

[54] **EMERGENCY FIRE ESCAPE**

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182/70, 182/75, 188/189, 254/151, 254/156

[51] Int. Cl. **B66d 5/04**, A62b 1/10

[58] Field of Search 254/159, 157, 154, 151,
254/156; 182/75, 74, 42, 73, 70, 3; 188/189,
185, 184, 180; 294/102 A, 106; 24/132 R,
132 AT, 132 HA, 132 HL, 132 FE, 132 WL,
248 R, 248 E, 248 L, 248 CR, 248 ES, 248
SB, 248 SL, 249 R, 249 PP, 249 FP, 249
WL, 249 PC, 249 DP

[56] **References Cited**

UNITED STATES PATENTS

139,484 6/1873 Talpey 254/157

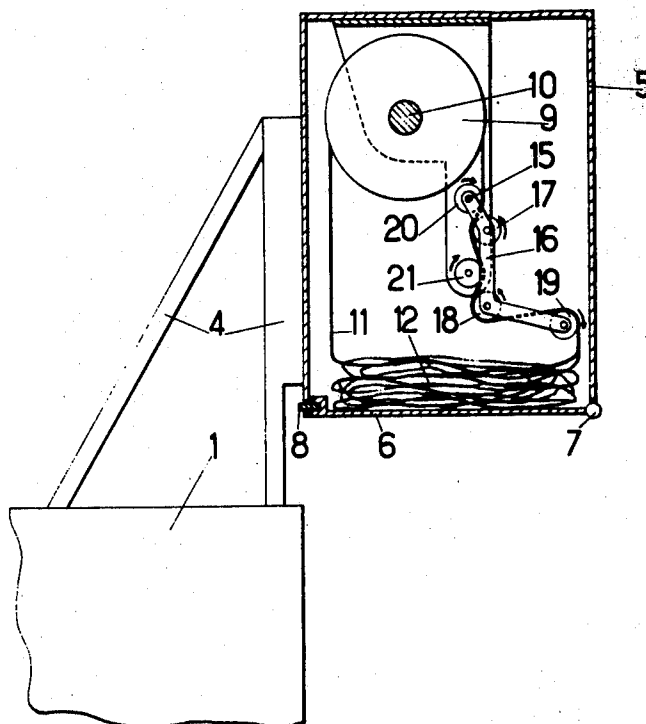
447,501	3/1891	Wilson.....	254/157
448,176	3/1891	Bullard.....	182/3
652,621	6/1900	Lepore.....	182/70
2,937,853	5/1960	Jackson.....	254/159

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[57] **ABSTRACT**

Safety device for evacuating persons from a building comprises box at top of building holding a pulley and an endless cord passing thereover. A door in the bottom of the box is opened by actuation of a remotely controlled latch, whereupon the lower part of the cord drops down so that a loop passing over the pulley at the top and near the ground at the bottom is formed adjacent the building wall. The movement of the cord over the pulley is braked so that a person grasping one length of the loop may travel safely to the ground. Special gripping means may be provided to assist one in grasping the cord.

