July 7, 1936. G. A. APPLEGARTH 2,046,762

FIRE ESCAPE

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Fig. 1.

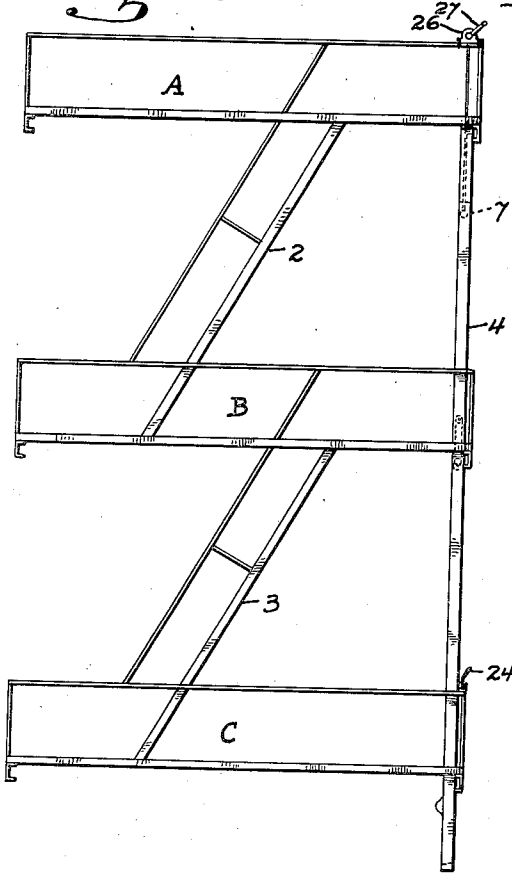


Fig. 2.

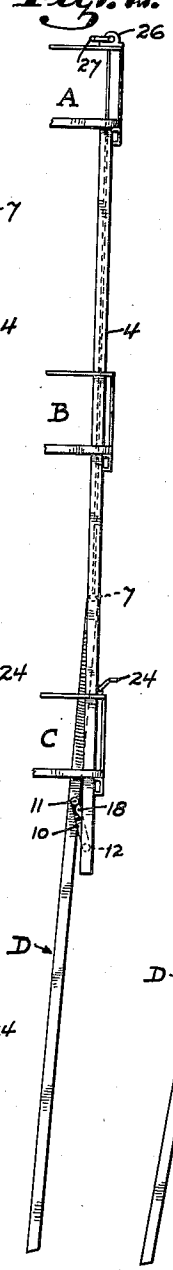


Fig. 3.

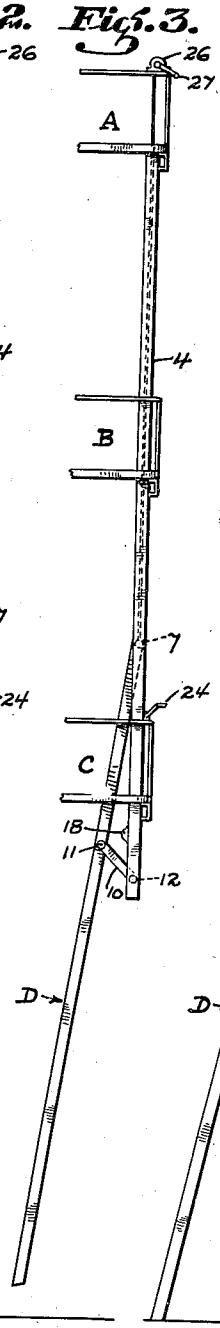


Fig. 4.

