April 17, 1951 P. G. PLUMMER 2,549,707

FIRE ESCAPE

Filed May 17, 1948 2 Sheets-Sheet 1

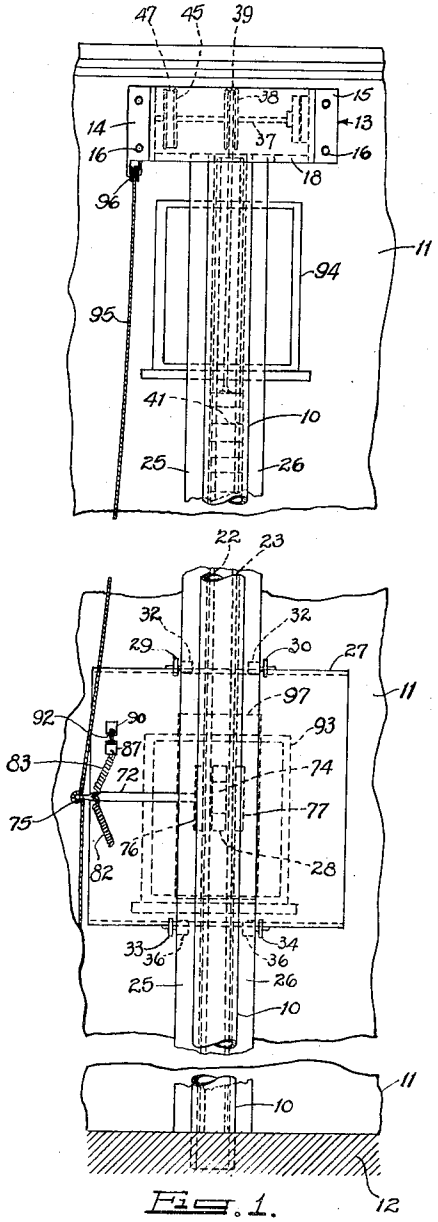


Fig. 1.

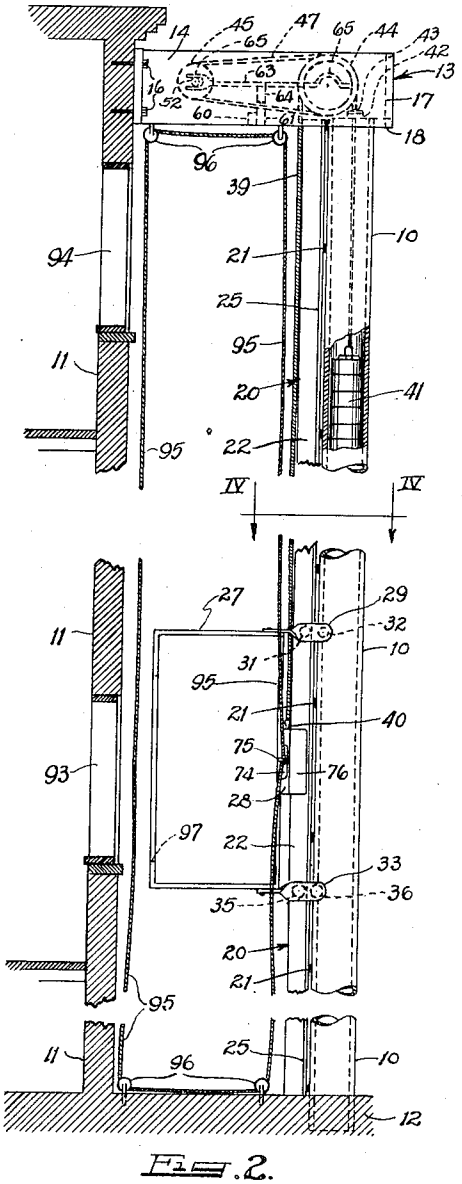


Fig. 2.

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April 17, 1951 P. G. PLUMMER 2,549,707

FIRE ESCAPE

Filed May 17, 1948 2 Sheets-Sheet 2

Fig. 7.

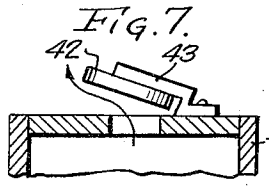
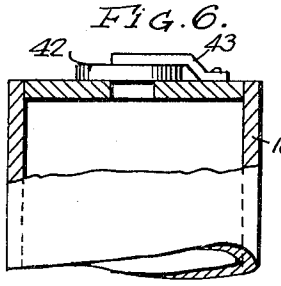


Fig. 6.