11 Claims, 11 Drawing Figures



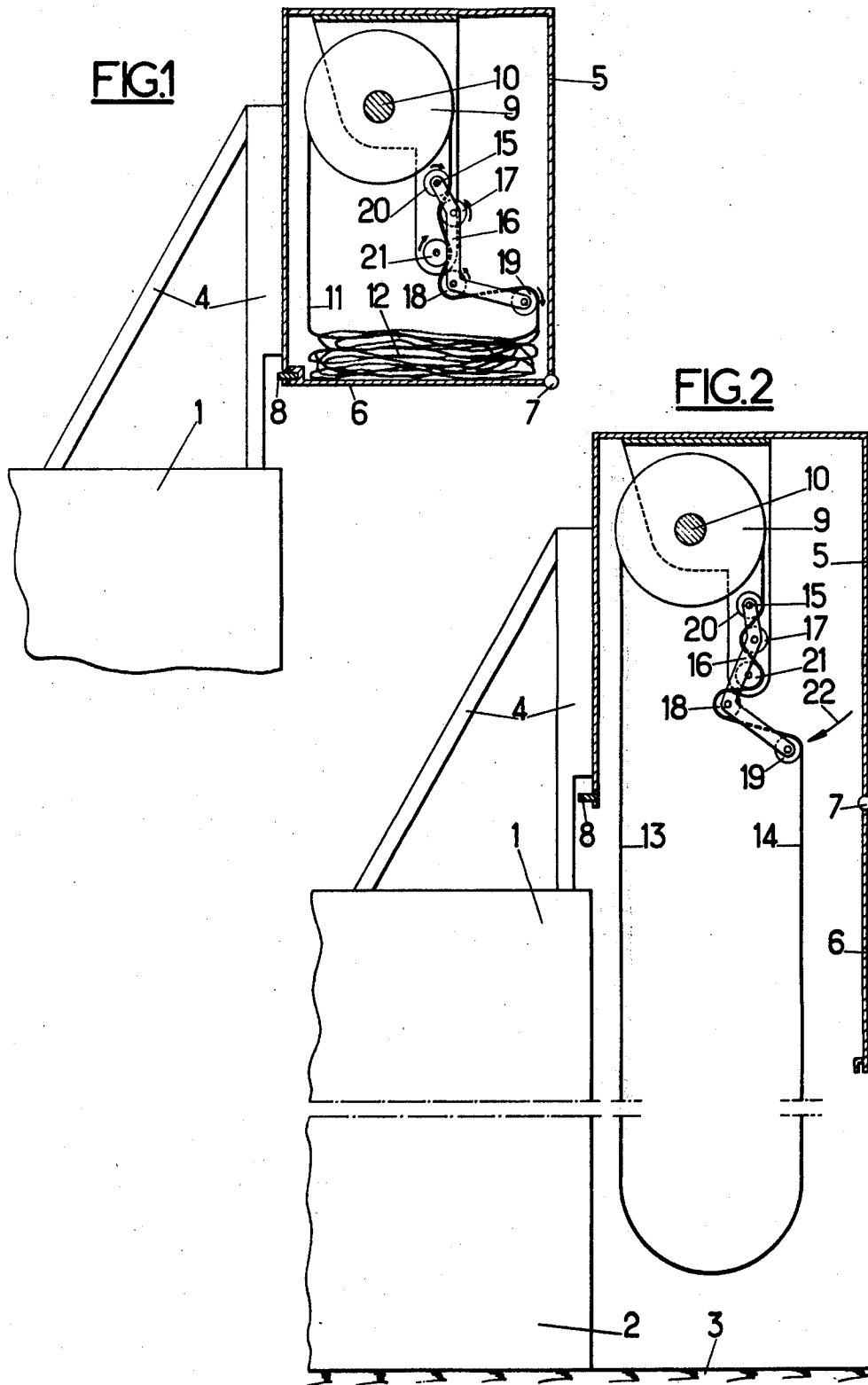


FIG.3

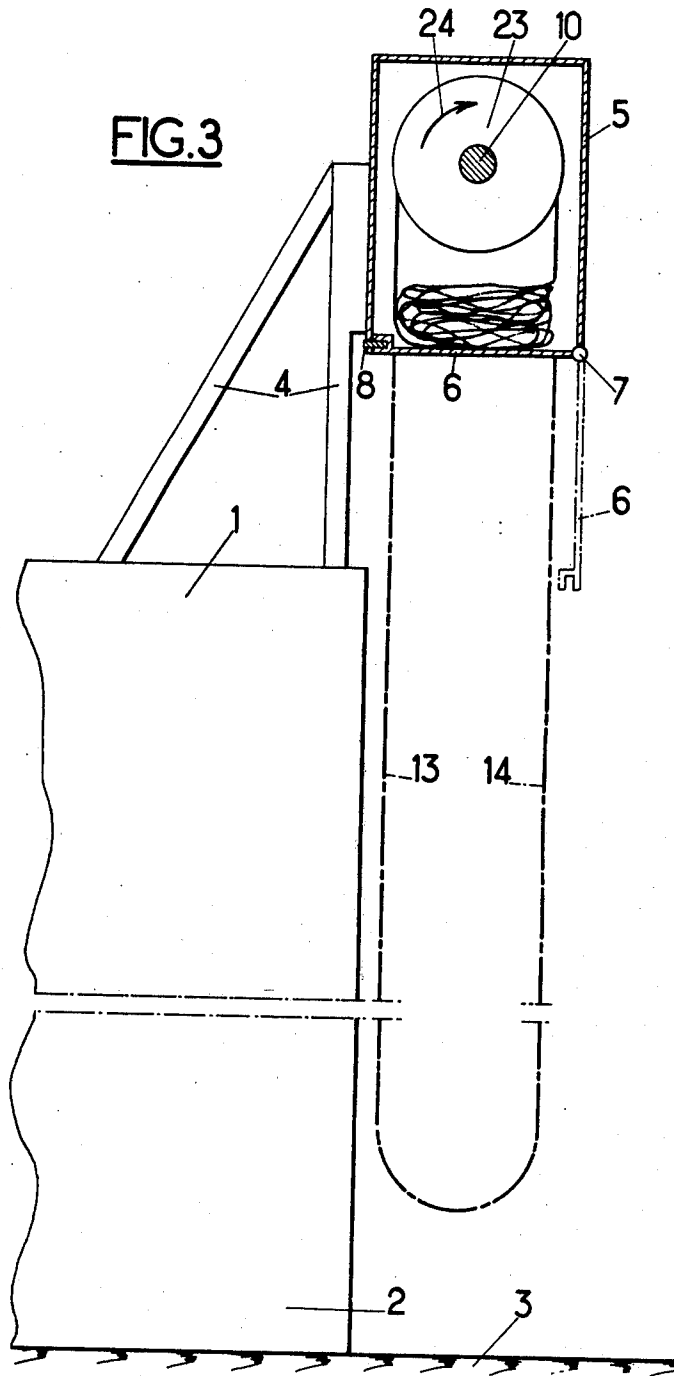


FIG.4

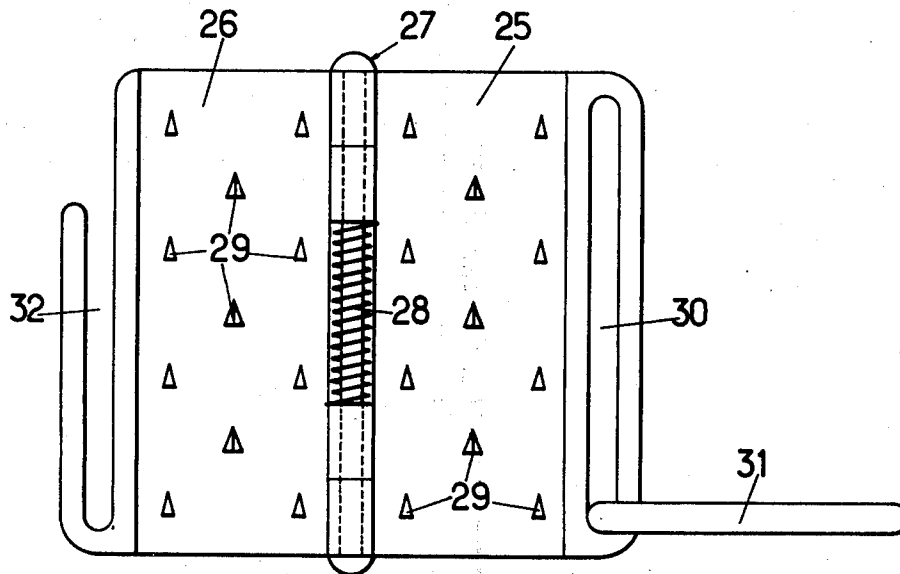


