

[54] **FIRE ESCAPE APPARATUS**

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Primary Examiner—Reinaldo P. Machado
Attorney—Linton & Linton

[30] **Foreign Application Priority Data**

Mar. 4, 1971	Great Britain	5,991/71
May 24, 1971	Great Britain	16,556/71

[52] U.S. Cl. **182/93, 182/198, 182/206**

[51] Int. Cl. **E06c 1/56**

[58] Field of Search **182/196, 206, 197,**
182/198, 3, 4, 93; 24/230 TC, 221 R

[56] **References Cited**

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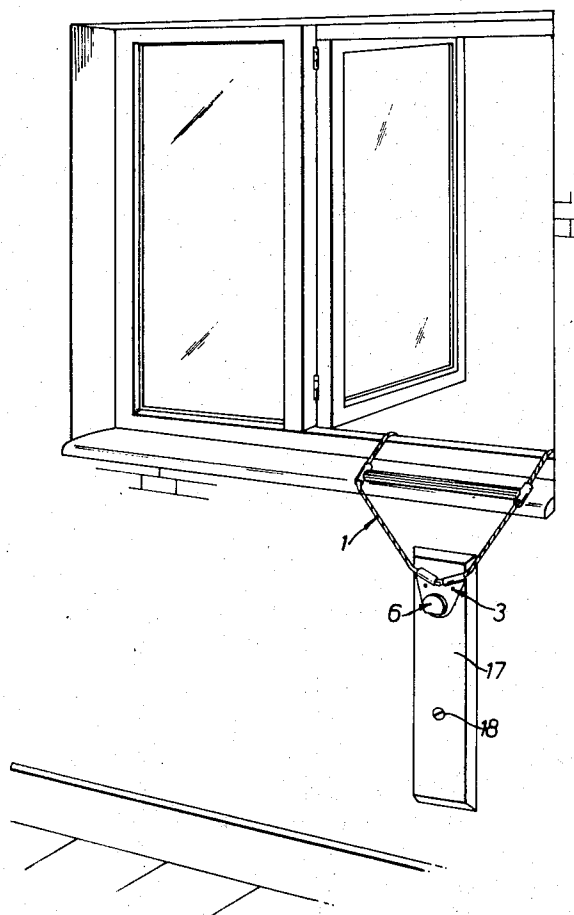
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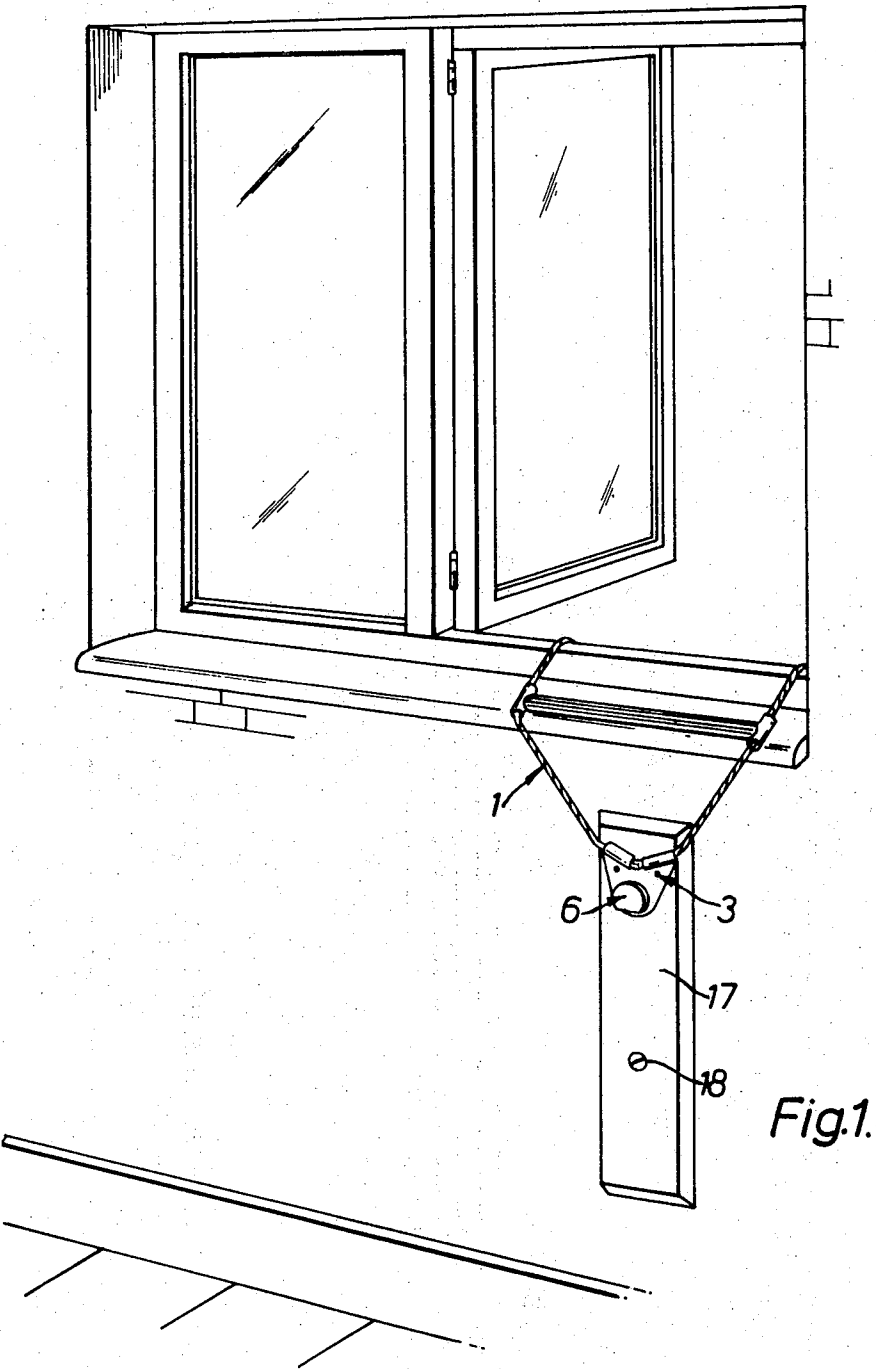
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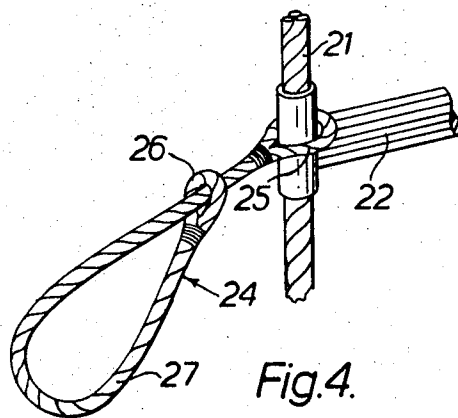
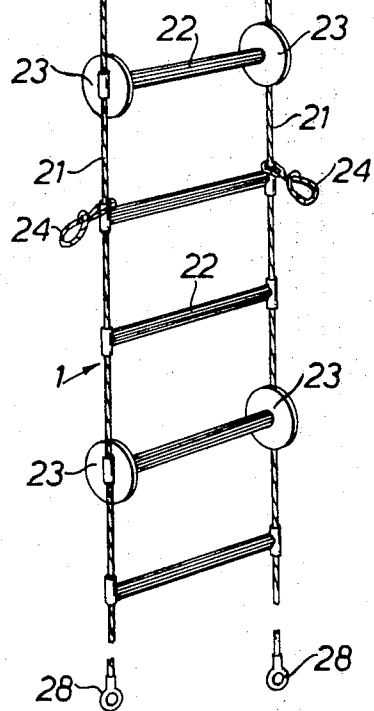
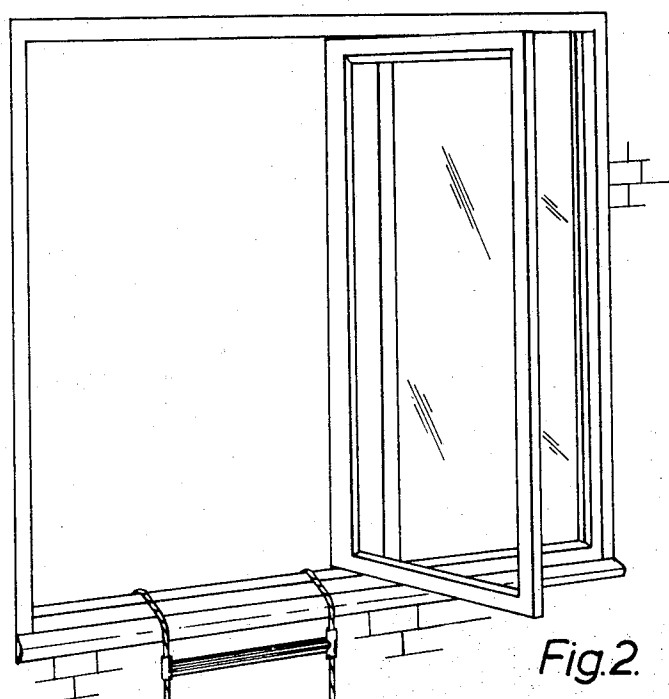
ABSTRACT

