

PATENT SPECIFICATION (11)

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DRAWINGS ATTACHED

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(54) FIRE ESCAPE

(71) I, FREDERICK BOOTH, a citizen of Canada, of 1429 Hamilton Street, New Westminster, British Columbia, Canada, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to exterior fire escapes.

Fire escapes on exterior walls of buildings usually take the form of a series of flights of stairs extending between landings disposed at every floor of the building emergency exits being provided at every landing to permit escapees to avail themselves of the fire escape should be need arise. Present fire escapes of this type are usually bolted to the building and, for obvious reasons, are made as light as practically possible. Steps of the stairs are usually light metallic mesh and handrails are usually of light tubular construction.

This type of fire escape is quite adequate to permit firemen to ascend to fight a fire however firemen find it very difficult to evacuate a building, quickly, as some escapees tend to freeze on the fire escape. This is probably due to fear of height and to panic.

I have determined, however, that many escapees who have fear of heights can be persuaded to descend a fire escape from great heights, in a sitting position, i.e. to move from step to step in a sitting position.

Fire escapes of prior art are not constructed to permit rapid descent in said sitting position manner, thus passage of other escapees may be impeded.

Furthermore, aesthetically, fire escapes of prior art leave much to be desired, consequently they are not used in modern highrise apartments where external appearance is considered to be of prime importance.

The present invention seeks to overcome the objections as above by providing a fire escape down which a person may descend in

a sitting position, thus facilitating rapid descent by those who are afraid of heights. In a preferred form of the present invention there is furthermore provided a fire escape which permits firemen to ascend to fight fire and also which can be amenable for use in highrise apartments as when not in use it may be partially hidden and detracts minimally from the appearance of buildings.

According to the present invention there is provided a fire escape for buildings having balconies arranged one above the other, the fire escape comprising a frame having a pair of parallel spaced apart side supports, a plurality of transverse braces extending between the side supports, the braces being staggered alternately on opposite sides of longitudinal centre lines of the supports, a strip of smooth flexible material extending from end to end of the side supports and woven through the braces so as to provide a flight of stairs having treads and risers, mounting means for mounting the frame at an upper end to an upper balcony so that the frame can be swung between a generally horizontal position and an inclined position, support means at a lower end of the frame for supporting the frame in said inclined position on a lower balcony, the braces being arranged so that with the frame disposed in said inclined position the treads slope downwards and risers slope outwards towards the foot of the flight.

A detailed description following, related to the accompanying drawings, gives exemplification of preferred embodiments of the invention.

In the Drawings:—

Fig. 1 is a part-sectional side view of one embodiment of the fire escape shown in one position in unbroken outline and in another position in broken outline,

Fig. 2 is an enlarged section on line 2—2 of Fig. 1,

Fig. 3 shows, diagrammatically, use of the fire escape by an escapee descending in a sitting position,

[Price 25p]

SPECIFICATION AMENDED - SEE ATTACHED SLIP

Fig. 4 is a view similar to Fig. 3 showing partially, a person ascending.

Fig. 5 is an enlarged side view of a portion of another embodiment of the fire escape,

Fig. 6 is an enlarged view on line 6—6 of Fig. 5,

Fig. 7 is an enlarged view on line 7—7 of Fig. 5.

Referring to Figs. 1 and 2 of the drawings, a fire escape, generally 10, being one embodiment of the invention, is shown secured exteriorly of a building 11 between an upper balcony 13 and a lower balcony 14. The fire escape includes a flight of stairs 15 swingably moveable between an inclined position, as shown in solid outline, and a horizontal position, as shown in broken outline.

The flight of stairs 15 is of metallic construction, such as aluminium, and includes a pair of side supports 16, 16 which can be extruded T-shaped sections having central webs 17, 17 between 6 to 8 inches in depth and upper cross pieces 18, 18. The supports 16, 16 are maintained in spaced apart parallel relationship by transverse braces 20, the braces being secured to the supports in a known manner, such as by ring connectors, not shown.

The transverse braces are staggered, alternately, on opposite sides of a longitudinal centre line 16.1 of each support.

A strip of smooth flexible material 21, in this instance a strip of aluminium having a width slightly less than the distance between the web portions 17, 17 of the supports, is woven between the transverse braces so as to form a series of steps and is secured at its ends to a lower transverse brace 20.1 and to an upper transverse brace 20.2.

The flight of stairs 15 is swingably mounted at upper ends of the supports by mounting means comprising a cross shaft 22 which extends transversely between the pair of brackets 23, the brackets being secured to the upper balcony at opposite sides of a manhole 24 therein. The manhole 24 is normally covered by a trap-door 25.