FIG.5

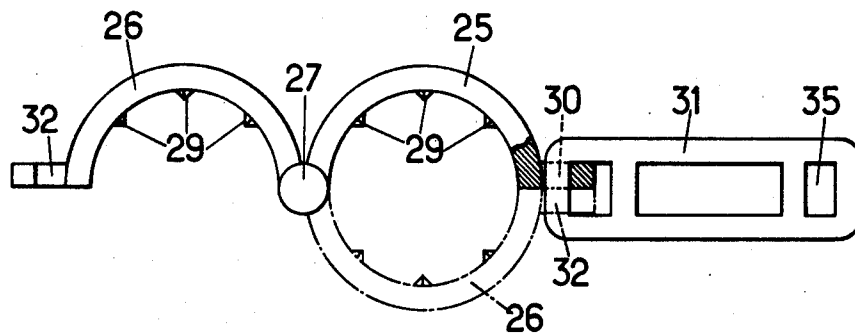


FIG.6

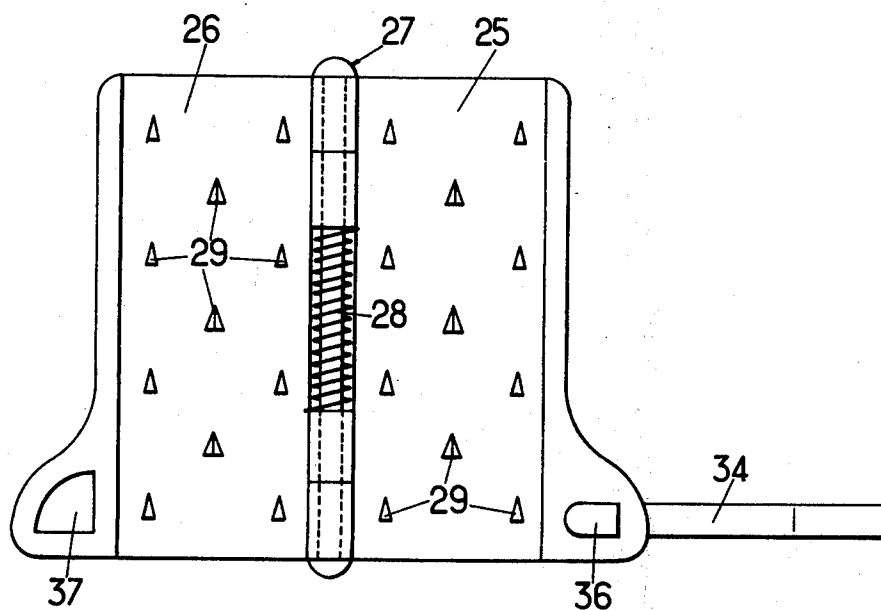


FIG.7

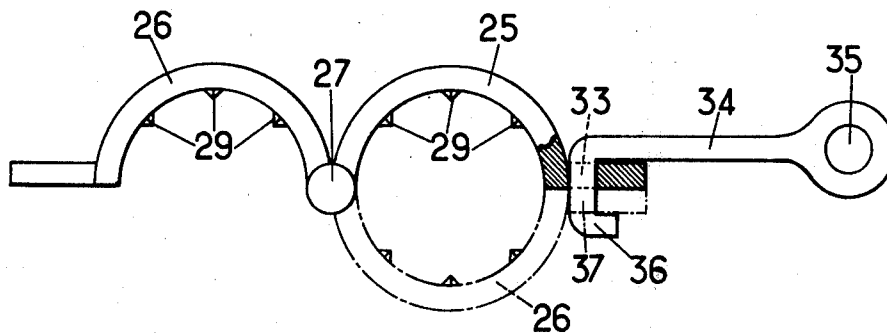