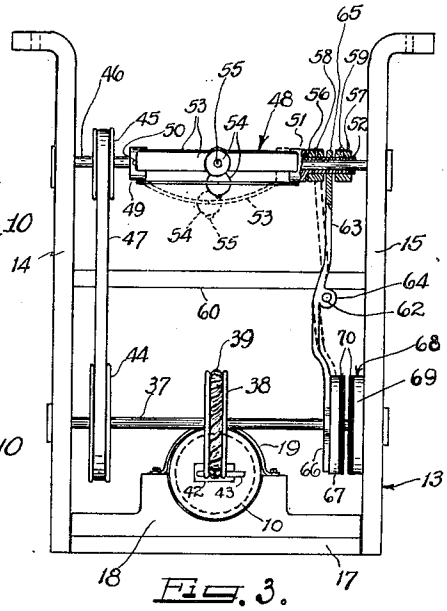


Fig. 3.

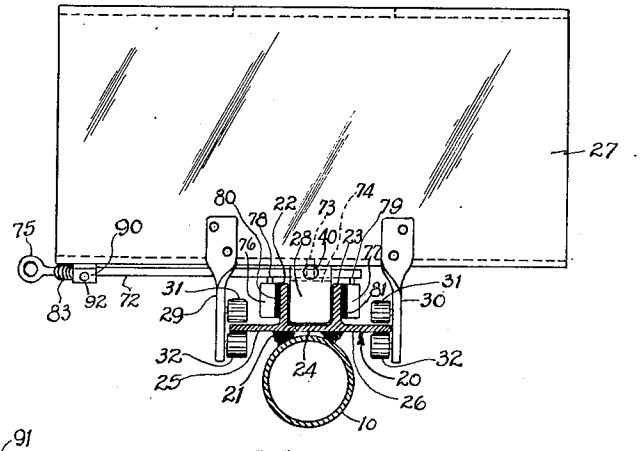


Fig. 4.

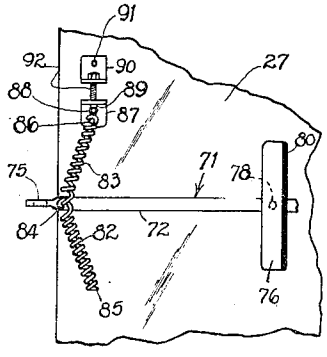


Fig. 5.

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2,549,707

FIRE ESCAPE

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Application May 17, 1948, Serial No. 27,393

1 Claim. (Cl. 227—31)

1

My invention relates to certain new and useful improvements in fire escapes.

An important object of this invention is to provide a fire escape arranged for permanent attachment to a building and so constructed whereby the occupants of the building may readily reach safety in case of fire or other accident.

A further object is to provide a fire escape having a cage which may readily be moved to any of the windows in a vertical line adjacent to the escape.

A still further object is to provide a fire escape having a cage the starting and stopping of which are under the joint control of the occupants of the building and the cage.

Another and still further object is to provide a fire escape having adjustable mechanism for automatically controlling the speed of a cage.

Other objects and specific features of the invention will become apparent from the following description when considered in connection with the accompanying drawings, in which:

Figure 1 is a fragmentary front elevational view of a fire escape constructed according to this invention, showing it applied to a building;

Figure 2 is a fragmentary side elevational view, partly in vertical section and partly broken away, of the fire escape shown in Figure 1;

Figure 3 is an enlarged plan view, with portions broken away, of the top of the fire escape showing details of construction of a speed control mechanism;

Figure 4 is an enlarged horizontal cross-sectional view taken along the line IV—IV of Figure 2 and showing the guiding and friction brake means between the movable cage or carrier member and the upright tubular flanged track members; and,

Fig. 5 is an enlarged fragmentary front elevational view showing details of construction of the adjustable braking means carried by the cage.

Figure 6 is a vertical transverse sectional view through the upper end of the tubular post showing the flap valve closed.

Figure 7 is a view similiar to Figure 6 showing the flap valve open.

Throughout the various views, the same reference numerals indicate the same or like parts.

As best shown in Figures 1 and 2, the fire escape of this invention includes an upright tubular post member 10 supported adjacent to a building 11. The tubular member is secured in place at its lower end by being embedded in the base 12 of the building, or otherwise anchored at ground level, and at its upper end by

2

a head frame bracket 13. The bracket includes side members 14 and 15, which are secured to the face of the building by means of studs 16, and a front cross-member 17. Extending between the side members and beneath the front cross-member is a yoke 18. As shown in Figure 4, the yoke is recessed to receive the upper end of the tubular post 10 which is held in place by a strip 19. A flanged track 20 is secured, as by welding at points 21 or other suitable means, to the tubular post in such a way that the flanges 22 and 23 extend toward the building. A web 24, between the forwardly extending flanges, extends laterally and terminates in side flanges 25 and 26.