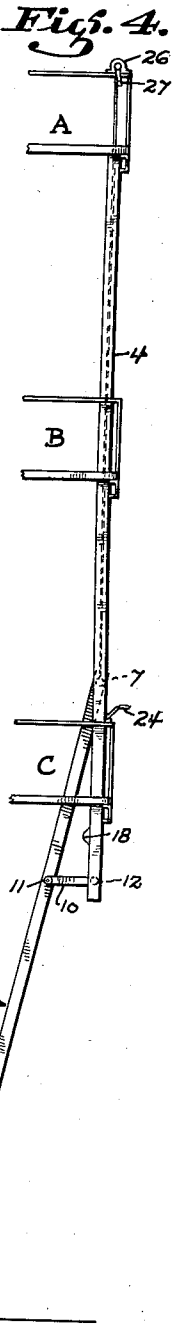
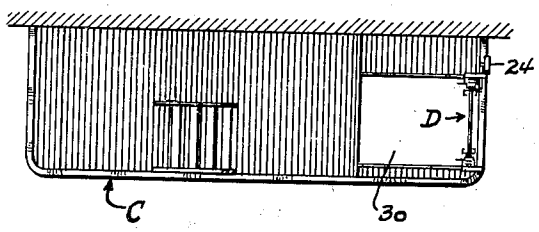


Fig. 5.



INVENTOR
George A. Applegarth.

BY

Chas. E. Townsend.
ATTORNEY.

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Fig. 6.

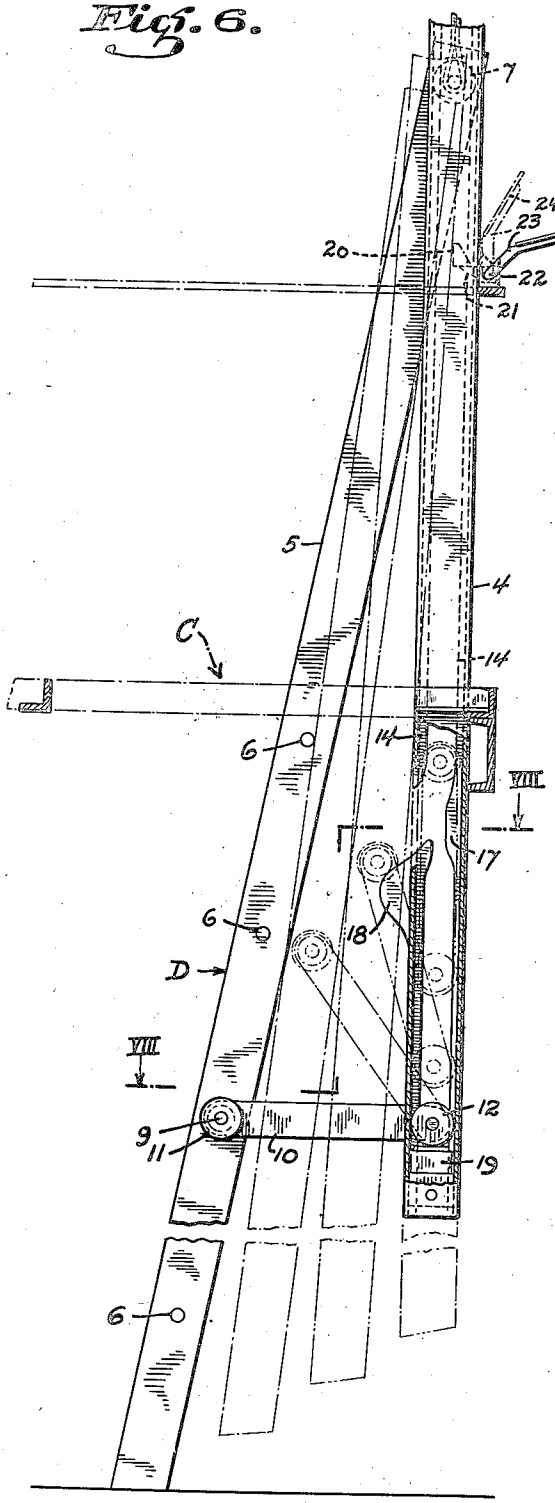


Fig. 7.