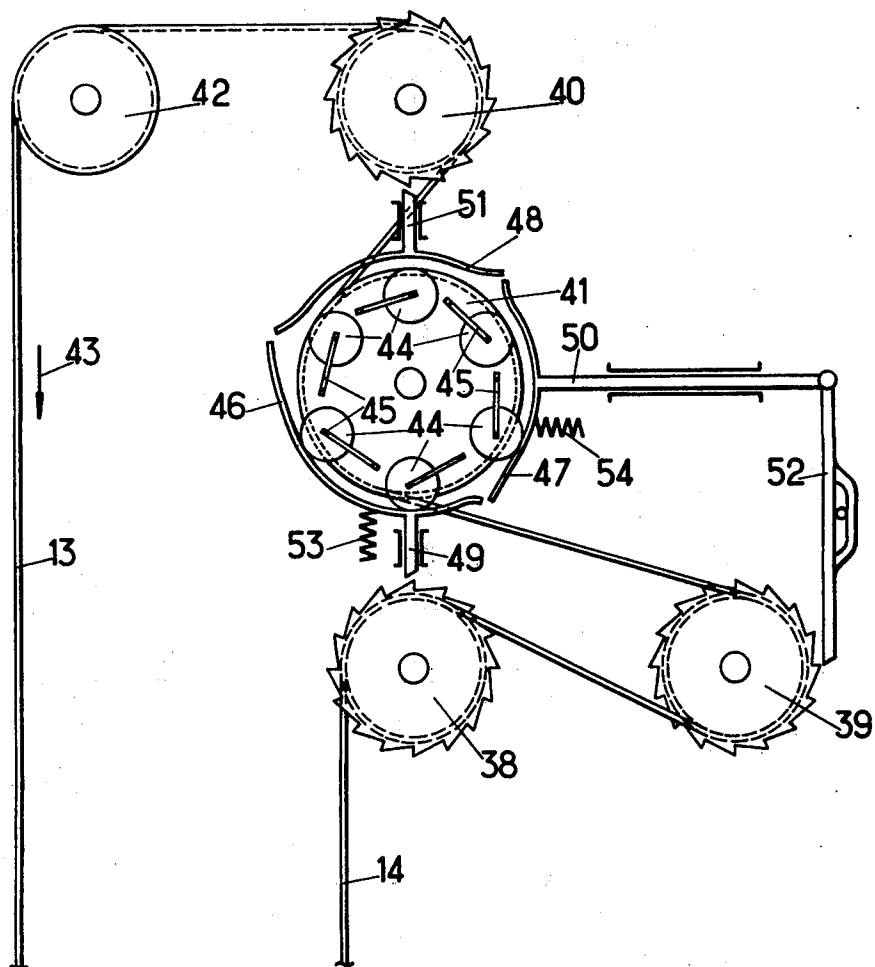
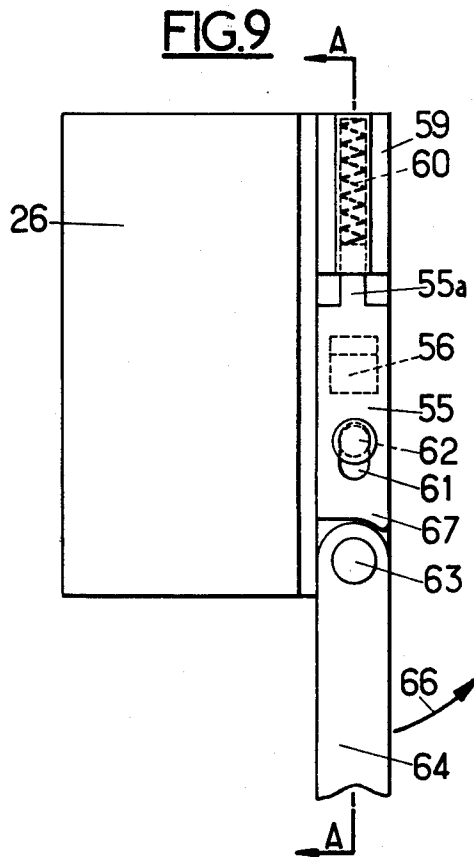
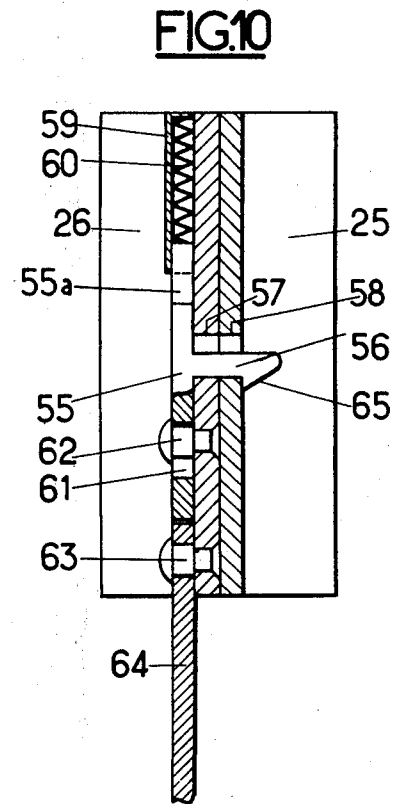
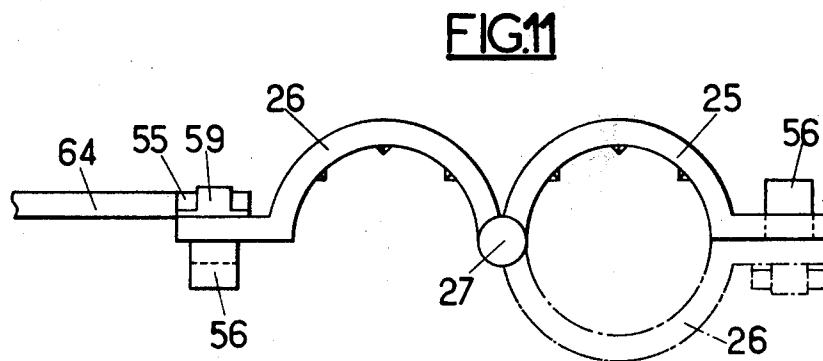