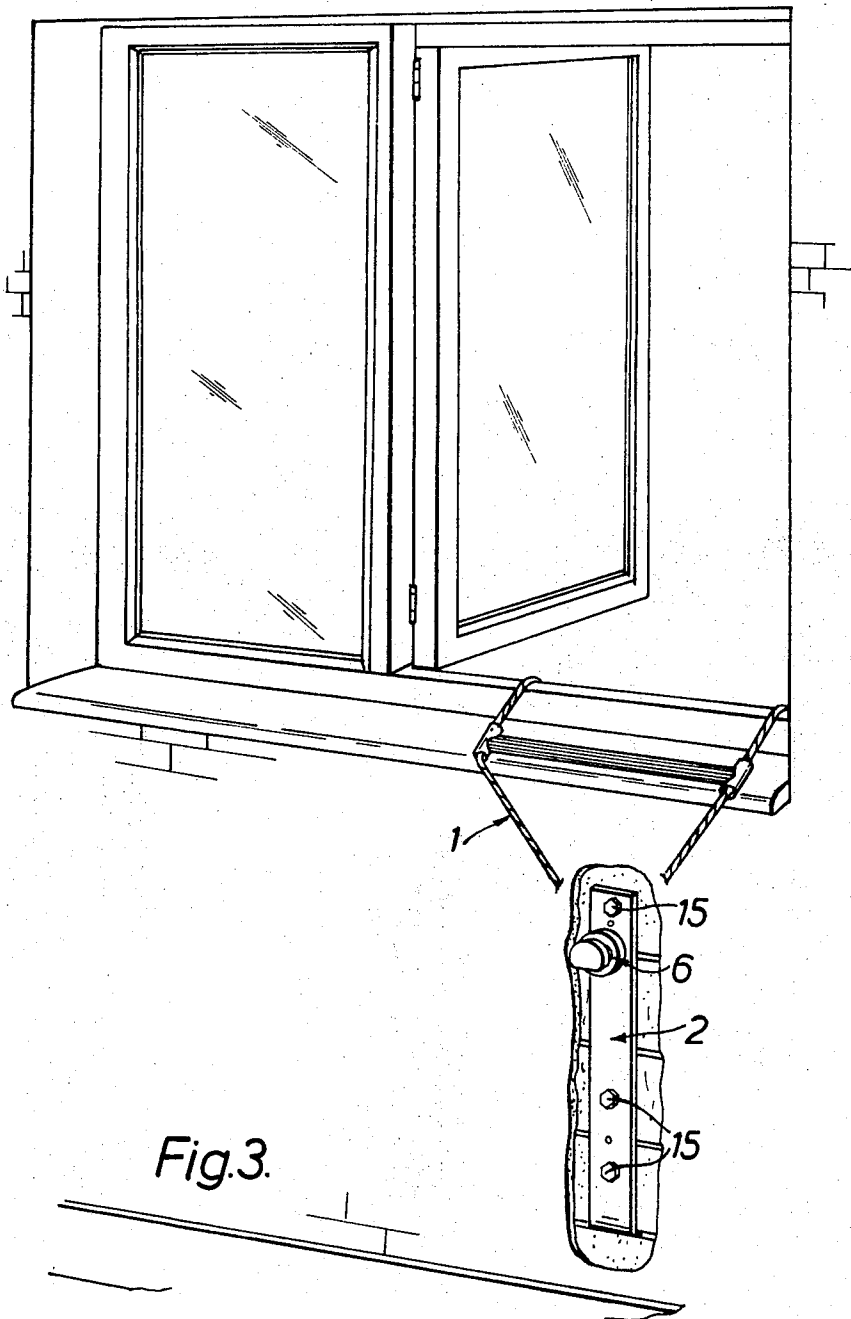
Fire escape apparatus comprising a flexible ladder having an apertured plate at one end and a wallplate for mounting permanently on the internal surface of an outside wall of a building below a window or other suitable opening. The wall plate has a post extending normal to the plate, on which post the apertured plate is hooked and the ladder thrown over the window sill and allowed to hang down the outside of the building. Spacer discs space the ladder away from the wall and self-tightening straps capable of being slipped over wrists are provided on the ladder. The ladder stiles are of steel wire or chain.