A supporting leg 26 is swingably mounted on a cross shaft 27 extending transversely between the supports at lower ends thereof. The supporting leg which is between two and three feet in length can be swung from a collapsed position, as shown in broken outline, in which it extends beneath and parallel to the side supports, and a vertical position, as shown in solid outline, in which it rests on the lower balcony 15 to serve as support means which supports the flight of stairs in an inclined position.

A spring closed latch 29 of known construction is secured at a lower end of the leg. Release means comprising cords 30 and 31 is provided to open the latch 29. The

latch 29 engages a latching element 32 secured to the building when the flight of stairs is arranged in its horizontal position with the leg against the underside of the supports so as releaseably to lock the stairs beneath the upper balcony. The cord 31 extends beneath the upper balcony to the manhole 24 for operation by a person who wishes to descend the flight of stairs while the cord 30 depends downwards from the latch 29 for operation by a person who wishes to ascend the stairs from the lower balcony.

A counterweight 35 is connected to the stairs by a cable 36 which passes over the pulleys 37 and is fastened at a lower end of one of the side supports. The weight of the counterweight is such that only a slight tension, say 5 pounds, need be applied to the cable 36 to pull the stairs from their horizontal to their inclined position; thus if the cord 31 is inadvertently pulled off if the latch should accidentally release the flight of stairs will not automatically swing down from its horizontal position.

As illustrated in Fig. 1 and Fig. 3 the transverse braces are disposed so that with the flight of stairs in its inclined position, i.e. supported on the lower balcony by the leg 26 in a vertical position, treads 38 of the steps slope downwards towards the foot of the flight at an angle ϕ to the horizontal, typically about 10° . The risers 39 slope outwards towards the foot of the flight at substantially the angle θ to the vertical.

As shown in Fig. 1 the flight of stairs when not in use, extends in a horizontal position, as shown in broken outline, beneath the upper balcony. In order to descend from the upper balcony, an escapee simply swings the trap-door away from the manhole, puts his weight on the stairs then pulls cord 30 so as to release latch 29, and permit the leg 26 to swing freely to a vertical position. The flight of stairs can then swing to the inclined position.

The fire escape permits a person to descend quickly, in a sitting position as shown in Fig. 3, due to the smoothness of the material forming the steps and to the slope of the treads and risers. The cross pieces 18 serve as handrails.

The fire escape, see Fig. 4, also permits a person to ascend in a standing position the strip of sheet metal being secured only at upper and lower transverse braces will give under foot pressure so that the weight of the ascending individual is taken by the transverse braces.

Figs. 5, 6, and 7 show another embodiment of fire escape, generally 50. Fire escape 50 is substantially the same as fire escape 10 with the exception of side supports 52, one being shown, which correspond to side supports 16 of fire escape 10.

Each side support 52 is an inverted T-shaped section having a central web 53 and a lower cross piece 54.

5 A handrail 55 extends along an upper edge 53.1 of the web. The handrail is secured to the web by means of a plurality of pairs of supporting arms 56 (one pair being shown). Each pair of arms is pinned at upper ends 57 on a pin 58 extending through the handrail and pinned at lower ends 59 on a transverse pin 60 passing through the web. The supporting arms have a length greater than the width of the web so that, see Fig. 5, each handrail can be swung upwards from a collapsed position as shown in broken outline, in which extends flush along the upper edge of each side support 52, to an extended position, as shown in solid outline, parallel to but spaced above each support. 20 A spring latch 61, see Figs. 5 and 7, is secured in a bracket 62 adjacent a lower end of each side support for engaging one of the arms 56 when the handrail is swung to its extended position so as to prevent return of the handrail to its collapsed position when an escapee uses the fire escape.

The handrails 55, when extended, obviously provide more of a feeling of security a person afraid of heights than the handrails of fire escape 10 yet, with the handrails collapsed escape 50 has, substantially, the same depth as escape 10.

The invention is not confined to the precise details of the foregoing examples, and many variations are possible within the scope of the invention as defined by the claims. For example, both fire escapes can be constructed so that when they are arranged in positions extending horizontally beneath the upper balconies they blend with the decor of the building. The undersides of both fire escapes can be covered with construction materials similar in appearance to the underside of the balconies. Furthermore, counterweights can be housed in covers which also blend with the decor of the building.

WHAT I CLAIM IS:—

50 1. A fire escape for buildings having balconies arranged one above the other, the fire escape comprising a frame having a pair of parallel spaced apart side supports, a plurality of transverse braces extending between the side supports, the braces being staggered alternately on opposite sides of longitudinal centre lines of the supports, a strip of smooth flexible material extending from end to end of the side supports and woven through the braces so as to provide a flight of stairs having treads and risers, mounting means for mounting the frame at an upper end to an upper balcony so that the frame can be swung between a generally horizontal position and an inclined position,

65 support means at a lower end of the frame for supporting the frame in said inclined position on a lower balcony, the braces being arranged so that with the frame disposed in said inclined position the treads slope downwards and risers slope outwards towards the foot of the flight.