A cage or occupant carrier 27 is mounted for movement vertically along the post. Securely attached to the exterior of the cage is a friction guide member 28 positioned between the flanges 22 and 23 for sliding engagement therewith. This member prevents lateral movement of the cage. Arms 29 and 30 each have one end secured to the top of the cage and a pair of rollers 31 and 32 pivotally attached to the other end. Each pair of rollers is so arranged as to seat against opposite sides of the adjacent flanges 25 or 26 on the member 20. Similar arms 33 and 34 are secured to the bottom of the cage and carry rollers 35 and 36 which cooperate with adjacent flanges 25 and 26. This construction holds the cage on the track member in spaced relation thereto.

A shaft 37 extends between the bracket side members 14 and 15. A pulley 38 is mounted on the shaft above the tubular post with its periphery in alignment with the center of the post. Over the pulley moves a cable 39, or other suitable hoisting means such as a rope, chain or the like. One end of the cable is anchored at 40 to the guide member 28 and at its other end to a counter-weight 41 sliding within the post. If desired, a flap valve 42 may be provided at the top of the post, or in any other suitable position, to control the speed of vertical movement of the cage. A spring 43 exerting a predetermined pressure normally maintains the valve in a closed position sealing an opening in the tubular support, not shown. As counter-weight ascends, during descent of the cage, air is compressed above the counter-weight and is relieved only when the pressure thereof exceeds the pressure exerted by the valve spring 43. The cage is thereby controlled against sudden or swift descent.

Another and additional control is provided for the cage. This control mechanism is mounted

on the bracket 13 at the upper end of the post. Near one end of the shaft 37 is mounted a pulley 44. In alignment is another pulley 45 mounted on a shaft 46. A driving member, such as an endless belt 47, operatively connects the aligned pulleys.

Also mounted on the shaft 46 is a governor mechanism 48. The latter includes a sleeve 49 locked to the shaft by a screw or stud 50. Another sleeve 51, having a reduced end portion 52, is slidingly mounted on the shaft 46. Flexible metal strips 53 bridge the space between the sleeve 49 and 51 and are firmly secured thereto by welding or lock screws, not shown. Centrally located on each strip is a split fly-ball 54. The halves of each ball, which are located on opposite sides of a strip, are held together by a locking screw or bolt 55. Adjustably mounted on the reduced end 52 of the sleeve 51 are bearing collars 56 and 57 which are locked in place by screws 58 and 59.

A cross-member 60 extends from one side member 14 to the other side member 15 of the bracket 13 and is positioned between the shafts 37 and 46. Adjacent to one end of the cross-member is mounted a support 61 (see Fig. 2) having an upwardly extending pin 62 thereon. An elongated lever 63 has an enlarged intermediate portion 64 with an opening therethrough for receiving the pin 62 thereby mounting the lever for horizontal pivotal movement. One end of the lever is forked as at 65 to receive the shaft 46. The other end 66 is secured to one disc 67 of a brake assembly 68. The disc 67 is slidably mounted on the shaft 37. Another brake disc 69 is fixedly mounted on the shaft 37 for rotation therewith. Brake linings 70, 70 cover opposing faces of the discs.

The operation of the control mechanism is as follows:

As the speed increases of the vertically moving cage, the balls 54 of the revolving governor mechanism move outward from the axis of rotation as the result of the increase in centrifugal force. This change in position of the balls effects an outward bowing of the flexible metal carrier strips 53. As a result, the slidable sleeve 51 is drawn toward the sleeve 49 which is locked on the shaft 46. As the collars 56 and 57 are locked on the sleeve 51, they move as a unit. The forked end 65 of the lever 63, being positioned between the bearings, moves in unison with the sleeve 51. With the increase in speed of the cage, the governor and brake assembly parts move to positions shown in dotted lines in Figure 3. In this position the lever 63 pivots on the pin 62 with the result that the brake linings 70, 70 are urged into contact with each other. The speed of rotation of the shaft 37 is thereby controlled and regulated. This in turn controls and regulates the speed of the cage so that persons of different weight will descend at the same rate of speed and at a predetermined maximum speed. It will be observed that the collars 56 and 57 are axially adjustable along the sleeve 51. By this adjustment, the speed of movement of the cage may be set at any desired maximum rate.

The air valve and governor mechanisms controlling the speed of descent of a weighted or passenger carrying cage have been described above. To control the movement and speed of ascent, the following mechanism is provided.

The counter-weight 41 is sufficiently heavy to raise the cage when empty. It is, therefore, necessary to provide a means for holding the cage stationary at a desired location. For this purpose a brake mechanism 71 is provided. On the side of the cage facing the post 10, a lever 72 is pivotally mounted as at 73. It will be noted in Figures 1 and 2 that the guide member 28 is recessed at 74 to provide clearance for the lever and its pivot.