3 Claims, 11 Drawing Figures









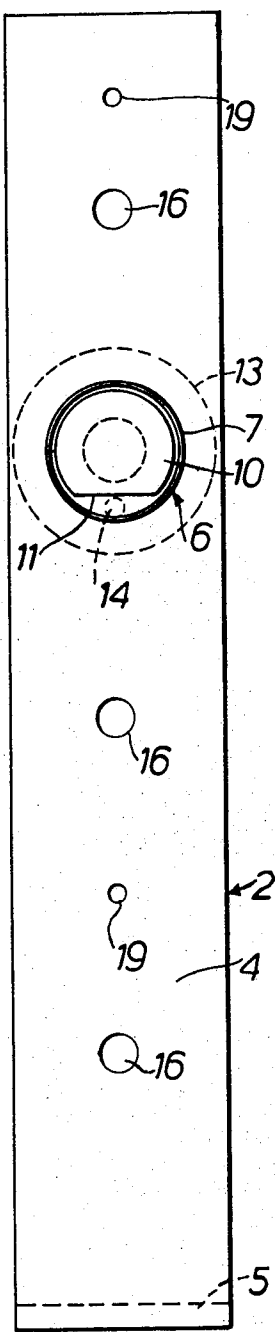


Fig. 5.

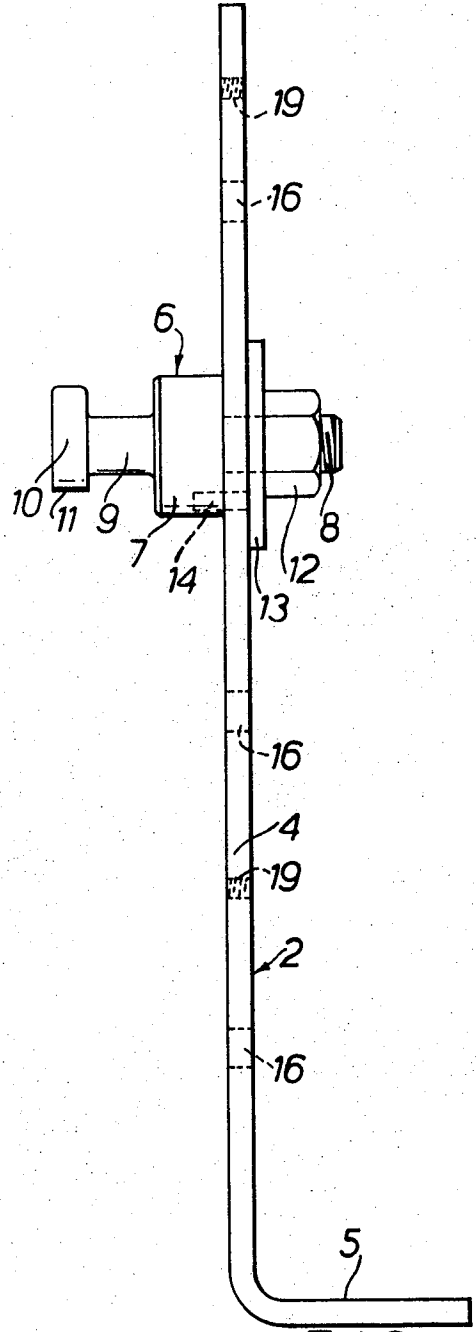


Fig. 6.

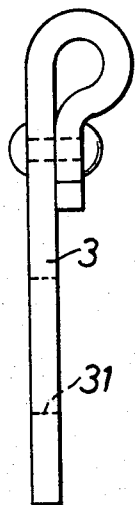


Fig. 7.

