

[54] INDOOR ESCAPE DEVICE 876,354 1/1908 Houghton 182/81
[76] Inventor: Hiromitsu Naka, No. 39, Oaza 2,579,379 12/1951 Fritsche 49/505
Shinmachi, Yashio-shi, 3,807,528 4/1974 Frank 182/81
Saitama-ken, Japan

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Primary Examiner—Reinaldo P. Machado
Attorney, Agent, or Firm—Wenderoth, Lind & Ponack

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[51] Int. Cl. A62b 1/20
[58] Field of Search 182/77, 78, 81, 70, 100,
182/189; 52/200; 49/505

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[57] ABSTRACT
The present invention is directed to an indoor escape device which allows the evacuees to pass through a manhole in a slab by which two stories are separated, thereby escaping swiftly to a safety story or zone, one after another, without going from the indoors to the outdoors.

7 Claims, 8 Drawing Figures

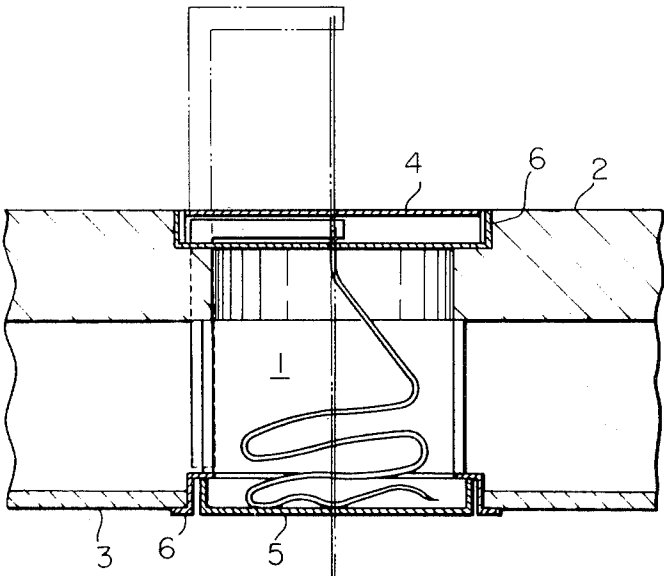


Fig. 1

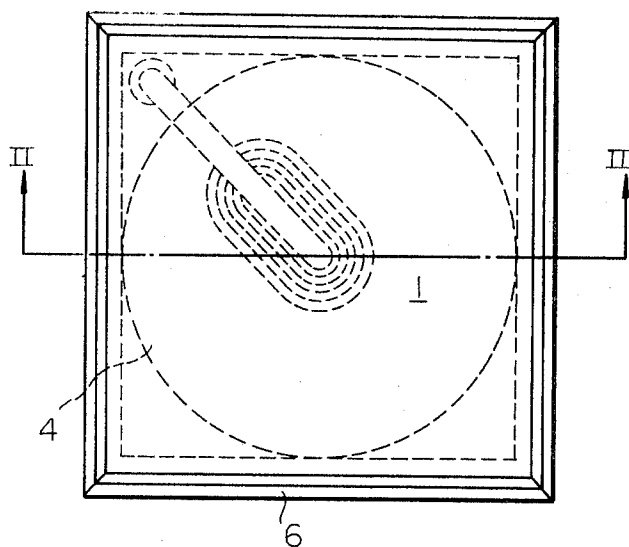


Fig. 2

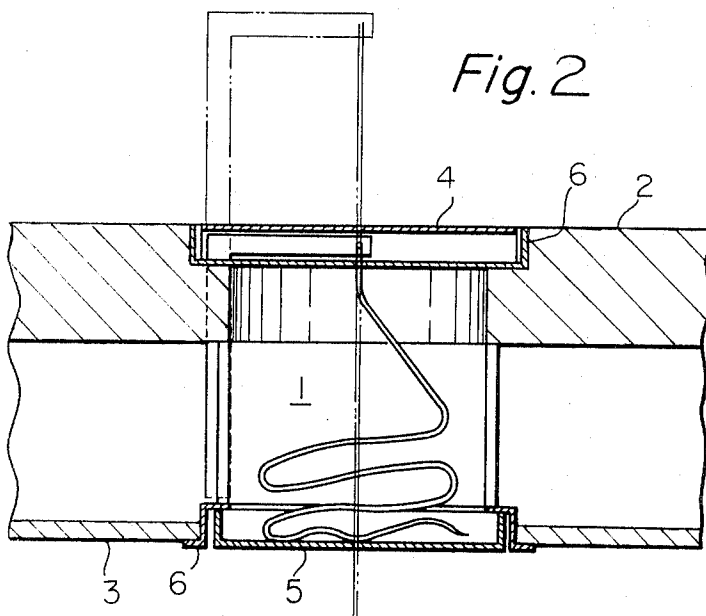


Fig. 3

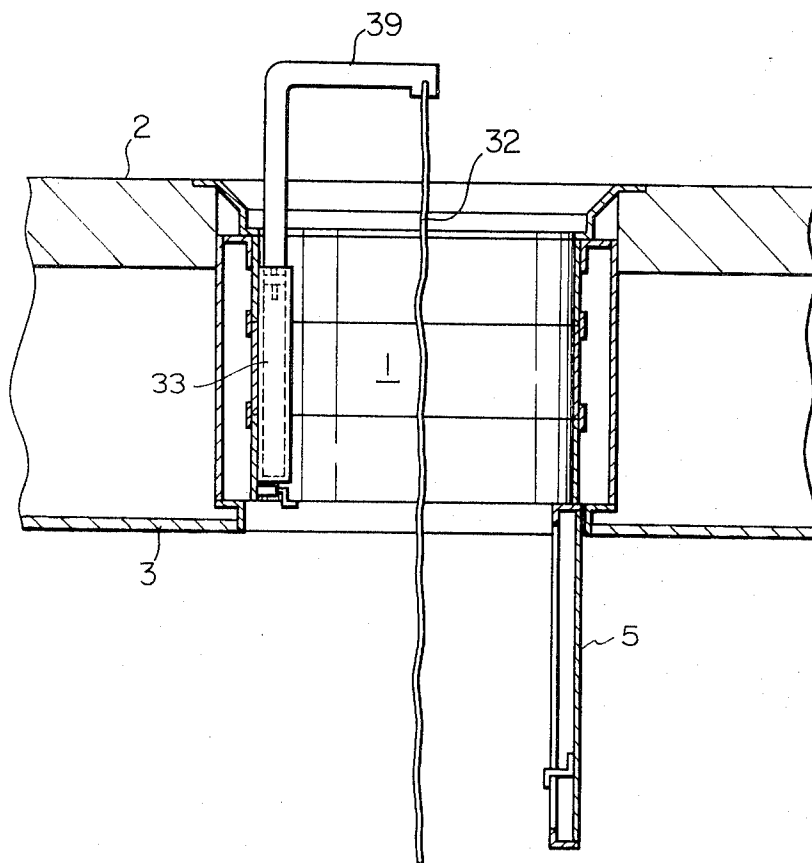


Fig. 4

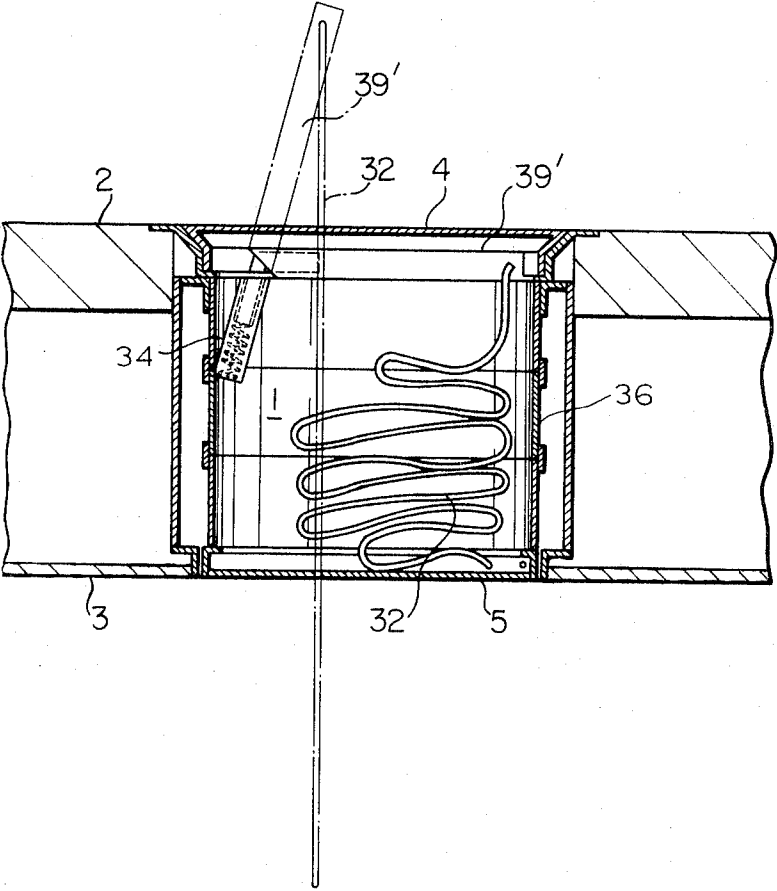


Fig. 5

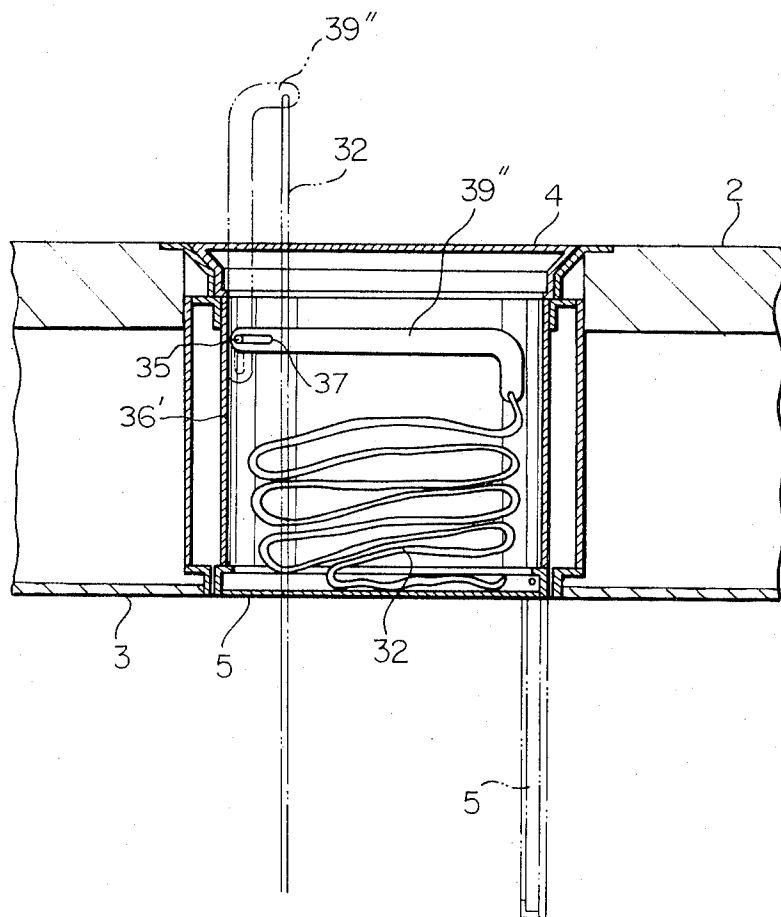


Fig. 6

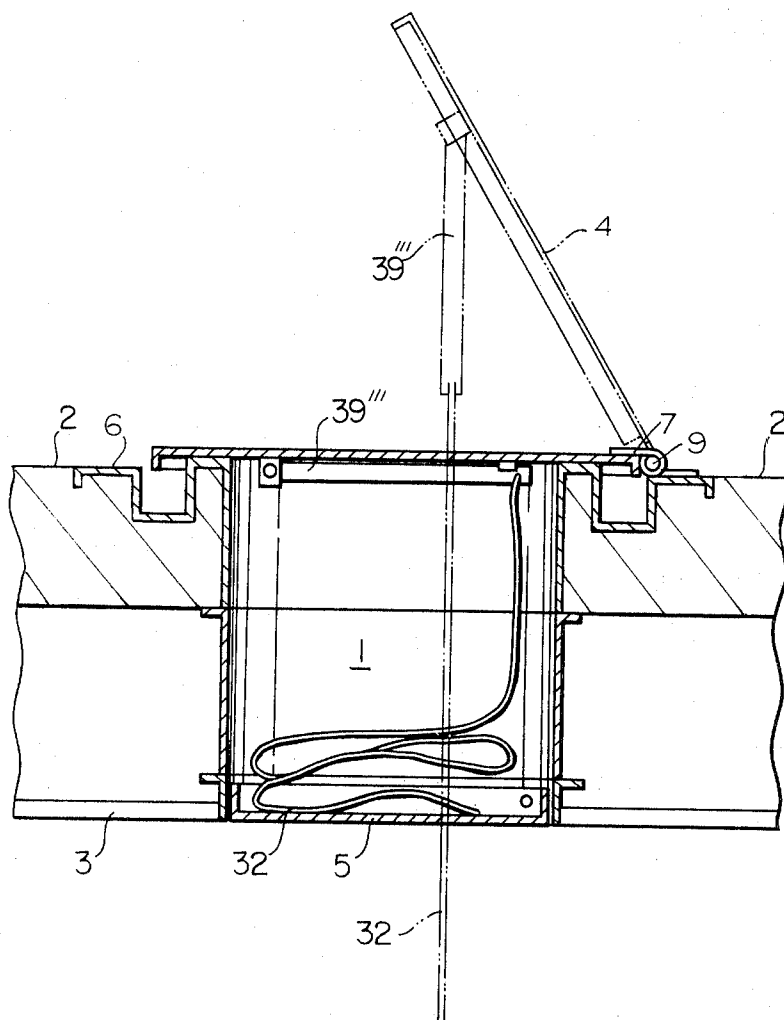


Fig. 7

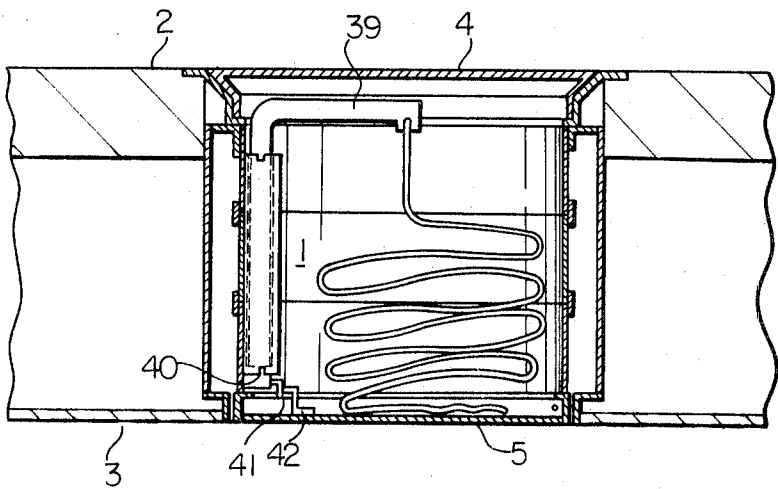
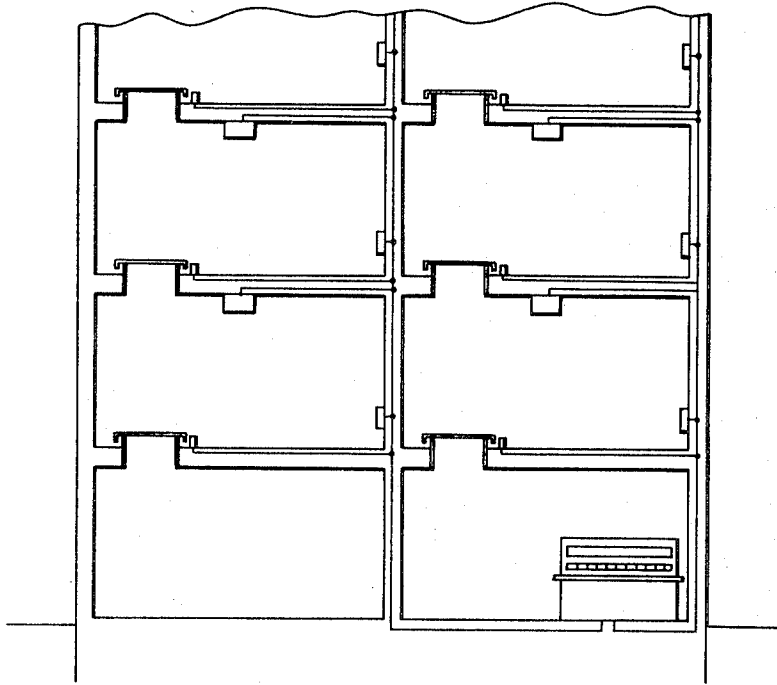


Fig. 8



INDOOR ESCAPE DEVICE

This application is a divisional application of applicant's copending application Ser. No. 124,034, filed Mar. 15, 1971.

BACKGROUND OF THE INVENTION

The present invention relates to an indoor escape device, and more particularly to an emergency installation which enables the evacuees to escape from dangers such as fire, smoke, gas, or water leakage, and ruffians.

