

Escape Device for Multistory Buildings

Background of the Invention

1. Field of the Invention

The present invention relates to an escape device for multistory buildings.

2. Description of the Related Art

Multistory buildings arise in cities as a result of limited space. Escape device is important for people in a building when fire occurs. Figs. 5 and 6 of the drawings illustrate a conventional escape device for buildings. The escape device 1 includes a gearbox 11 having an axle 111 mounted therein. A rope 12 is wound around the axle 111. When fire occurs, a user grasps the rope 12 and descends by gravity. The descending speed is reduced by means of frictional engagement between a gear 112 on the axle 111 and another gear 113, thereby allowing the user to descend slowly. Nevertheless, the situation is dangerous to the user if the rope flames. Friction between the gears might be insufficient to a heavy user. In addition, the user feels dizzy and uncomfortable when the rope swings in the air. Furthermore, re-use of the escape device is dangerous to next user if the rope is not coiled properly.

The present invention is intended to provide an escape device that mitigates and/or obviate the above problems.

Summary of the Invention

It is a primary object of the present invention to provide an improved escape device that provides reliable escape for users.

An escape device in accordance with the present invention comprises a stand, a shaft rotatably extended through the stand, a rod securely mounted to the stand and located above the shaft, a reel securely mounted to the shaft to rotate therewith, a brake drum coaxially mounted to the reel to rotate therewith, a brake shoe carrier having an upper end pivotally connected to the rod and a lower end, a brake shoe securely mounted to the brake shoe carrier and in friction contact with the brake drum, a metal strip wound around the reel and having a

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free end that winds around the lower end of the brake shoe carrier, and an escape carrier connected to the free end of the metal strip.

Descending speed of the escape carrier and a user in the escape carrier is reduced under frictional engagement between the brake shoe and the brake drum.

An electric motor with a reduction means or a handle may be provided for driving the shaft. A pressure roller may be extended from the rod and means may be provided for biasing the pressure roller to exert a radial force to the metal strip, thereby reducing outward dispensing speed of the metal strip.

In a preferred embodiment of the invention, an escape device comprises:

- at least two juxtaposed stands each having two side walls,

- a shaft rotatably extended through the side walls of each said stand,

- a rod securely mounted between the side walls of each said stand and located above the shaft,

- a corresponding number of reels securely mounted to the shaft to rotate therewith, each said reel being located below an associated said rod,

- a brake drum coaxially mounted to each said reel to rotate therewith,

- a corresponding number of brake shoe carriers each having an upper end pivotally connected to the associated rod and a lower end,

- a brake shoe securely mounted to each said brake shoe carrier and in friction contact with an associated said brake drum,

- a metal strip wound around each said reel and having a free end that winds around the lower end of the associated brake shoe carrier, and

- an escape carrier connected to the free ends of the metal strips,

whereby descending speed of the escape carrier and a user in the escape carrier is reduced under frictional engagement between the brake shoes and the brake drums.

In an embodiment of the invention, each brake shoe carrier is a U-shape member having two limbs and a mediate section. The limbs are pivotally connected to the associated rod, and

the free end of each metal strip winds around the mediate section of the associated U-shape member. Each limb of each U-shape member includes an associated brake shoe securely mounted thereon for frictional engagement with the associated brake drum.

Other objects, advantages, and novel features of the invention will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings.

Brief Description of the Drawings

Fig. 1 is a perspective view of an escape device in accordance with the present invention;

Fig. 2 is a front view, partly sectioned, of the escape device in accordance with the present invention;

Fig. 3 is a sectional view of the escape device in accordance with the present invention;

Fig. 4 is a sectional view similar to Fig. 3, illustrating braking of the escape device;

Fig. 5 is a sectional view of a conventional escape device; and

Fig. 6 is a sectional view taken along line 6-6 in Fig. 5.

Detailed Description of the Preferred Embodiment

Referring to Figs. 1 through 4 and initially to Figs. 1 and 2, an escape device 2 in accordance with the present invention generally includes a power means 21 and at least two stands 22. The power means 21 includes a motor 211 and a shaft 213. The motor 211 may be empowered to drive the shaft 213 by a power source, e.g., a battery unit 214. A reduction means 210 may be provided to reduce speed of the shaft 213. Alternatively, a handle 212 may be attached to the shaft 213 for manually driving the shaft 213.

Each stand 22 includes two side walls 23, and a rod 24 connected between upper ends of the side walls 23. The shaft 213 is rotatably extended through the side walls 23 of each stand 22, best shown in Fig. 2. Two reels 25 are mounted to the shaft 213 to rotate therewith and located below the rods 24, respectively. Each reel 25 has a metal strip 251 wound therearound. An escape carrier 28 is attached to free ends of the metal strips 251 by chains (not labeled). A

brake drum 26 with a rugged outer periphery (not labeled) is coaxially mounted to each reel 25 to rotate therewith.

Referring to Figs. 2 and 3, a pressure roller 241 is mounted below each rod 24 and biased by springs (not labeled) to provide a radial force to the metal strip 251, thereby retarding outward dispensing speed of the metal strip 251.