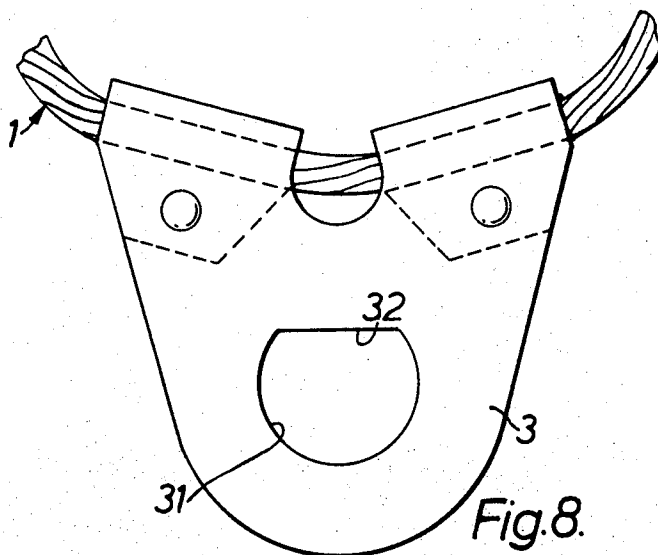


Fig. 8.

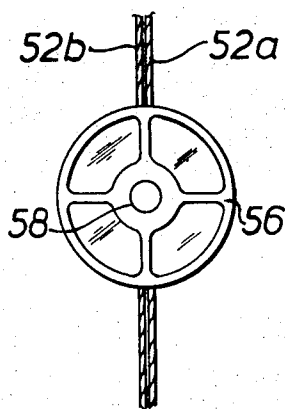


Fig. 10.

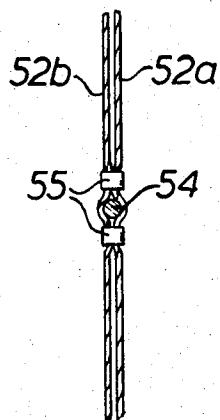
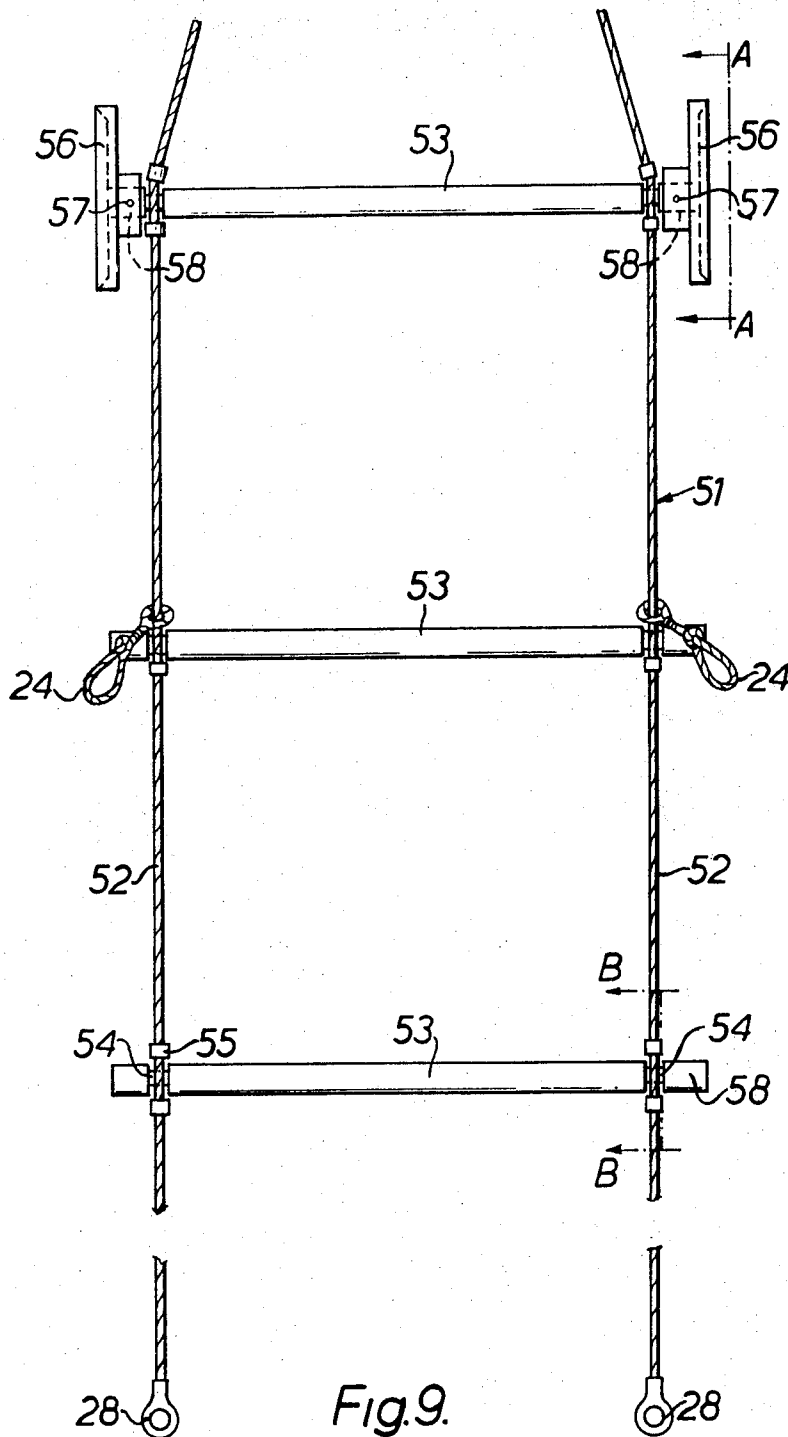