2. A fire escape as claimed in claim 1 wherein the strip of flexible material is secured only at its ends to upper and lower transverse braces.

3. A fire escape as claimed in claims 1 or 2 in which the support means includes a supporting leg connected at one end to the lower end of the frame for swinging movement between a collapsed position against an underside of the frame and an extended position depending vertically from the frame.

4. A fire escape as claimed in claim 3 further comprising a spring latch connected to the supporting leg; a latch element, for connection to the building, adapted to be engaged by spring latch when the supporting leg is disposed in collapsed positions and the frame is disposed in its horizontal position for releasably maintaining the frame in the generally horizontal position beneath the upper balcony; and release means connected to the spring latch so as to permit operation of the latter from either the upper or lower balconies for releasing the latch so as to permit the flight of stairs to be moved to its inclined position.

5. A fire escape as claimed in any preceding claim provided with a handrail which is swingably mounted so as to be movable into a collapsed condition to permit the frame to assume the generally horizontal position.

6. A fire escape as claimed in claim 1, 2, 3 or 4 further comprising a pair of handrails each of which extends longitudinally of an upper edge of a respective one of the side supports, and is connected thereto by means of supporting arms swingably connected to the side supports so as to permit the handrail to be swung between a collapsed position adjacent the support and an extended position parallel to but spaced above the support, and comprising a spring latch for releasably engaging one of said arms when the handrail is swung to its extended position.

7. A fire escape substantially as described and illustrated with reference to Figures 1 to 4 or Figures 5 to 7 of the drawings.

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The handrails 55, when extended, obviously provide more of a feeling of security a person afraid of heights than the handrails of fire escape 10 yet, with the handrails collapsed escape 50 has, substantially, the same depth as escape 10. 20

The invention is not confined to the precise details of the foregoing examples, and many variations are possible within the scope of the invention as defined by the claims. For example, both fire escapes can be constructed so that when they are arranged in positions extending horizontally beneath the upper balconies they blend with the decor of the building. The undersides of both fire escapes can be covered with construction materials similar in appearance to the underside of the balconies. Furthermore, counterweights can be housed in covers which also blend with the decor of the building. 25 30 35 40 45

WHAT I CLAIM IS:—

50 1. A fire escape having balconies arranged one above the other, the fire escape comprising a frame having a pair of parallel spaced apart side supports, a plurality of transverse braces extending between the side supports, the braces being staggered alternately on opposite sides of longitudinal centre lines of the supports, a strip of smooth flexible material extending from end to end of the side supports and woven through the braces so as to provide a flight of stairs having treads and risers, mounting means for mounting the frame at an upper end to an upper balcony so that the frame can be swung between a generally horizontal position and an inclined position, support means at a lower end of the 65 frame for supporting the frame in said inclined position on a lower balcony, the braces being arranged so that with the frame disposed in said inclined position the treads slope downwards and risers slope outwards towards the foot of the flight. 70 75 80 85 90 95 100 105 110 115 120

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2. A fire escape as claimed in claim 1 wherein the strip of flexible material is secured only at its ends to upper and lower transverse braces.

3. A fire escape as claimed in claims 1 or 2 in which the support means includes a supporting leg connected at one end to the lower end of the frame for swinging movement between a collapsed position against an underside of the frame and an extended position depending vertically from the frame.

4. A fire escape as claimed in claim 3 further comprising a spring latch connected to the supporting leg; a latch element, for connection to the building, adapted to be engaged by spring latch when the supporting leg is disposed in collapsed positions and the frame is disposed in its horizontal position for releasably maintaining the frame in the generally horizontal position beneath the upper balcony; and release means connected to the spring latch so as to permit operation of the latter from either the upper or lower balconies for releasing the latch so as to permit the flight of stairs to be moved to its inclined position.

5. A fire escape as claimed in any preceding claim provided with a handrail which is swingably mounted so as to be movable into a collapsed condition to permit the frame to assume the generally horizontal position.

6. A fire escape as claimed in claim 1, 2, 3 or 4 further comprising a pair of handrails each of which extends longitudinally of an upper edge of a respective one of the side supports, and is connected thereto by means of supporting arms swingably connected to the side supports so as to permit the handrail to be swung between a collapsed position adjacent the support and an extended position parallel to but spaced above the support, and comprising a spring latch for releasably engaging one of said arms when the handrail is swung to its extended position.

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