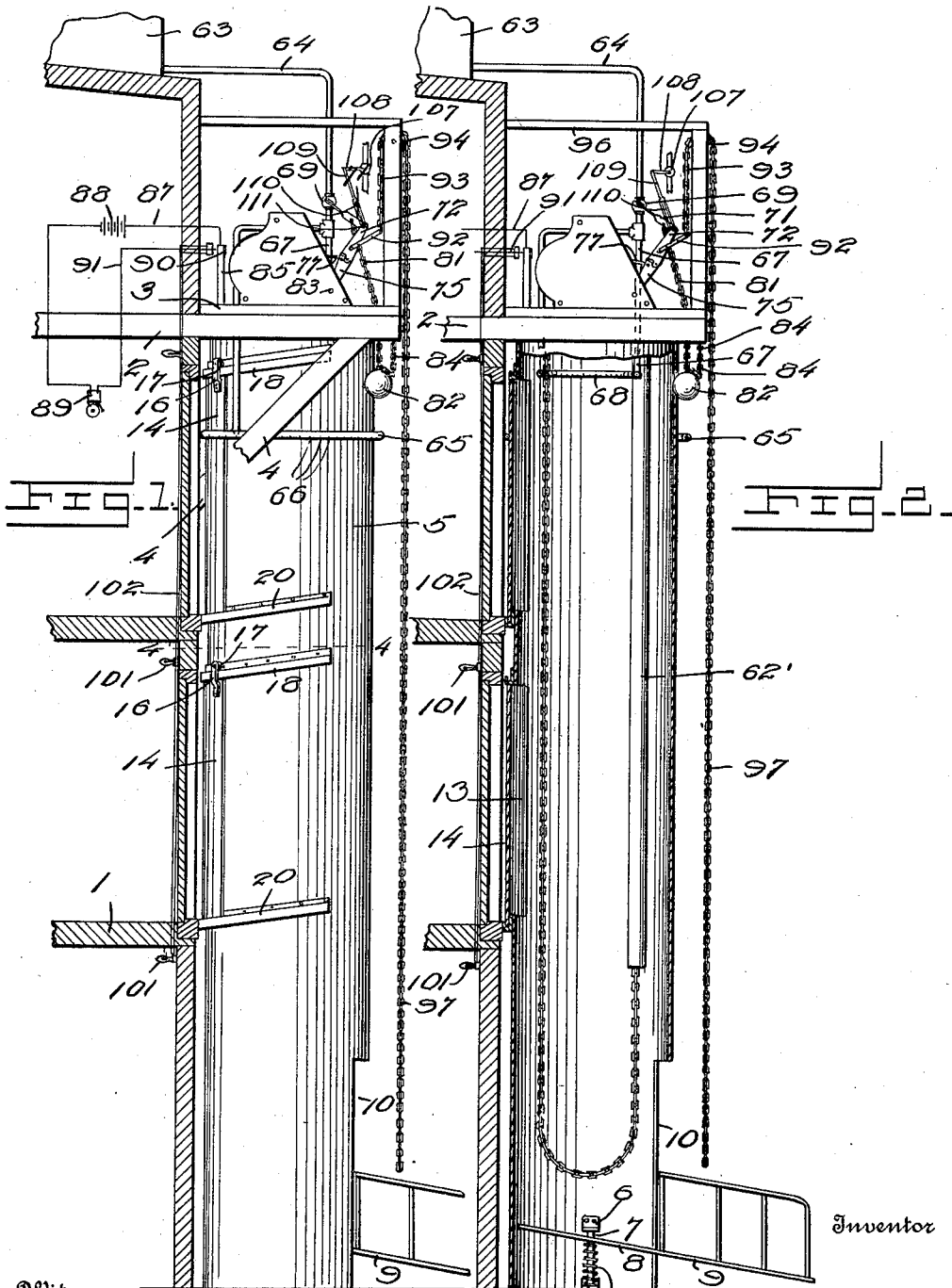
W. H. SMITH.
FIRE ESCAPE.

APPLICATION FILED MAY 16, 1911.

1,029,769.

Patented June 18, 1912.