Fig. 11.



FIRE ESCAPE APPARATUS

BACKGROUND OF THE INVENTION

This invention relates to fire escape apparatus incorporating a flexible ladder.

Proposals have been made hitherto to install such fire escape apparatus permanently adjacent selected windows in multi-storied buildings, such as factories, blocks of flats and blocks of offices. In such permanently installed apparatus, the ladder, which is folded or rolled when not in use, has one end anchored to, for example, the wall immediately beneath the window. To make use of the apparatus, the ladder is thrown from the window and unfolds or unrolls as it descends.

It is an object of the present invention to provide fire escape apparatus incorporating a portable flexible ladder which, when required to be used, is readily secured in position at any window provided with a simple fitting, with a minimum of thought on the part of the user.

SUMMARY OF THE INVENTION

According to the present invention there is provided fire escape apparatus comprising a flexible ladder and securing means for securing one end of the ladder to a wall of a building, the securing means including a wall member adapted to be permanently mounted on the wall.

Further according to the present invention there is provided fire escape apparatus comprising a flexible ladder and spacer discs secured to the ends of each rung or selected rungs whereby in use the ladder is spaced from the wall of the building no matter which major face of the ladder faces the wall.

It will be appreciated that, in general, persons who will make use of this fire escape apparatus will have had little or no practice in descending a flexible ladder. Owing to the effect of the ladder swinging to and fro beneath him, and possibly a fear of heights if a ladder is installed at a very high window, a person using a flexible ladder for the first time may find himself incapable of descending more than a short distance. Furthermore, if a ladder is inadvertently used to make a descent from a higher which is higher than that for which the ladder is intended, the lower end of the ladder may be some distance from the ground. A person using the ladder may, therefore, be unable to descend fully to the ground. Unless skilled assistance is readily available, the person may become unconscious and fall from the ladder. Therefore, according to a preferred feature of the present invention, there is secured to the ladder at least one self-tightening strap capable of being slipped over a wrist.

BRIEF DESCRIPTION OF THE DRAWINGS

Embodiments of the invention will now be described by way of example with reference to the accompanying drawings, in which:

FIGS. 1 to 3 show fire escape apparatus in position on a wall ready for use,

FIG. 3 being a view similar to FIG. 1 with parts removed or broken away to show detail;

FIG. 4 is a detail view, to a larger scale, of a self tightening safety strap;

FIGS. 5 and 6 are, respectively, front and side elevations of a wall plate;

FIGS. 7 and 8 are, respectively, side and front elevations of a ladder securing plate; and

FIGS. 9 to 11 show an alternative construction of a flexible ladder for use in the fire escape apparatus,

FIG. 10 being a side elevation on line A—A of FIG. 9 and

FIG. 11 being a section on line B—B of FIG. 9.