Each stand 22 further includes a substantially U-shape member 27 (brake shoe carrier) with two limbs 271 pivotally connected to an associated rod 24. A brake shoe 272 is provided on at least one of the limbs 271 for frictional engagement with the brake drum 26. A mediate section of the member 27 that interconnects the limbs 271 forms a bearing rod 273 around which the free end of the associated metal strip 251 is wound, best shown in Fig. 3.

Referring to Figs. 3 and 4, when a user enters the escape carrier 28 for escape, the shaft 213 is rotated by the motor 211 or the handle 212. The motor 211 may also be activated by remote control. Alternatively, the shaft 213 may be rotated under action of gravitational force of the escape carrier 28 and the user. Descending of the escape carrier 28 will be more stable if more than one stands 22 is provided. The downward force as a result of the weight of the escape carrier 28 and the user is imparted into a vertical force and a horizontal force and thus urges the limbs 271 to approach the brake drums 26. Thus, the brake shoes 272 engage with the brake drums 26 to reduce rotational speed of the brake drums 26 as well as the reels 25. As a result, outward dispensing speed of the metal strips 251 that carry the escape carrier 28 and the user is reduced, thereby reducing the descending speed of the escape carrier 28 and the user. Users of different weights may cause different braking effects between the brake drums 26 and the brake shoes 272, thereby reducing risk to the users. The metal strips 251 are coiled back to the reels 25 by means of activating the motor 211 or operating the handle 212 to thereby lift the escape carrier 28 upward for next user.

The metal strip 251 is made of heat-resistant material. Temperature rise in the metal strip 251 as a result of heat conduction is insufficient to cause injury to the user, as the time for escape is relatively short. Re-coiling of the metal strip 251 can be easily achieved for next use.

Descending of the escape carrier 28 is stable and slow under the braking effect between the brake shoes 27 and the brake drums 26. The descending of the escape carrier 28 is more stable if more stands 22 are provided. Nevertheless, a single stand 22 is sufficient to provide the required escape function. The braking effect between the brake shoes 27 and the brake drums 26 changes in response to users of different weights.

Although the invention has been explained in relation to its preferred embodiment, it is to be understood that many other possible modifications and variations can be made without departing from the spirit and scope of the invention as hereinafter claimed.

**What is claimed is:****1. An escape device comprising:**

- a stand,
- a shaft rotatably extended through the stand,
- a rod securely mounted to the stand and located above the shaft,
- a reel securely mounted to the shaft to rotate therewith,
- a brake drum coaxially mounted to the reel to rotate therewith,
- a brake shoe carrier having an upper end pivotally connected to the rod and a lower end,
- a brake shoe securely mounted to the brake shoe carrier and in friction contact with the brake drum,
- a metal strip wound around the reel and having a free end that winds around the lower end of the brake shoe carrier, and
- an escape carrier connected to the free end of the metal strip,

whereby descending speed of the escape carrier and a user in the escape carrier is reduced under frictional engagement between the brake shoe and the brake drum.

2. The escape device as claimed in claim 1, further comprising an electric motor for driving the shaft.**3. The escape device as claimed in claim 2, further comprising a reduction means for reducing rotational speed of the shaft.****4. The escape device as claimed in claim 1, further comprising a handle attached to the shaft for manually driving the shaft.****5. The escape device as claimed in claim 1, further comprising a pressure roller extended from the rod and means for biasing the pressure roller to exert a radial force to the metal strip, thereby reducing outward dispensing speed of the metal strip.****6. An escape device comprising:**

- at least two juxtaposed stands each having two side walls,
- a shaft rotatably extended through the side walls of each said stand,



a rod securely mounted between the side walls of each said stand and located above the shaft,

a corresponding number of reels securely mounted to the shaft to rotate therewith, each said reel being located below an associated said rod,

a brake drum coaxially mounted to each said reel to rotate therewith,

a corresponding number of brake shoe carriers each having an upper end pivotally connected to the associated rod and a lower end,

a brake shoe securely mounted to each said brake shoe carrier and in friction contact with an associated said brake drum,

a metal strip wound around each said reel and having a free end that winds around the lower end of the associated brake shoe carrier, and

an escape carrier connected to the free ends of the metal strips,

whereby descending speed of the escape carrier and a user in the escape carrier is reduced under frictional engagement between the brake shoes and the brake drums.

7. The escape device as claimed in claim 6, further comprising an electric motor for driving the shaft.

8. The escape device as claimed in claim 7, further comprising a reduction means for reducing rotational speed of the shaft.

9. The escape device as claimed in claim 6, further comprising a handle attached to the shaft for manually driving the shaft.

10. The escape device as claimed in claim 6, further comprising a pressure roller extended from each said rod and means for biasing the pressure roller to exert a radial force to an associated metal strip, thereby reducing outward dispensing speed of the associated metal strip.

11. The escape device as claimed in claim 6, wherein each said brake shoe carrier is a U-shape member having two limbs and a mediate section, the limbs being pivotally connected to the



associated rod, and the free end of each said metal strip winding around the mediate section of the associated U-shape member.

12. The escape device as claimed in claim 11, wherein each said limb of each said U-shape member includes an associated said brake shoe securely mounted thereon for frictional engagement with the associated brake drum.