4 SHEETS-SHEET 1.



Witnesses
R. P. Knudsen
A. K. Parsons

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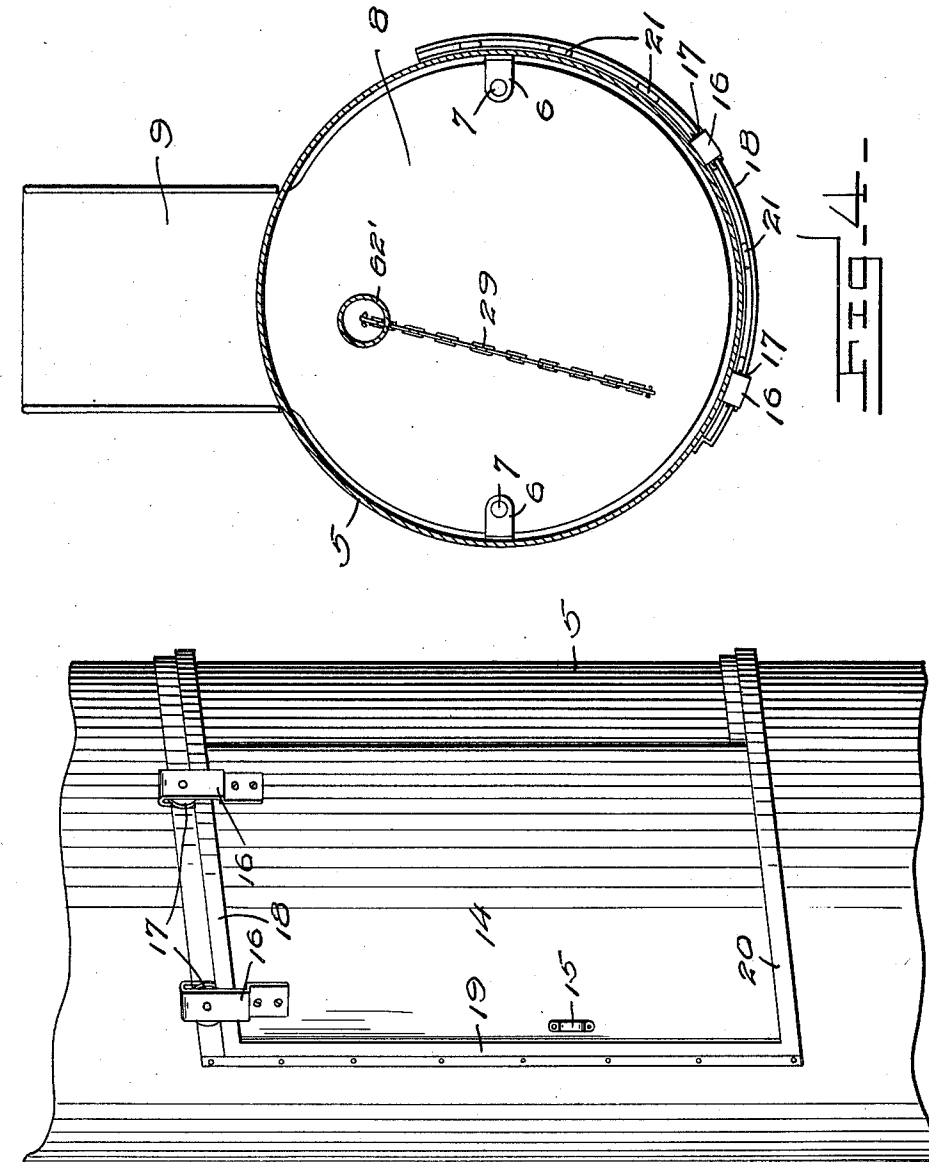
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4 SHEETS—SHEET 2.

1,029,769.



Witnesses
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4 SHEETS-SHEET 3.

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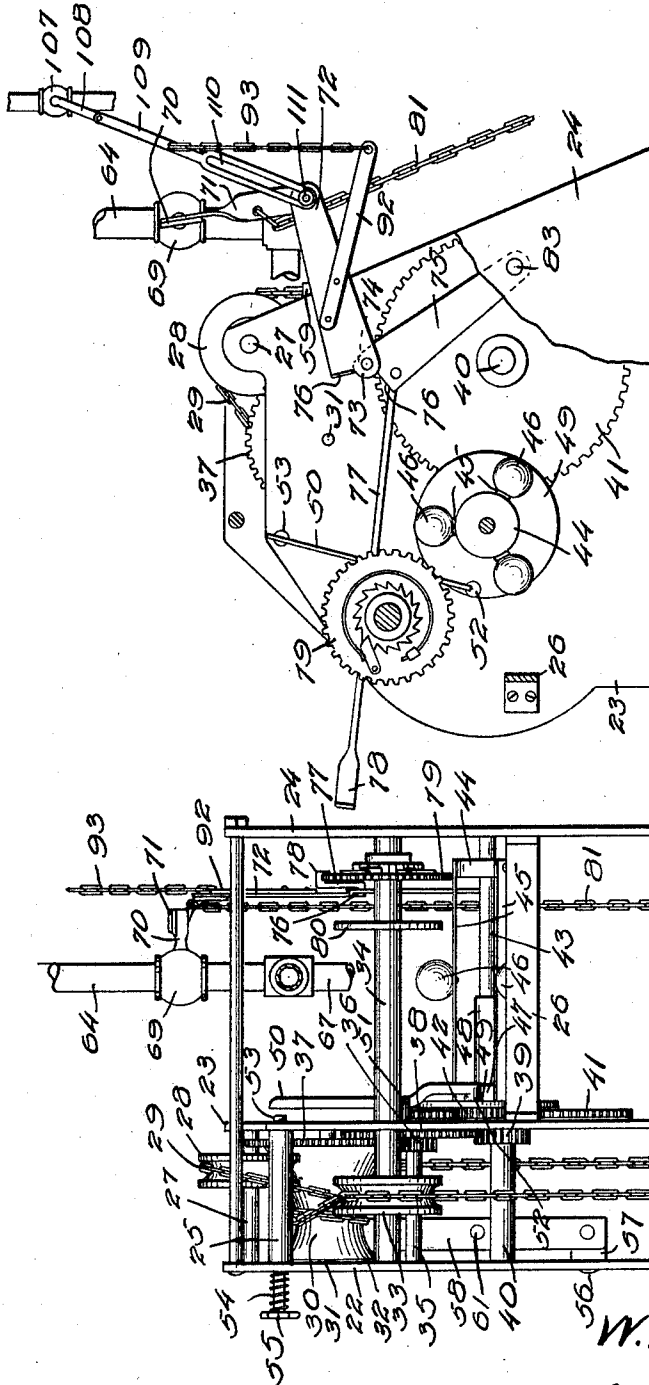