DESCRIPTION OF PREFERRED EMBODIMENTS

As shown in FIGS. 1 to 3, the fire escape apparatus comprises essentially a flexible ladder 1, a wall plate 2, and a securing plate 3 for securing the ladder 1 to the wall plate 2.

The wall plate 2, which could conveniently be made of $\frac{1}{4}$ inch thick galvanised mild steel plate, is shown in detail in FIGS. 5 and 6 and comprises a main portion 4 and a return portion 5. The main portion 4 has a post 6 secured thereto extending normal to the portion 4 and comprising a base 7, a threaded shank 8, a portion 9 of reduced diameter compared to the base 7 and a knob or stop 10 having a flat 11. On assembly of the wall plate 2, the threaded shank 8 of the post is passed through a hole in the main portion 4 and the post secured in position by means of a self-locking nut 12 and a washer 13, with the flat 11 towards the return portion 5. A dowel pin 14 projecting from the base 7 locates in a corresponding hole in the main portion 4 and ensures that the flat 11 is always in this position.

As shown in FIG. 3, the wall plate 2 is mounted on the internal surface of an outside wall of a building below a window or other opening by means of bolts 15 passing through holes 16 in the wall plate. The return portion 5 of the plate is located and grouted in-between courses of bricks. A cover plate 17 is secured return the wall plate 2 by means of screws 18 (FIG. 1) engaging in threaded holes 19 in the wall plate. The stop 10 and the portion 9 project through the cover plate and for aesthetic reasons the stop at least could be chromium plated. The cover plate 17 would be removable for inspection purposes by the appropriate authorities. Wall plates complete with cover plates would be mounted in appropriate positions throughout the upper floors of the building.

The flexible ladder 1 has two stiles 21 formed from a single length of rope, preferably steel wire rope, in the form of a loop, the stiles being linked at intervals by rungs 22 formed from metal tubing. Secured to the ends of each rung or selected rungs is a spacer disc 23 of metal, wood, plastics or any other suitable material, which is intended to space the ladder in use from the side of the building.

As shown in FIGS. 2 and 4, supported from the stiles 21 between selected pairs of adjacent rungs are self-tightening straps 24. The vertical spacing between adjacent straps is preferably no greater than the height of the average person, the spacing being, say, about 5 feet. By "self-tightening" is meant any strap formed from leather, cord, plastics or other suitable material, of circular, substantially flat or other suitable cross-section, and which is formed to define a running loop which will tend to tighten on a load being applied to it.

The self-tightening straps may be in the form shown in FIG. 4, consisting of a plain cord having a ring at each end, the ring 25 being of a size to pass through the ring 26 so as to form a running loop 27. The cord is sufficiently stiff to prevent the loop 27 running entirely through the ring 26.

The ring 25 is secured to the stiles of the ladder either before or after the assembly of the ladder. In the latter case, the ring 25 is in the form of a clip.

In use, a person on the ladder who is unable to descend further, or for any reason requires additional support, may slip a pair of straps over his wrists. If he should lose consciousness and begin to fall, these straps will tighten about his wrists to hold him on the ladder until such time as he can be rescued.

As shown in FIGS. 1, 7 and 8, the securing plate 3, which could conveniently be made from 3/16 inch thick mild steel, cadmium plated, is secured to the ladder 1 midlength of the rope, i.e. at that end of the ladder constituting the upper end from which it is suspended from the wall plate 2 when the ladder is required for use. The plate 3 has an aperture 31 shaped corresponding to and slightly larger than the cross-section of the stop 10 on the post 6, and to secure the ladder 1 to the wall plate 2 it is a simple matter to slip the securing plate 3 over the stop 10 by aligning flat surface 32 of the plate 3 with the flat 11 on the stop 10. When the plate reaches the portion 9 of the post, the plate is rotated about the post through 180° and the ladder passed up and over the window sill and allowed to hang down the outside of the building. The ladder cannot become unfastened from the wall plate, by design or accident, until the ladder is at least partially withdrawn into the building and the plate 3 rotated through 180°.

It will be noted that the ladder is "universal" inasmuch as no matter which way round the securing plate 3 is passed over the stop 19, the discs 23 ensure that the ladder is spaced from the wall of the building.