The escape devices heretofore found best in buildings have been emergency stairs mounted on the external wall of the building, or an emergency rope, ladder, and chute or the like. No matter where the emergency stairs are located, in an emergency the evacuees who are in an area far away from the stairs have a hard time reaching them. Thus, in an emergency, the lives of evacuees who must go to the location where the stairs are positioned are jeopardized. If an emergency occurs in an area close to the stairs, it is even worse due to possible combination of unfavorable conditions, such as the interruption of electric current or the presence of smoke in addition to the instant accident. An emergency ladder or chute must be taken out from a housing or container mounted on the wall at the window, and, after seeing if the site is safe, hung out the window. This requires much time and trouble. Furthermore, if the building is extremely high and there are a large number of evacuees, the use of such ladder or chute is limited to the least extent.

The present invention involves a manhole provided in a slab between two stories or a single veranda slab to give easy access to the upper or lower story or floor, a shell received in the manhole, a cover member mounted on the manhole, an extensible elevating member arranged within or adjacent the manhole, not only for lowering, but also for lifting the evacuees.

The present invention is characterized in that the cover mounted on each of the slabs between the two stories is opened to stretch the elevating member from the manhole to the next floor, thereby allowing the evacuees to escape readily from danger.

According to the present invention, there is no need of massive installations, as for example, emergency stairs attached to the external wall of the building, and the arrangement may be provided in suitable numbers anywhere on the slab, floor, or the veranda of the building to improve emergency capability so that more evacuees can safely, readily, and quickly escape to a safety zone or another floor, in contrast to the prior art in which the emergency exit is limited. In addition, in accordance with the present invention, the evacuees can escape from danger within the building by promptly pulling down a shutter to prevent a fire blaze or smoke from spreading without requiring any care-taker or watchman.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other objects and advantages of the invention will be apparent from the following description and accompanying drawings, in which:

FIG. 1 is a plan view of one form of each of the ceiling and floor cover members and a manhole through the floor or ceiling;