FIG.8





EMERGENCY FIRE ESCAPE

This invention relates to safety devices which enable individuals within a building to evacuate that building rapidly in case of danger.

Ordinarily, in the case of danger, such as a fire, when the normal means of leaving the building, such as the stairways and elevators, cannot be used, the occupants are evacuated by means of a ladder on a fire truck or movable rescue means. However, in order to facilitate rapid evacuation, it is indispensable in the case of buildings too high to rely on movable rescue means, to provide stationary safety means, that is to say means which are attached to the building and which permit its evacuation without waiting for outside help.

In order to solve this problem it is common to use a stairway or fire ladder positioned on the outside of a building wall. This solution is both expensive and unattractive. Other means have also been suggested, but all are relatively complex and cumbersome.

The object of the invention is to provide safety means attached to a building which is particularly simple and economical and does not detract from the appearance of the building walls.

The invention consists in providing at one or more points, each situated at the top of the wall and vertically aligned with the windows or safety doors, a box opening toward the bottom, which box can be opened from a distance and which contains an endless cord coiled therein and mounted on a pulley provided with braking means, which cord comprises, when it is deployed by opening the box, a descending length situated close to the building wall and an ascending length a little further therefrom. The brake may be automatically controlled as a function of speed or may be manually controlled by acting on the rising length. People may suspend themselves from the descending length either by directly gripping it in the hand or by using special gripping means adapted to be rapidly attached and to be detached automatically.

The invention also consists in running the cord successively over a certain number of braking wheels and over a speed detecting wheel and in providing means actuated by the speed of rotation of the speed detecting wheel to control the stopping or braking of the various braking rollers so that the rollers are stopped or braked successively at a number of different spaced speeds of the detecting roller.

The invention also consists in using for the gripping means two distinct members, one constituting the fastening means proper in the form of an automatic latch actuated by a draw spring and adapted to latch the two parts of the gripping means in closed position, and the other consisting of the intermediate member of the harness suspension, these two members being so related that when the second member swings in the direction of the gripping means it moves the first member in the release direction, whereas when on the contrary it swings in a direction in alignment with the grip it does not interfere with the free operation of the automatic latch.

In order that the object of the invention may be better understood, several embodiments thereof will now be described, purely by way of illustration and example, with reference to the accompanying drawings on which:

FIG. 1 is a vertical sectional view through a first embodiment of the invention in its rest position;

FIG. 2 is a similar view showing the same embodiment in its operating position;

FIG. 3 is a vertical sectional view showing a simplified variation of the apparatus;

FIGS. 4 and 5 are respectively an elevational and a horizontal sectional view through one embodiment of the gripping means;

FIGS. 6 and 7 are elevational and horizontal sectional views through a variation of this gripping means;

FIG. 8 is a diagrammatic assembly view of another embodiment of the braking means;

FIG. 9 is a lateral view of another embodiment of the latch for the gripping means;

FIG. 10 is a vertical sectional view taken along the line A—A of FIG. 9; and

FIG. 11 is a top plan view of the gripping means.

On FIGS. 1 and 2 reference numeral 1 indicates the upper corner of a building wall, which wall carries reference numeral 2 on FIG. 2. The bottom of this wall is at the level of the ground 3. At the top of the building, and in vertical alignment with the windows or safety doors, a box 5 is mounted on the corner 1 by means of a suitable support 4 and is closed at its bottom by a horizontal door 6 which is pivotally attached at 7 and latched by suitable latching means 8 which may be controlled from any floor by any suitable means, whether mechanical, electrical or hydraulic.