FIGS. 9 to 11 show an alternative construction of a flexible ladder 51 for use in the fire escape apparatus in which each stile 52 comprises two steel wires 52a and 52b. The stiles 52 are linked together at intervals by rungs 53 each rung having two knecded portions 54 about which the wires 52a, 52b are secured by clips 55, as seen in detail in FIG. 11. A cast metal spacer disc 56 is secured by a pin 57 to the projecting ends 58 of each rung 53 or selected rungs, to space the ladder in use from the side of a building no matter which way the ladder faces the building.

The ladder may be folded or rolled up onto a reel by means of eyelets 28 when not in use and ladders would be located at one or more strategic positions on each upper floor of the building. If a fire occurs, a ladder can be taken to the window most suited as an escape route and there secured in position as described above in an extremely short time, with the minimum of thought on the part of the user. Consequently, no more than a short instruction course is necessary for the occupants or staff of buildings where the apparatus is installed.

It will be apparent that various modifications and alternative constructions are possible. For example, chain provides a useful alternative to wire rope. Such a chain ladder comprises two stiles formed from a single length of chain or a single length of chain may be used for each stile. The stiles are linked at intervals by rungs in the form of rods passing through the links of the chain, stops being provided to prevent the stiles slipping off the ends of the rods or moving towards each other along the rods, i.e. the spacing of the stiles relative to the rungs is maintained. The stops are in the form of pins or rods passing transversely through the rungs, one pin or rod being located, as by welding for

example, to each side of a stile. Alternatively, large diameter washers welded to the rung are used, the diameter of the washers being such as to prevent the links of the chain passing over the washers.

To provide a flexible ladder that can be assembled and dismantled as required, at least the outermost stops on each rung can be in the form of spring loaded latches spring biased into an operative stop position, the arrangement being such as to allow a rung to be passed through a link while preventing withdrawal of the rung through the link unless the latch is depressed against spring bias.

The chain and the rungs may be of steel or plastics material such as nylon, or steel coated with such plastics materials. The ladder has spacer discs 23 or 56 and self-tightening straps 24 as described above.

I claim:

1. Fire escape apparatus comprising a flexible ladder and securing means for securing one end of said ladder to a wall of a building, said securing means comprising a wall member mounted on an internal surface of an outside wall of a building below a window opening and a post mounted perpendicular to said wall member and having a free end portion upstanding from the internal surface of the wall, said post having a stop of irregular cross-section at its free end portion, an apertured securing plate at said one end of said ladder, said securing plate aperture having a shape corresponding to the irregular cross-section of said stop whereby said plate can just pass over said stop in only one mutually aligned position of said stop and said aperture, said apertured plate then being rotatable with respect to said post into a position in which said stop prevents disconnection of said post and said plate, said position of said apertured plate being such that it is then convenient to pass said ladder over the window sill and out of the window to hang down the outside of the building, the stiles of said ladder being provided by a single continuous length of flexible material in the form of a loop, rungs connecting said stiles at spaced apart of said stiles intervals and spacer discs being secured to the ends of at least selective ones of said rungs whereby in use said ladder is spaced from the outside wall of the building no matter which major face of said ladder faces the wall.

2. Fire escape apparatus comprising a flexible ladder and securing means for securing one end of said ladder to a wall of a building, said securing means comprising a wall member mounted on an internal surface of an outside wall of a building below a window opening and a post mounted perpendicular to said wall member and having a free end portion upstanding from the internal surface of the wall, said post having a stop of irregular cross-section at its free end portion, an apertured securing plate at said one end of said ladder, said securing plate aperture having a shape corresponding to the irregular cross-section of said stop whereby said plate can just pass over said stop in only one mutually aligned position of said stop and said aperture, said apertured plate then being rotatable with respect to said post into a position in which said stop prevents disconnection of said post and said plate, said position of said apertured plate being such that it is then convenient to pass said ladder over the window sill and out of the window to hang down the building, the stiles of said ladder each being provided by chain, rungs in the form of rods passing through the links of said chain, at spaced apart intervals linking said stiles together, means being pro-

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vided to maintain the spacing of said stile relative to said rungs, and spacer discs being secured to the ends of at least selected ones of said rungs whereby in use said ladder is spaced from the outside wall of the building no matter which major face of said ladder faces the

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wall.

3. Apparatus as claimed in claim 1 wherein at least one self tightening loop is secured to said ladder of such a size to grip the wrist of a user of said ladder.

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