FIG. 2 is a view in vertical section taken along the line II—II of FIG. 1, showing sections of the floor and ceiling slabs;

FIGS. 3 to 6 are sectional views of the floor and ceiling incorporating various embodiments of the invention in which extensible elevating members depend from a stator provided in the manhole;

FIG. 7 is a sectional view of the manhole slab incorporating an additional embodiment of the invention in which the cover member disposed in the ceiling member is adapted to be opened by operation of the elevating member; and

FIG. 8 is a schematic view showing the total escape arrangement which further includes a locking device, alarm device, fire alarm, and fire or smoke sensor.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to FIGS. 1 through 7, numeral 1 is a manhole which is bored through a floor slab 2 or a ceiling slab 3 disposed thereunder, and any number of which may be provided at any place, as desired, for instance a corridor, room, or veranda. The slabs are bored so that the openings 1 are in alignment with each other, whereby the evacuees can escape from danger to the other story without going outdoors.

A cover member 4 is pivotally mounted (FIG. 6) on the floor slab 2 by suitable means such as a hinge 7 or the like at a pivot axis 9 so as to cover the manhole 1 on which a flanged frame 6 is mounted. Similarly, a cover member 5 is also hingedly mounted on the ceiling slab 3 so as to cover the manhole 1 on which a flanged frame 8 is mounted.

In FIGS. 2 to 4 and 7, the floor cover member 4 is adapted to be in a plane coplanar to the surface of the floor 2 and is mounted within the flanged frame 6 over the manhole 1. In addition, a handle can be provided to engage a lock shaft and both can be embedded within the cover member at its corner when it is not in use. As a result, the cover member is prevented from being opened, unless an emergency arises. This arrangement and various other advantageous features which can be used with the instant invention are more clearly described in applicant's copending application Ser. No. 124,034.

Referring to FIGS. 1 and 2, the cover member for both the floor and the ceiling and the flanged frame are square shaped, while the manhole in the floor and the ceiling is circularly shaped. In order to receive a square cover member, it is necessary to provide a corresponding square recess for the floor, the side of the square recess being equal to the diameter of the circular manhole. As shown, this arrangement provides a step portion so that it is convenient for the evacuee when passing through the manhole. The circular manhole is preferable to the square manhole, since it economizes space with the same effective area and facilitates the action of the evacuee.

As described in copending application Ser. No. 124,034, a shell means can be received in the manhole 1 in the floor and ceiling slab to cover them and partition off the space between the slabs so as to reduce the evacuee's fear, and thus facilitate his actions. This shell can take on a variety of forms such as a plurality of frames coupled to one another to form a unitary shell, or the shell could be formed of a corrugated metal, plastic sheet, or elastic sheet, so that its length can be

adjusted in accordance with the distance between the slabs.

In addition, a coating material, such as fireproofing material or heat-resisting material, can be coated on the external or internal surface of the shell to protect the evacuee against fire or smoke, if the flames spread. Furthermore, the shell could be provided with a buffer member integral therewith to protect the evacuee from scratches and bumps when he is escaping through the manhole.

Various forms of guide means 32 for leading the evacuee from one story to another are shown in the above mentioned copending application. These are all adapted to be extensible and collapsible in use and non-use, and most are received in the space between the cover members 4 and 5.

FIGS. 3-7 show embodiments wherein a slidable or rotatable bar is provided under the cover member to hang the guide means such as a rope 32 therefrom. As can be seen in FIG. 3, an L-shaped rod 39 is provided which, when not in use, fits in the space between the covers 4 and 5, the vertical section of the bar being held by bracket 33. For use, the bar is lifted and is held in the upright position by a known locking means.

In the embodiment shown in FIG. 4, when the bar 39' is pivoted vertically, a spring loaded extension 34 engages the wall of the shell 36 and, as a result, supports the bar 39' in the upright position so as to locate part of the bar 39' outside of the shell 36.