In this box is a pulley 9 turning about a stationary axis 10, and an endless cord 11 having a length sufficient to reach the bottom of the building is passed over this pulley, as shown on FIG. 2. In its rest position, as shown on FIG. 1, the cord is coiled up at 12 inside the box. When the door 6 is opened, the cord falls instantly and takes the position shown in FIG. 2. Attention is drawn particularly to the length 13 which passes close to the building wall and which is intended to serve as the descending length for the evacuation of individuals from the building, whereas the length 14 further from the wall rises toward the pulley 9 as the length 13 descends.

In order to prevent people who grip the length 13 from falling too rapidly it is naturally necessary to provide means for braking the cord so as to permit them to control their speed of descent at any instant. For this purpose, an elbow-shaped lever 16 may be pivotally mounted on an axis 15 parallel to the axis 10. This lever may be provided with rollers such as 17, 18 and 19 shaped like grooved pulleys, but incapable of rotation. These rollers cooperate with another pair of stationary rollers including a roller 20 mounted on the axis 15 and a roller 21 which is positioned between 17 and 18.

In this manner, when the cord is deployed, as shown in FIG. 2, the upper part of the ascending length 14 is subjected to friction as it passes over the successive stationary rollers 19, 18, 21, 17 and 20 before reaching the pulley 9 and this brakes the descent of the length 13. A slight pull on the length 14 will then cause the lever 16 to swing in the direction shown by the arrow 22 so as to cause the roller 17 to enter between the rollers 20 and 21, thus increasing as shown in FIG. 2 the arcs along which the cord frictionally engages these fixed rollers. In the absence of any manual action, the simple weight of the length 14 of the cord suffices to produce a braking action which in itself affords a certain safety, but any manual action on the length 14 by the person suspended from 13, or by another person

situated elsewhere, for example at the base of the building, can regulate this braking to control the speed of descent with a minimum effort, even if several persons at one time are suspended from the length 13.

In certain cases, it may be desirable to also use the device to lift a fireman or rescuer from the ground toward an opening in the upper part of the building wall by using the same endless cord. The braking device previously described would, however, prevent such use. For this reason, the rollers 17, 18, 19, 20 and 21, instead of being fixed, may advantageously be mounted to roll freely in the direction which permits the length 13 to rise in response to traction on the length 14 while preventing movement in the normal direction which corresponds to the descent of the length 13 and the ascent of the length 14.

In a simplified embodiment illustrated on FIG. 3, the grooved pulley 9 is replaced by a pulley 23 having a large annular groove shaped like that of a capstan, which pulley is also mounted to turn freely in the direction of the arrow 24 to permit, as above, upward movement of the length 13, as needed. This pulley 23 is locked against movement in the opposite direction and the cord is braked solely by friction thereof against the pulley 23, which friction may be increased by winding the cord about the pulley 23 several times between the rising length 13 and the descending length 14 in order to permit amplified frictional effects to be obtained while exerting a relatively slight force on the length 14, utilizing the principle of the capstan. Naturally, in the absence of any manual action on the length 14, that is to say, when this length is under a load consisting only of its own weight, the cord may slide under the effect of weights lighter than those of people to be rescued.

As a variation, the pulley 23 may have a speed regulating device of the centrifugal or hydraulic type controlling the speed of descent of the length 13 automatically, without necessitating any action on the length 14 while permitting, as before, free movement in the direction 24. With this arrangement persons to be evacuated need only to attach themselves to the length 13 of the cord and wait to arrive at the ground level at a limited speed controlled by the speed regulator. Of course, in this case, the friction between the cord and the pulley may be further assured by providing, if necessary, several turns of the cord about the pulley between the rising length and the descending length, but contrary to the foregoing, it is in this case necessary that, under the sole weight of the descending length, the cord will never slide on the pulley.

As an improvement, instead of suspending oneself by hand from the length 13, it is possible to use a handle or harness which may be attached to any point on the cord by gripping means such as the one shown on FIG. 4. This comprises two jaws 25 and 26 which are semi-cylindrical in shape, have the external diameter of the cord, and are pivotally attached to each other by a hinge 27 provided with a torsion spring 28 tending to open the jaws into the position shown on FIGS. 4 and 5. The inner surface of these cylindrical jaws may advantageously be provided with friction increasing linings which are striated or provided with unsymmetrical pointed projections 29 analogous to those of a rasp in order to increase adherence to the cord.

On the edge of the jaw 25 spaced from the hinge 27 is a vertical opening 30 in which a mounting ring 31 slides, while the edge of the jaw 26 remote from the

hinge 27 is provided with a slot 32 opening toward the top. This makes it possible, after having attached the handle or the harness to the ring 31, to position the jaw 25 about the cord and then to fold the jaws together after having lifted the ring 31 to its upper position. When the ring is then lowered with the hole 30 and the slot 32 it automatically latches the grip on the cord so as to permit even a feeble or unskilled person to descend easily, while his descent is braked automatically or by another person.

When a person descending in this manner reaches ground level, the gripping means passes from the descending length to the ascending length which causes the ring 31 to fall under its own weight in a direction opposite to the preceding direction and automatically unlatches the grip, which is then opened by the spring 28 and falls to the ground.