FIG. 5-

FIG. 6-

Witnesses
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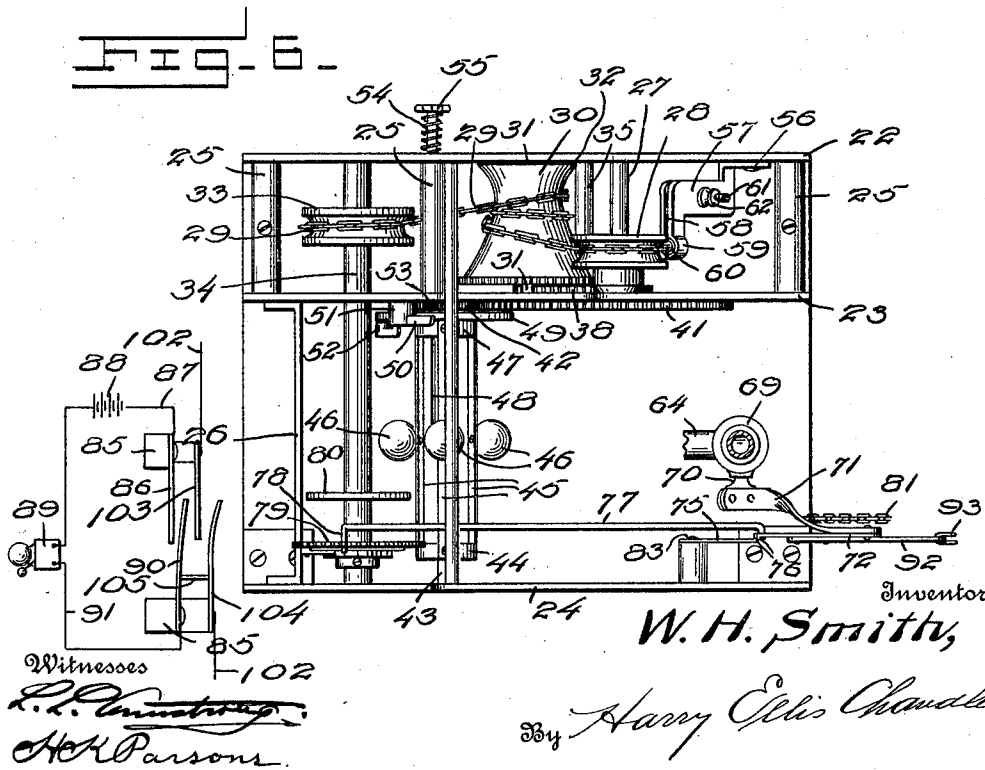
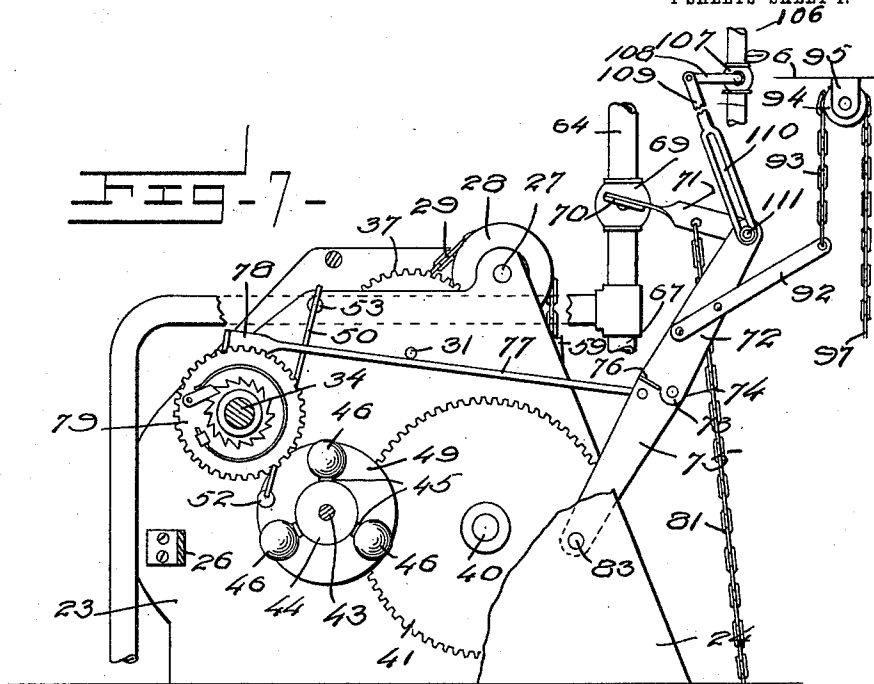
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4 SHEETS-SHEET 4.