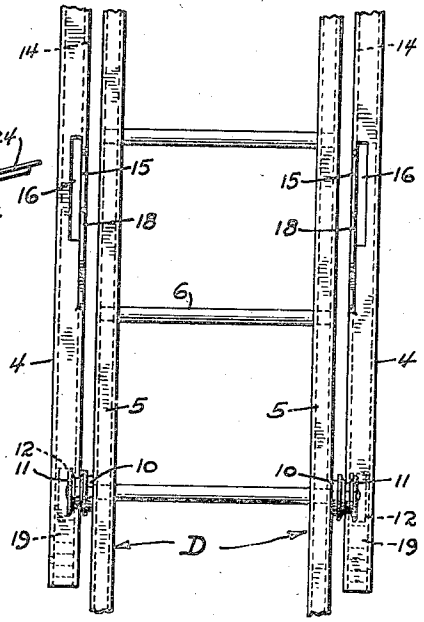
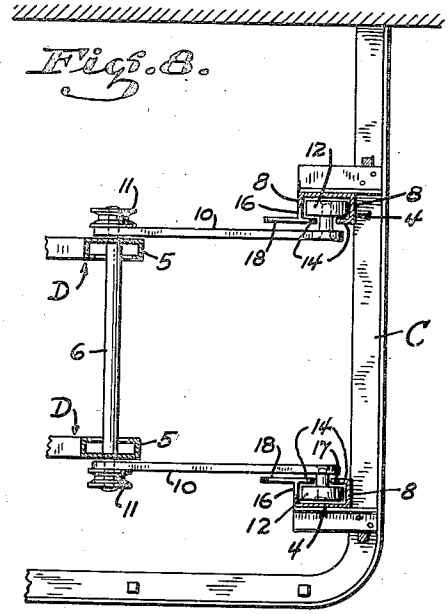


Fig. 8.



INVENTOR.
George A. Applegarth.

BY

Chas. E. Townsend.
ATTORNEY.

Patented July 7, 1936 2,046,762

UNITED STATES PATENT OFFICE

2,046,762

FIRE ESCAPE

George A. Applegarth, San Francisco, Calif.

Application March 30, 1935, Serial No. 13,849

3 Claims. (Cl. 228—48)

This invention relates to fire escapes such as are applied to the exterior face of a building, and particularly to an improved or modified form of the type of fire escape disclosed in my copending application entitled "Fire escape", filed March 18, 1935, Serial Number 11,645.

Fire escapes, which are applied to the exterior of a building, usually consist of a balcony for each floor with permanent stairways or ladders between them so that persons escaping during a fire climb down from one balcony to another until the street or sidewalk is reached.

In the structure disclosed in my copending application the lowermost balcony is provided with a stairway or ladder which is normally held in a raised position and which must be released and lowered in case of fire, or a similar emergency. The present invention is equipped with a similar type of stairway or ladder and the object of the invention is to provide means for automatically actuating the ladder during the lowering operation so that it will assume a tilted or inclined position when fully lowered.

The invention, more specifically stated, embodies a ladder which is vertically movable between a pair of guide rails, means for raising the ladder and for supporting it in raised position, means for releasing the ladder and for controlling the speed with which it is lowered, and lever actuated means carried by the ladder and cooperating with the guide rails to swing the ladder to assume an inclined position when fully lowered.

The invention is shown by way of illustration in the accompanying drawings, in which—

Fig. 1 is a front view of a fire escape, said view showing the ladder which connects the lowermost balcony with the ground in raised position;

Figs. 2, 3 and 4 are views similar to Fig. 1, showing the ladder as it approaches its lowermost position and the mechanism which swings it to inclined position;

Fig. 5 is a plan view of the lowermost balcony;

Fig. 6 is an enlarged detail view of the lower end of the trackways, said view being partially in section and disclosing the mechanism whereby the ladder is swung to inclined position as it reaches fully lowered position;

Fig. 7 is a partial front view of the ladder and the guide rails, said view showing the manner in which a portion of the guide rails are cut away;

Fig. 8 is a cross section taken on line VIII—VIII of Fig. 6.