As an alternative, and as shown on FIGS. 6 and 7, the two jaws 25 and 26 of the grip may be latched together by a rotating device comprising a pin 33 turning in a bore in the part 25 and carrying on one side a lever 34 terminating in an eye 35 for the attachment of harness and, on the other side, a latching finger 36 perpendicular to the axis 33, while the jaw 26 comprises an appropriate hole 37 through which the finger 36 can latch the jaw in closed position when it is swung from the perpendicular position shown on the figures into a position more or less vertical to the lower part. In like manner, during return of the apparatus, when the lever 34 returns to its perpendicular position or to an oblique position in the other direction, the grip is automatically unlatched and opens itself as in the preceding case.

In another embodiment of the braking device illustrated on FIG. 8 the assembly comprises, for example, three braking pulleys 38, 39 and 40 and a speed detecting pulley 41. The cord coming from the rising length 14 passes successively over the assembly of these pulleys and then after passing over a return pulley 42 reaches the descending length 13, the normal direction of operation being indicated by the arrow 43.

Each of the braking pulleys 38, 39 and 40 may consist, in its simplest form, of a pulley which rotates freely about its axis and comprises ratchet teeth at its periphery.

The pulley 41 is a simple pulley rotatably driven by the cord and turning freely about its axis. This pulley carries about its periphery a certain number of centrifugal weights 44 consisting of rollers having a certain weight and capable of moving in a substantially radial direction with respect to the pulley. In the example illustrated, each roller turns at the end of a lever 45, the other end of which is pivotally attached to the pulley 41. Around the pulley are mounted three ramps 46, 47 and 48 corresponding respectively to the rollers 38, 39 and 40. Each of these ramps comprises an arc concentric with the pulley 41 and consequently enveloping it and connected to the preceding ramp by parts shaped to prevent collisions. Each of these three ramps is fixed to a rod, 49, 50 and 51, respectively, sliding in a stationary part of the mechanism and capable of latching the corresponding braking roller by acting upon the ratchet teeth, either directly through its end in the case of rods 49, 51 or indirectly through a lever 52, in the case of rod 50.

At rest the three ramps 46, 47 and 48 are held in a position in which they do not block the corresponding braking rollers by the spring 53 urging the ramp 46 to-

ward the top and the spring 54 urging the ramp 47 to the left. For the ramp 48 a spring may also be provided, but it is possible to rely simply on the weight of the member.

In this manner, when a person suspends himself on the descending length of the cord, the only friction which acts on the cord is the friction between the five pulleys and their respective axes, which is relatively small. This friction may be increased by locking the pulley 42 against movement in the direction of the arrow 43, while permitting it to turn freely in the opposite direction. Movement thus accelerates until the speed of the pulley 41 is sufficient to cause centrifugal force to act on the rollers 42 and add to the weight of these rollers as well as the weight of the ramp 46 until they overcome the force of the spring 53 and move the rod 49 downward to lock the braking roller 38. The cord which travels over a certain arc on this braking pulley 38 is thus braked proportionally to the tension on the rising length 14, which consequently slows down the descending movement of the person suspended from the length 13. This brake may be manually controlled by regulating the tension on the rising length 14, which is amplified by friction on the immobilized pulley 38.

In the absence of such manual control, which is not in any sense necessary, if the braking applied is insufficient, the speed of descent of the person will continue to increase until the pulley 41 attains a speed of rotation slightly greater than that at which centrifugal force acting on the roller 41 becomes sufficient to horizontally displace the ramp 47 and the rod 50 while compressing the spring 54. This has the effect of locking the pulley 39 while the pulley 38 continues to remain locked, so that the cord is braked by the two pulleys, the total arc along which it is subjected to friction being substantially greater than before and the braking continuing to be proportional to the tension on the rising length 14.

If this effect still does not suffice, the speed increases until the rollers 44 acquire a centrifugal force sufficient to lift their own weight, as well as the weight of the ramp 48 and the rod 51, which then has the effect of locking the third braking roller 40 while the two other braking rollers remain locked. The total of the arcs of engagement between the cord and the locked pulleys then becomes such that in all circumstances the braking is more than sufficient to resist the maximum weight which can be suspended from the length 13 of the cord. This therefore progressively slows down until the ramp 48 again releases the pulley 40 and decreases the braking effect. Of course, the regulation of the speed by successive locking and unlocking may also be obtained by arranging for the roller 38 to be locked by a small weight and the roller 39 by an average weight.

It will thus be seen that, without complicated mechanism, an automatic regulation of the speed is obtained which always remains between two predetermined limits, the first corresponding to the speed of the pulley 41 which causes locking of the pulley 38 and the second being the speed which corresponds to the locking of the pulley 40. Naturally, the three speeds corresponding to the locking of the rollers 38, 39 and 40 are carefully adjusted to the desired value by adjusting the load on the springs 53 and 54 as well as the weight of the member 48 so that these three speeds are regularly spaced and

sufficiently close to each other and to the desired ideal speed.

It is interesting to note that the device described also makes it possible to lift persons, for example rescuers, suspended from the length 13 by pulling on the length 14 as indicated above, since at the slow speed at which they are normally lifted the braking device does not act. Moreover, the orientation of the ratchet teeth is such as to permit a lifting movement.