UNITED STATES PATENT OFFICE.

WILLIAM H. SMITH, OF GAYHEAD, NEW YORK.

FIRE-ESCAPE.

1,029,769.

Specification of Letters Patent.

Patented June 18, 1912.

Application filed May 16, 1911. Serial No. 627,472.

To all whom it may concern:

Be it known that I, WILLIAM H. SMITH, a citizen of the United States, residing at Gayhead, in the county of Greene and State of New York, have invented certain new and useful Improvements in Fire-Escapes, of which the following is a specification.

My invention relates to improvements in fire escapes, and has for its leading object the provision of an improved form of fire escape which may be readily secured to a building and which will at all times provide a safe means for descending from the upper floor of the building to the ground irrespective of the proximity of the conflagration to the said fire escape.

The further object of my invention is the provision of an improved inclosed fire escape in which the inclosing chute or member will serve to protect the persons using the fire escape from the flames and smoke, and which fire escape shall be provided with means for automatically spraying the same to keep down the temperature within the inclosing chute, said spraying means being automatically set into operation by the movement of the carrier member within the chute as a load is placed on the said carrier.

Another object of my invention is the provision of an improved form of fire escape which may be readily secured in position on a building and which will serve to accommodate a large number of persons at one time and will safely convey said persons to the ground and whose operation will not be interfered with by flames surrounding the fire escape at any of the floors which it passes and which will be provided with improved means for absorbing the shock of the descent of the persons employing my fire escape to prevent injury thereof either through overcrowding of the fire escape or through carelessness on the part of the users of the said fire escape.

Another object of my invention is the provision of a fire escape embodying an endless carrier and an inclosing chute for the carrier, which fire escape shall be provided with improved means for automatically controlling the movement of the endless carrier member and shall be provided with additional means for automatically controlling the spraying of the inclosing chute, said latter means being operated upon the initial movement of the carrier and continuing in operation until manually shut off.

Other objects and advantages of my improved construction of fire escape will be readily apparent by reference to the following description taken in connection with the accompanying drawings, and it will be understood that I reserve to myself the right to make any alterations or modifications in the specific details of construction shown and described within the scope of my claims without departing from or exceeding the spirit of my invention.

Figure 1 represents a view of my improved escape applied to a building. Fig. 2 represents a vertical sectional view of my complete fire escape and controlling mechanism therefor. Fig. 3 represents an enlarged detailed view of a portion of the fire escape illustrating the construction of the entrance doors and guide tracks for said doors. Fig. 4 represents a cross sectional view of the fire escape chute on the line 4—4 of Fig. 1. Fig. 5 represents an enlarged front view of the carrier and spray controlling mechanism. Fig. 6 represents a top plan view of the said mechanism. Fig. 7 represents a sectional view on the line 7—7 of Fig. 6, and Fig. 8 represents a similar sectional view showing the position occupied by the various parts of the controlling and water distribution regulating mechanism when the fire escape is in use.

In the drawings in which similar characters of reference are employed to denote corresponding parts throughout the several views, the numeral 1 designates the building to which my improved fire escape is secured, said building having embedded therein and projecting outwardly therefrom the beams 2 on which is secured the metal plate 3 forming a support for the controlling mechanism of my fire escape, the beams and plate being further supported by the diagonally disposed bracing beams 4 having their inner ends secured to the building. Depending below the said plate 3 is the cylindrical shaped metal chute 5 projecting downward to the ground, while secured within said chute near its lower end are the brackets 6 having secured thereto the upper ends of the guide rods 7 on which is slidably engaged the bottom plate 8 having the laterally projecting member 9 extending through the discharge aperture or doorway 10 at the bottom of the chute. A second set of brackets 11 is secured at the bottom of the chute and engage the lower ends

of the guide rods 7, helical springs 12 being wound on said rods and having one end bearing against the brackets 11 and the other end bearing against the under face of the plate 8. It will thus be seen that the plate is resiliently supported at the bottom of the chute and will yield to the weight of a person falling thereon and will thus absorb the shock of the fall and prevent injury of the person thereby, the plate inclining toward the trough portion thereof to cause the person dropping or standing on the plate to slide out of the chute in the trough through the door opening 10.