Referring to the drawings in detail, and particularly Figs. 1 to 5, inclusive, A, B and C indicate balconies, such as used on fire escapes of the type applied to the exterior of the building, and 2 and 3 the permanent stairways, or ladders, connecting the same.

The ladder, generally indicated at D, is employed for connecting the lowermost balcony C with the street or sidewalk. This ladder is normally held in raised position, as shown in Fig. 1, and is only lowered in case of fire or a similar emergency. The means for supporting the ladder in raised position, together with means for releasing, lowering, guiding and tilting the ladder will be as follows.

Suitably secured to the several balconies and connecting them are a pair of spaced channel-shaped guide tracks 4—4, the lower ends of which extend slightly below the lowermost balcony. Vertically movable between the guide rails is the ladder D.

The ladder consists of a pair of side rails 5—5 connected by rungs 6. The uppermost rung is extended to serve as a journal pin for a pair of rollers 7—7, and these extend into and are guided by the side walls 8—8 of the channel-shaped guide tracks 4. Another rung 9 disposed a suitable distance below the uppermost rung is similarly extended and serves as a pivotal support for a pair of lever arms 10—10 and as a journal pin for a pair of rollers 11. The free or opposite ends of the lever arms carry rollers 12—12, which extend through and are guided by the side walls 8—8 of the guide rails in a manner similar to the rollers 6—6, while the rollers 11—11 extend only part way into or between the side walls 8—8 of the guide rails as they run between and are guided by right angular flanges 14—14 formed on the outer edges of the side walls 8—8. These flanges, together with a portion of the side walls 8—8, are cut away, as indicated at 15 and 16 see Figs. 6 and 7, to permit the rollers 11—11 to be released and projected outwardly from between the flanges 14—14. Cams 17 and 18 are also employed for this purpose and so are stop members 19. The function of this part of the mechanism will hereinafter be described.

Means are employed for supporting the ladder in raised position and for releasing the same when it is to be lowered. The means disclosed in this application is similar to that disclosed in my copending application. Briefly stated, it consists of a lug 20 secured to the ladder which is engaged by a pawl 21. The pawl is secured on a shaft 22, suitably journaled on the railing of the lowermost balcony. The shaft is provided with a crank arm 23 and a handle 24. When the ladder is raised the latch is swung in under the lug 20

and thus supports the ladder in raised position. When it is desired to lower the ladder, it is only necessary to push outwardly on the lever **23**, thus moving the latch out of engagement with the lug and releasing the ladder thereby permitting it to be lowered.

Means must also be employed for controlling the speed of descent of the ladder and for raising and returning it to elevated position. The means shown in this instance are similar to the mechanism disclosed in my copending application and is more or less standard equipment.

In actual operation when it is necessary to lower the ladder, it is accomplished by pushing outwardly on the crank arm **23** so as to swing the latch **22** out of engagement with the lug **20**. When this is accomplished the ladder will immediately begin to descend between the guide rails and the speed of descent will be controlled by the valve of the pump. As the ladder reaches its lowermost position rollers **11** will align with the openings **15** and **16** formed in the guide rails. Cams **17** will be engaged and force the rollers **11** outwardly through the openings formed by the cut away portions and the rollers will thus leave the flanged guideways and will engage the cams **18**, which will further project the rollers. The lever arms **10** will at the same time assume a slightly angular position with relation to the vertical guide rails and as further downward movement continues the rollers **12—12** will engage the stop members **19**. Further downward movement of the ladder will cause the lever arms to swing outwardly and when the ladder reaches full lowered position the arms **10** will assume a right angular position with relation to the rails. This movement of the lever arms from a position parallel to the rails to a position at right angles thereto causes the lower end of the ladder to swing about the upper end of the rollers **7** and an inclined position is thus finally attained; the weight of the ladder itself being utilized in cooperation with the arms **10** to produce this swinging movement.