The lever terminates adjacent an end of the cage in a ring portion 75. Brake shoes 76 and 77 are pivotally mounted, as at 78 and 79, on the lever 72. The brake shoe 76 is provided with a brake lining 80 and the shoe is so mounted on the lever that the lining is adjacent the outer face of the flange 22. Similarly, the shoe 77 has a brake lining 81 on a face thereof and is so mounted on the lever that the lining is adjacent to the outer face of the flange 23.

Coil springs 82 and 83 are each connected at one end to the lever 72 as at 84. The other end 85 of the spring 82 is connected to the side wall of the cage either through an opening for receiving the end or by a pin or bolt, not shown. The spring 82 exerts tension on the lever in a downward direction. The outer end of the spring 83 is connected to a pin 86 carried by an angle member 87. This spring exerts tension on the lever in an upward direction. The angle member 87 is mounted on the side wall of the cage for sliding movement. This is accomplished by a retaining stud 88 which extends through a slot 89 in the angle member 87 and into threaded engagement with an opening (not shown) in the side wall of the cage. A similar angle member 90 is secured to the side wall of the cage by a bolt 91. An adjusting screw 92 operatively connects the angle members whereby the angle member 87 is moved toward and away from the angle member 90.

By adjusting the screw 92, the springs 82 and 83 can be so tensioned as to maintain the lever 72 in a dead-center position in which the brake shoes 76 and 77 are parallel and slightly spaced from the flanges 22 and 23. In this position the shoes exert no braking force. By further adjustment, the lever may be moved off dead-center whereby a desired braking pressure is constantly exerted on the flanges. It is desirable that this braking pressure be enough normally to hold the cage stationary which would be a pressure sufficient to overcome the difference in weight between the cage and the counter-weight.

It is obvious that the lever 72 may also be operated manually by an occupant of the cage to control the speed of descent. It also becomes necessary that the braking mechanism 71 be operable from the building in order to release the brakes and effect an ascent of the cage. When a descent is made, the cage is held at the unloading point by the braking mechanism. This is usually at ground level. Further escapes become impossible unless the ascent of the cage is controlled from the windows 93 and 94. To effect this control, a cord or rope loop 95 is properly positioned by means of sheaves 96. As best shown in Figs. 1 and 2, the cord hangs down beside the windows within easy reach of an occupant of the building desiring to use the fire escape. The cord is secured to the lever ring 75 by being either tied to or looped around the ring. At any point along the cord loop, then, the brake mechanism may be operated to release the cage for ascent.

The operation of my invention is as follows:

A person wishing to escape from one of the floors of a building to which my invention is connected merely operates the cord 95 to release the brakes on the cage. The counter-weight 41 raises the cage to the level desired at which point the person desiring use of the cage releases the cord which then applies the brakes and brings the cage to a halt. Entrance to the cage is facilitated through the doorway 97 therein. As soon as the weight of the person is added to the cage the effect of the counter-weight is overcome and the cage descends. Speed of descent is automatically controlled by the air valve 42 and the governor mechanism 48. In addition, control both as to speed and stopping may be exerted by an occupant of the cage through the braking mechanism 71. Both manual and automatic controls, then, effect a descent of the cage at a desired speed whether the cage be fully or partly loaded. When the cage is unloaded it automatically stands at rest. Thereafter, further movement is controlled by an occupant of the building.

While only one embodiment of the present invention has been shown herein, it will of course be understood that the invention is not to be limited thereto since many modifications may be made.

I claim as my invention:

A fire escape comprising a vertical upright tubular support spaced outwardly from a wall having vertically alined windows, a carrier interposed between the wall and the tubular support and inwardly spaced from the tubular support, a counterweight in the tubular support, a pulley above the tubular support, a flexible member connecting the counterweight and extending upwardly and over the pulley and downwardly and

connected to the carriage, a vertically disposed guide plate secured to the inner side of the tubular support in parallel relation to the wall and having its opposite sides extending beyond the opposite sides of the tubular support, spaced vertical flanges carried by the inner side of the plate and spaced inwardly from the sides of the plate, a guide member carried by the carriage and extending outwardly between the spaced flanges, brackets carried by the carriage and extending outwardly and overlying the edges of the sides of the plate, anti frictional bearings carried by said brackets and cooperating with opposite sides of the sides of the plate, a brake lever hingedly connected to the outer side of the carrier and between the carrier and the spaced flanges and brake shoes carried by said lever and cooperating with the outer sides of the spaced flanges for a braking operation.

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