To permit of access to the interior of the chute from the different floors, I form in the chute on a level with a door or window of the building at each floor the door openings 13 normally closed by the metal doors 14. Said doors have the operating knobs 15 and have upwardly projecting hanger brackets 16 bearing rollers 17 riding on the track 18. Said tracks are spirally secured on the chute 5 whereby the weight of the door will cause the door to automatically move into closed position when not held open. To prevent entrance of smoke or flame through the door opening and to make a tight fit against the chute I secure to the chute the angle plate 19 forming a keeper for the vertical edge of the door, and the supplemental track 20 in which the bottom of the door rides, the track plates 18 and 20 having the apertures 21 formed therein to permit of downward passage of water along the outer face of the chute without hindrance by the tracks.

Secured on the upper portion or face of the plate 3 are the frame plates 22, 23 and 24, the plates 22 and 23 being held in spaced relation by the spacing sleeves 25 and the plates 23 and 24 being connected by the braces 26. Journaled in the plates 22 and 23 near the outer upper edge thereof is the shaft 27 having secured thereon the guide sheave 28 over which passes the endless carrier chain 29. A cone shaped drum 30 has its spindle 31 journaled in said plates 22 and 23 adjacent the sheave, and the chain is wound around the drum a plurality of turns, the winding being started from the sheave to the larger end of the drum and extending toward the smaller end thereof, the drum having at its smaller end the sharply flaring portion 32 to prevent the chain from slipping off of the drum. A second guide sheave 33 has its shaft 34 journaled near the inner upper portion of the bracket plates 22 and 23, said shaft extending laterally and having its end journaled in the plate 24. The chain passes from the drum inward and down over the sheave 33 and through the aperture provided for its passage in the plate 3.

From the foregoing description taken par-

ticularly in connection with Fig. 2 the operation of my fire escape will be best understood, and it will be seen that the carrier chain 29 passes downward adjacent the door openings 13 of the chute, and the chain may be thus readily grasped by persons reaching through the door way and they may cling to the chain which will pass downward in the chute with them. To prevent the too rapid descent of the chain, I journal in the plates 22 and 23 the spindle 35 having a pinion 36 in mesh with the gear 37 formed on the end of the drum 30, said spindle also bearing the gear 38 in mesh with the pinion 39 of the shaft 40 journaled in said bracket plates 22 and 23, the shaft 40 projecting through the plate 23 and having secured on its projecting end the large gear 41. The gear 41 is in mesh with a pinion 42 carried by the governor shaft 43 which has its ends journaled in the plates 23 and 24, a collar 44 being secured on said shaft and having secured to its periphery the blade springs 45 bearing centrally the governor balls 46, the other ends of said springs 45 being secured to the collar 47 of the sleeve 48 which is slidably mounted on the shaft 43. Said sleeve is also provided with the brake disk 49, the rotation of the shaft 43 by centrifugal force throwing the balls 46 outward and shifting the sleeve and thus the brake disk. A lever 50 is pivoted to the lugs 51 of the plate 23 and bears at one end the brake shoe 52 for engaging the brake disk when the latter is shifted, while passing through the bracing sleeve 25 and having threaded engagement with the plate 23 is the rod 53 adapted to bear against the other end of the lever to regulate the position of the same, a spring 54 being coiled on the rod and bearing against the head 55 formed on the rod to hold the same against accidental turning. The centrifugal speed governor is thus driven at a high rate of speed compared to that at which the drum is rotated and will consequently be extremely sensitive and will serve as a satisfactory brake to control the movement of the drum and thus the speed of revolution of the endless chain. To prevent the chain from slipping around the drum and to exert a constant tension on the upward moving portion of the chain, I pivotally secure to the plate 22 by the bolt 56 the L shaped plate 57 having secured to its lower end the lower end of the second L shaped plate 58, said plates having the curved or offset portions 59 at their upper ends providing guides for the chain, the inner faces of said offset portions being faced with brake lining material 60 to prevent wearing of the chain against the plates, said plates 57 and 58 are formed from spring metal, and to force them into position to yieldingly grip the chain and to vary the gripping action of the plates, I pass there-through the bolt 61 having engaged thereon

the adjusting nut 62 for forcing the plates toward each other.

To add to the safety of my fire escape and prevent contact with the upwardly moving chain and also to eliminate any liability to upward draft within the chute creating a suction to draw smoke or flames into the chute, I secure to the plate 3 the depending pipe 62 which passes down within the chute, the upwardly moving portion of the chain being contained within said pipe and being protected thereby.