To return the ladder to elevated position, it is only necessary to grasp the crank of the pump and rotate it. This will cause the wire cable supporting the ladder to be wound about the drum and the ladder will, accordingly, be raised. During the first raising movement the arms **10** will swing upwardly and engage the cams **18**. Further movement will cause the rollers **11** to ride inwardly on the cams and will, accordingly, enter the guide rails through the openings **15** and **16** and will engage the right angular flanges **14—14** so as to be guided thereby during the upward movement of the ladder. When the ladder is finally raised, it will assume a position between the guide rails and parallel therewith. The only time an angular position is assumed is when it is fully lowered, this position being ideal as it facilitates the ease with which individuals can ascend or descend.

The ladder may be provided with hand rails, if desired, but they are not shown in the present instance. It is conveniently arranged with relation to the lowermost balcony, an opening **30** being provided in the floor of the balcony to permit easy access to the ladder.

The construction involved is simple and substantial. The guide rails employed will, if anything, reinforce and strengthen the balcony of the fire escape and as they are disposed at one end of the balcony they can be readily applied and installed on old structures or new.

A mechanism of this character is obviously exposed to all kinds of weather conditions and will be subject to rusting, sticking, jamming, etc. The parts employed may, however, be galvanized, or otherwise protected, and as they are few and of simple construction any chances of the parts rusting or jamming when required for operation is very remote.

While certain features of the present invention are more or less specifically described, I wish it understood that various changes may be resorted to within the scope of the appended claims. Similarly, that the materials and finish of the several parts employed may be such as the manufacturer may decide, or varying conditions or uses may demand.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:—

1. In a fire escape of the character described the combination with a pair of vertically disposed guide rails, of a ladder movable and guided between the rails, means for lowering the ladder between the rails, a pair of rollers journaled one on each side of the ladder, a pair of levers one on each side of the ladder, said levers pivoting about the same axis as the rollers, a pair of flanges on the guide rails between which the rollers run and are guided, said rails and flanges being parallel and said flanges being cut away throughout a portion of their length, cooperating cam faces on the flanges and rails with which the rollers engage during lowering of the ladder and whereby the rollers are projected through the cut out portion to cause the lower end of the ladder to swing outwardly away from the rails, and a stop member on each guide rail with which the free ends of the lever engage to further project the lower end of the ladder away from the guide rails as the ladder reaches a fully lowered position.

2. In a fire escape of the character described the combination with a pair of vertically disposed guide rails, of a ladder movable and guided between the rails, means for lowering the ladder between the rails, a pair of rollers journaled one on each side of the ladder, a pair of levers one on each side of the ladder, said levers pivoting about the same axis as the rollers, a pair of flanges on the guide rails between which the rollers run and are guided, said rails and flanges being parallel and said flanges being cut away throughout a portion of their length, cooperating cam faces on the flanges and rails with which the rollers engage during lowering of the ladder and whereby the rollers are projected through the cut out portion to cause the lower end of the ladder to swing outwardly away from the rails, a stop member on each guide rail with which the free ends of the lever engage to further project the lower end of the ladder away from the guide rails as the ladder reaches a fully lowered position, and a pair of rollers on the upper end of the ladder for maintaining it in alignment with the guide rails when the lower end is swung outwardly and away therefrom.

3. In a fire escape of the character described the combination with a pair of vertically disposed guide rails, of a ladder movable and guided by and between the rails, means for lowering the ladder between the rails, a pair of levers pivotally attached to the ladder at their upper ends, one lever being disposed on each side of the ladder, the lower ends of the levers being retained and guided by the guide rails, cam members engageable with the upper ends of the levers during

lowering of the ladder to project them outwardly from between the guide rails, stop members on the guide rails with which the lower ends of the levers engage, said stop members and the levers engaging the same causing the lower end of the ladder to swing outwardly and assume an inclined position with relation to the guide rails as the ladder reaches a fully lowered position, and means on the upper end of the ladder for maintaining it in alignment with the guide rails.

GEORGE A. APPLEGARTH.