To use the embodiment of FIG. 5, the L-shaped guide rod 39'' is vertically pivoted about pivot 35. When the rod is in the vertical position, as shown by the broken lines, the elongated slot 37 allows it to move slightly downward as the slot moves over the pivot 35. The rod 39'' is then held in this position by the pivot 35 and the wall 36', as shown.

In FIG. 6, the bar 39''' is mounted parallel to the cover member 4 and is adapted to hang vertically when the cover member is opened.

The rod 39, shown in FIG. 7, is similar to that shown in FIG. 3, but is adapted to open the ceiling cover member 4 when it is operated. A projection 40 is mounted at the lower end of the rod and is received in an elastic tongue 41 which engages a retainer 42 mounted on the cover member 5, so that if the rod is actuated, thus allowing the projection 40 to move away from the tongue 41, the cover member 5 is opened upon disengagement of the tongue with the retainer.

The indoor escape system may be required to include many types of control means, as shown in FIG. 8, such as a locking device for maintaining closure of the cover member, alarm device, fire alarm, fire or smoke alarm, and any type of electric device electrically connected to a power board in a control room of the building. The alarm device and electric device provide functions, such as promptly giving alarm and/or warning for fire or smoke occurring in a control room or zones other than the area suffering from an accident in the building and/or disengaging said escape unit from its locking engagement by means of a control board in said control room.

It is to be understood that the embodiments of the invention which have been described are merely illustrative of the principles of the invention. Numerous modifications and changes may be made without departing from the true spirit and scope of the invention.

What is claimed is:

1. An escape system to be positioned between the floor of one story of a building and the ceiling of a story below the first mentioned story, said system comprising:

5 an escape means including a first frame means adapted to be positioned at one end of a hole formed between a slab of the floor of said one story and the slab of the ceiling of said story below said first mentioned story, and a second frame means adapted to be positioned at the other end of said hole;

10 a shell means extending between said first and said second frame means forming an escape passage for an evacuee;

15 a cover member positioned over at least one of said frames for closing the hole when the system is not in use;

an escape device secured adjacent said escape means, said escape device comprising an adjustable guide rod means; and

20 an escape unit connected to one end of said guide rod, said escape unit being adapted to extend through at least part of said shell means when said cover member is open for use by the evacuee in passing through said escape means.

25 2. An escape system as claimed in claim 1 wherein said adjustable guide rod means comprises a bracket mounted on said shell means and an L-shaped guide rod, one end of said guide rod being adapted to be adjustably positioned within said bracket.

30 3. An escape system as claimed in claim 1 wherein said adjustable guide rod means comprises a pivotally mounted guide rod having a spring loaded extension thereon, said guide rod being adapted to be pivoted from a position entirely within said escape passage to a position wherein at least part of said guide rod is located outside of said escape passage.

35 4. An escape system as claimed in claim 1 wherein said adjustable guide rod means comprises an L-shaped guide rod having an elongated slot adjacent one end thereof, and a pivot means fixedly mounted within said escape passage, said guide rod being adapted to pivot about said pivot point and to move vertically with respect thereto when said guide rod is moved into its operative position.

40 5. An escape system as claimed in claim 1 wherein said adjustable guide means comprises a guide rod pivotally connected to said cover member.

45 6. An escape system as claimed in claim 2 wherein each of said frames has a cover member positioned thereover, and wherein said guide rod includes means for opening the ceiling cover member.

50 7. An escape system for use in a multi-story building comprising a plurality of escape means adapted to be positioned between the floor and ceiling of each of at least the majority of said stories, each of said escape means including a first frame means adapted to be positioned in a hole in the floor of one story and a second frame means adapted to be positioned at the other end of said hole in the ceiling of the story below said first-mentioned story, a shell means extending between said first and said second frame means forming an escape passage for an evacuee, a cover member positioned over at least one of said frames for closing the hole when the system is not in use, an escape device secured adjacent said escape means, said escape device comprising an adjustable guide rod means and an escape unit connected to one end of said guide rod, said escape unit being adapted to extend through at least part of said shell means when said cover member is open for use by the evacuee in passing through said escape means.

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