In order that my chute may be used comfortably and with perfect safety when an intermediate portion is surrounded by flames such as would normally render the chute extremely hot and endanger suffocation therein, I have provided an improved spraying mechanism. In the drawings, I have shown a water containing tank 63 secured on the roof of the building and having a pipe 64 depending therefrom, but it will be understood that I may connect the pipe 64 with any suitable water pressure supply. Said pipe extends downward between the building and the chute adjacent the keeper plate for the doors, and extending from the pipe 64 around the chute at one or more points as desired are the pipe rings 65 having apertures 66 formed therein through which the water may be sprayed against the exterior of the chute. Branching from the pipe 64 is a second pipe 67 which extends downward inside of the chute, said pipe being likewise provided with the branching spray rings 68 which will serve to spray the interior of the chute and the persons passing down in the fire escape thus preventing the persons from suffering from excess of heat within the chute and also serving to extinguish any blaze of their clothing which may have caught from the fire before they entered the chute of my fire escape. To control the flow of water down through the pipe 64 and thus through the various spraying rings, I provide the pipe with the valve 69 having the projecting valve lever 70 for turning on and off the water. In the use of my improved fire escape, I preferably provide means for automatically turning on the water when a person grasps the chain to descend thereby, while I further provide means operating in unison with the water controlling means which latter will serve to sound an alarm which will continue to sound until either the alarm and water are manually shut off or until the electric circuit of the alarm is in some manner broken. The said controlling mechanism comprises a lever 71 which is secured to the valve lever 70 and normally lies in a horizontal position. Said lever has pivoted to its free end the end of the toggle lever 72 having the ear 73 to which the ear 74 of the other lever 75 of the toggle is pivoted, said levers 72 and 75

having the engaging shoulders 76 which prevent the bending of the levers in but one direction. Pivotaly secured to the shoulder 76 of the lever 75 is a rod 77 having the flattened portion 78 extending at right angles to the main portion of the rod, a pull upon the said rod serving to shift the toggle levers to bend their joint. To impart the pull to the said rod automatically, I secure upon the shaft 34 the ratchet wheel 79, when the parts are in normal position the flattened end of the rod fitting between the teeth of said ratchet, a guide disk 80 being secured on the shaft 34 and guiding the flattened end of the rod against said ratchet wheel. It will thus be seen that upon a pull on the exposed portion of the endless chain 29 will cause the sheave 33 and thus the shaft 34 to rotate, and as the shaft 34 rotates the ratchet 79 will push the flattened end of the plate inward and will thus draw on the rod to bend the joint of the toggle levers, this movement of the toggle levers serving to shift the valve levers and partially open the valve 69. To continue said movement of the valve to entirely open the valve, I secure to the valve lever 70 the chain 81 which depends through the plate 3 and has secured thereto the weight 82, the lower end of the lever 75 being pivoted by the bolt 83 to the plate 24 and the locking engagement of the shoulders of the toggle levers normally preventing the weight from depressing the valve lever. When the toggle joint is bent by the pull on the rod, however, the weight will drop and will pull on the lever through the chain to entirely open the valve. To prevent the weight from dropping with a jerk against the valve lever and other mechanism, I extend the chain 81 upward in the portion 84 which is secured to the under side of the plate 3, the length of said portion being such as to suspend the weight therefrom before the main portion of the chain is tensed, whereby the jerk of the dropping of the weight acts merely on the portion 84 of the chain. The bending of the toggle levers by the downward movement of the lever 70 will cause the rod 77 to be forced forward. Rising from the plate 3 are standards 85, and projecting inward from one of said standards is a contact plate 86 having connected thereto the wire 87 in circuit with the battery 88 and electric bell or alarm 89. Secured to the other of the standards is a blade spring member 90 having the other terminal wire 91 of the bell and battery circuit secured thereto, said spring 90 extending to meet the contact plate 87 but being normally sprung inward from said plate. As the rod 77 is forced forward its end 78 engages the spring 90 and presses said spring toward the contact plate 87 to cause it to engage said plate and complete the bell circuit, whereby the bell

will be sounded as long as the valve 69 is open.

To enable me to shut off the alarm and the flow of water from the ground when the necessity for the same is over, I secure to the upper toggle lever 72 the plate or bar 92, the other end of said plate projecting outwardly from the lever. Secured to the projecting end of the plate is a chain 93 which passes over the sheave 94 supported by the bracket 95 depending from the cover plate 96, said chain depending from the sheave and having the wire or rod 97 secured to its lower end and extending to the ground or base of the chute, whereby a jerk on the said member 97 will draw the plate and thus the toggle lever and valve operating lever upward until the toggle levers lockingly engage each other to prevent the weight from operating the valve. As the toggle levers are thus shifted the rod 77 will ride over the teeth of the ratchet wheel, swinging upward on its pivot, and it will then drop down and be engaged by one of the ratchet teeth ready to again automatically operate the valve 69 and the alarm upon movement of the chain 29.

To enable persons desiring to employ my fire escape to readily find the entrance doors thereof, I secure to the building above the various doors, the red signal lamps 101, current conducting wires 102 extending down in the building for supplying current to the various lamps for illuminating the same. Said wires receive the current from any suitable source of supply, but the electrical circuit of the lamps is normally opened so that the same will not be lighted. To close the electrical circuit to cause the illumination of the lamps upon movement of the carrier chain within the chute of my fire escape, I secure to the post 85 exterior to the stationary switch member 86 a second switch member 103 to which one of the wires 102 is connected, said switch member 103 being insulated from the switch member 86. Secured to the other post 85 outwardly of the spring switch member 90 is a second spring switch member 104 similar in size and shape to the member 90 and insulated therefrom, a block of insulating material 105 being interposed between the members 90 and 104 near the free ends of said spring switch members.

In the operation of my device, as the rod 77 is thrown forward by movement of the carrier chain in the chute, the end 78 strikes the member 90 and presses the same into engagement with the stationary switch member 86, while at the same time the block 105 bearing against the switch member 104 presses it outward into engagement with the stationary switch member 103 to close the alarm circuit and cause the illumination of the red lamps 101 to indicate the entrance

to my fire escape on each floor of the building.

It is a well known fact that frequently great loss of property and often times loss of lives of those endeavoring to quench a fire is occasioned by the exploding of some of the gas pipes in the building, and the ignition of the gas pouring out through the broken pipes. To eliminate this danger, I secure to the side of the building the gas main pipe 106 through which the gas is supplied to the building, said pipe being provided with a valve 107 for shutting off the gas supply. Secured to said valve and projecting therefrom in horizontal position when the valve is open is the lever arm 108 while pivotally to the free end of the lever arm 108 is the link 109 having in its lower end the longitudinal extending slot 110 in which is slidably engaged the pivot pin 111 which serves to pivotally connect the arm 71 with the upper toggle of lever 72. This construction will be readily understood by reference to Figs. 7 and 8, and it will be seen that as the toggle is broken and the pivot pin 111 is drawn downward by the action of the weight 82 suspended from the chain 81, the lever arm 108 will be shifted in the same manner as the arm 71 to close the gas valve and cut off the gas supply while the water is turned on by the valve 69. The advantage of this construction in employing a slot 110 in which the pivot pin 111 is engaged instead of having the link 109 fixedly pivoted on the pin is that when the chain 97 is pulled to straighten the toggle and shut off the water the pin will ride upward in the slot, and the gas will continue to be shut off until manually turned on. Danger of gas being turned into the various pipes of the building which may have been left open at the time of the fire and thus the spreading of gas throughout the entire building and the waste of gas as well as danger of fire is prevented.

To protect the various operating mechanism from the weather, I preferably inclose the same within a suitable casing, but in the drawings I have illustrated but a fragment of this casing in order that the construction of the mechanism might be more readily understood.

From the foregoing description taken in connection with the accompanying drawings the construction and operation of my improved fire escape will be readily understood, and it will be seen that I have provided a fire escape of the highest efficiency which will serve to conduct persons in safety to the ground and which will automatically sound an alarm as soon as the first person commences using the fire escape, avoiding the necessity of seeking a fire alarm to warn other persons in the building and positively insuring the warn-

ing of said persons. It will further be observed that I have provided an improved fire escape in which the persons are inclosed within a tube which will permit them to pass directly through the burning portion without being damaged by the flames or smoke, the fire escape being provided with automatic fire spraying devices for keeping down the temperature within the said tube and for extinguishing the burning clothing of those using the fire escape. It will also be observed that I have provided improved tracks for the doors closing the apertures in the side of the chute or tube the inclination of said tracks causing the doors to slide shut automatically when released to close the opening and prevent drawing in of the flame therethrough, the tube or chute being thus inclosed both at the top, bottom, and sides except for the bottom discharge door, whereby the liability of a draft in the tube which will tend to draw in the poisonous gases or suffocating smoke of the fire is reduced to a minimum. I have, moreover, provided in connection with my improved fire escape means for automatically shutting off the flow of gas through the branch main supplying the gas to the entire building and have further provided automatically lit lights for indicating the entrance to my fire escape upon each floor of the building.

I claim:

1. A fire escape, comprising an inclosing chute, an endless carrier moving within the said chute, and spraying devices automatically thrown into operation by the movement of said endless carrier.

2. A fire escape, comprising an inclosing chute, an endless carrier moving within said chute, spraying devices disposed within the chute, a rod mounted for shifting by movement of the endless carrier, a valve for the spraying devices, and connections between the rod and said valve for causing the opening of the valves upon moving of the carrier.

3. A fire escape, including an endless carrier, devices for spraying the carrier, an alarm, and a rod shifted by movement of the endless carrier and serving to turn on the spraying devices and cause the sounding of the alarm.

4. A fire escape, comprising a chute, spraying devices surrounding the chute, a valve for controlling said spraying devices, an endless carrier mounted within the chute, and means operated by the movement of said carrier for opening the controlling valve of the spraying devices.

5. A fire escape, comprising an inclosing chute, an endless carrier mounted in the chute, a spraying device surrounding the chute, weight controlled means controlling the spraying device, and means operated by

the movement of the carrier for releasing the weight to operate the spraying devices.

6. A fire escape, comprising a chute, an endless carrier moving within the chute, a tube depending in the chute and surrounding a portion of the carrier, a drum over which the carrier passes, a guide sheave for the carrier supported adjacent the drum, a spraying device mounted on the chute, and means actuated by the passing of the carrier over the guide sheave for causing the operation of the spraying device.

7. A fire escape, comprising a chute, an endless carrier depending into said chute, a sheave mounted for rotation by movement of the carrier, a ratchet wheel secured to rotate with the sheave, means for spraying the chute, a valve for controlling the spraying of the chute, and connections between the ratchet and the valve for opening the valve upon shifting of the carrier.

8. A fire escape, comprising a chute, an endless carrier depending in the chute, a sheave mounted for rotation by movement of the carrier, a ratchet wheel mounted to move with the sheave a spraying device for spraying the chute, a controlling valve therefor, a weight for operating said valve, a toggle device normally holding the weight inoperative, and connections between the toggle device and the ratchet, whereby movement of the ratchet breaks the toggle joint and allows the weight to descend and open the valve of the spraying device.

9. A fire escape, comprising a chute an endless carrier depending in the chute, means for controlling the movement of the carrier, a shaft having a guide sheave secured thereon for rotation by the movement of the carrier, a ratchet wheel secured on the shaft, spraying devices surrounding the chute, a valve for controlling said devices, a valve lever for operating the valve, a weight depending from the valve lever for automatically shifting the same, means for normally locking the lever against shifting, connections between the locking means and the ratchet for releasing the weight upon shifting of the carrier, and means for absorbing the shock of the descent of the weight to prevent undue strain on the valve lever.

10. A fire escape, including supporting brackets, a shaft journaled therein, a sheave secured on the shaft, an endless carrier passing over the sheave, a ratchet wheel secured on the shaft, a guide disk secured on the shaft adjacent said ratchet wheel, an electrical circuit including an alarm, a normally open spring switch in said circuit, a weight operated means for closing said switch, and a toggle device for holding the switch holding means inoperative, the said means including a rod having a flattened end engaging the teeth of the ratchet, where-

by the rotation of the ratchet upon movement of the carrier shifts the rod to break the toggle joint and allow the weight to further shift the rod to close the switch.

- 5 11. A fire escape, comprising a chute, an
endless carrier depending in the chute, sup-
porting means for the carrier including a
shaft rotated by movement of the carrier, a
ratchet secured on the shaft, means for
10 spraying the chute, a valve for controlling
the spraying action of said means, a weight
for operating the valve to open the same,
a toggle jointed device for holding the valve
against operation by the weight, connections
15 between the ratchet and the toggle device
for moving the device to allow the weight
to operate the valve upon shifting of the
ratchet by movement of the carrier, and
manually controlled means for closing the
20 valve and shifting the toggle device to re-
lock the weight against movement to oper-
ate the valve.

12. A combination with a fire escape com-
prising a chute and an endless carrier mov-
25 able therein, of a gas controlling valve dis-
posed adjacent the chute, and means oper-
ated by the movement of the carrier for
shifting the valve to shut off the gas supply.

13. The combination with a fire escape
30 comprising a chute and an endless carrier
movable therein, of water and gas pipes
mounted adjacent the chute, a normally
closed valve in the water pipe, a normally
open valve in the gas pipe, and means oper-

ated by movement of the endless carrier for
35 automatically closing the gas pipe valve
and opening the water controlling valve.

14. The combination with a fire escape
including a chute and an endless carrier
movable therein, of gas and water pipes dis-
posed above the chute, controlling valves
40 for the said pipes, the water controlling
valve being normally closed and the gas con-
trolling valve being normally open, control-
ling levers secured to the valves, a link
pivoted to the lever of the gas controlling
45 valve and depending therefrom, said link
having a longitudinally extending slot from
in the lower portion thereof, and a pivot pin
passing through the lever of the water con-
50 trolling valve and slidably engaged in the
slot of the link, means for depressing the
pin upon movement of the carrier whereby
the valve levers are shifted to open the
water controlling valve and close the gas
55 controlling valve, and means for drawing
the pin upward to shift lever of the water
controlling valve to shut off the flow of
water, whereby the pin will ride in the slot
of the link to prevent the movement of the
60 pin from turning the gas controlling valve
to turn on the gas.

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

WILLIAM H. SMITH.

Witnesses:

FRANCIS C. BURNHAM,
MOSES M. PALMER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."