Naturally the speed detecting device may be of any type and the control means by which it locks the braking wheels may also be different, for example, it may be electrically operated through a more sensitive speed detector which actuates a latch or an electric clutch for each of the braking wheels through an appropriate electromagnet.

Another embodiment of the attaching grip for the harness for use in descending on the length 13 of the cord is illustrated on FIGS. 9-11.

As before, the grip comprises two jaws 25 and 26 pivotally mounted on an axis 27, together with a draw spring (not shown) tending to open the jaws into the position shown on FIG. 11. But the means for latching one of these jaws to the other in a closed position in this case consists of a latch 55 sliding vertically and equipped with a hooked bolt 56 passing through two rectangular openings 57 and 58 formed respectively in the edges of the jaws 26 and 25 as shown on FIG. 10. The upper part of the latch 55 comprises a projection 55a which slides in a small steel box 59 mounted on the part 26 and containing a spring 60 constantly biasing the latch 55 downwardly. The lower part of the latch 55 has an oblong opening 61 through which passes a shouldered rivet 62, also attached to the part 26. Finally, at the bottom of the part 26 is another shouldered rivet 63 about which a member 64 pivots. This member constitutes the intermediate part of the connection to which the harness is hooked.

While the member 64 is in vertical position as shown on FIG. 9 or in a position slightly inclined with respect to the vertical, the latch 55 may move freely and be returned to its latched position by the spring 60. This makes it possible to close the jaws which automatically lifts the hooked bolt when its ramp 65 encounters the lower edge of the window 57, after which it falls into latched position.

This latching is thus automatically obtained by closing the jaws regardless of the position of the member 64 which may hang normally downward.

On the contrary, when the gripping member moves from the descending length to the ascending length, the harness draws the lever 64 downwardly, that is to say taking into account its new position, in the direction indicated by the arrow 66, which then causes release of the latch 55, permitting the automatic opening of the jaws in response to the spring thereof. This lifting action is automatically obtained by action of the outer edge of the member 64 on the corner 67 of the latch 55, which is appropriately shaped.

This arrangement not only automatically opens the gripping means as heretofore set forth but also automatically latches the two jaws of the gripping means together when they are closed.

What is claimed is:

1. Safety device for evacuating a person from a building which device comprises a box having a door in its bottom, a pulley within said box, an endless cord lying

on said door and passing over said pulley, means within said box for braking the advance of said cord in at least one direction over said pulley, remotely controlled means for opening said door, and means for manually gripping said cord, said gripping means comprising a pair of jaws pivotally connected to each other, resilient means biasing said jaws apart, and gravity actuated latching means for holding said jaws in a closed position.

2. Safety device as claimed in claim 1 in which the means for braking the cord consists of rollers engaging said cord, said rollers being incapable of rotation in at least one direction, and certain of said rollers being mounted in a stationary position while others are mounted on a swinging lever which swings in response to tension on said cord.

3. Device as claimed in claim 2 in which the rollers are mounted to rotate in the opposite direction so as to permit the lifting of a burden suspended from said cord by pulling in said opposite direction.

4. Device as claimed in claim 1 in which said pulley means is provided with a large groove over which the cord is wound several times to brake its advance.

5. Device as claimed in claim 4 in which the pulley is mounted to turn freely in only one direction, the number of turns of said cord over said wheel being such that the cord can slide over said pulley wheel in the opposite direction when the weight of one person is applied thereto.

6. Device as claimed in claim 4 in which said pulley is equipped with a speed regulator for regulating the speed of descent of said cord in at least one direction, said cord being wound over said wheel a sufficient number of times to prevent said cord from sliding relative to said wheel under the maximum load for which the device is designed.

7. Safety device for evacuating a person from a building which device comprises a box having a door in its bottom, a pulley within said box, an endless cord lying on said door and passing over said pulley, means within said box for braking the advance of said cord in at least one direction over said pulley, and remotely controlled

means for opening said door, said braking means comprising several braking pulleys and a speed detecting pulley over which said cord passes, together with means for stopping or braking the various braking pulleys successively at various speeds of rotation distributed between a minimum and a maximum speed.

8. Device as claimed in claim 7 in which each braking pulley comprises a groove in which the cord can slide with a certain friction and peripheral ratchet teeth in which latching means engage.

9. Device as claimed in claim 8 in which the speed detecting pulley comprises a grooved portion frictionally driven in the direction in which the cord travels and a plate fixed thereto carrying a plurality of weighted rollers mounted for radial movement thereon, said plate and rollers being encircled by three arcuate ramps concentric with said speed detecting pulley, each of said ramps being mounted for radial movement away from the pulley in response to pressure from a roller and being biased toward the pulley, each ramp being connected to actuate a latch for preventing rotation of a braking pulley when said ramp moves away from said speed detecting pulley.

10. Device as claimed in claim 9 in which each ramp is mechanically connected to a latch.

11. Device as claimed in claim 7 which also comprises means for supporting a person from said cord, said means comprising a harness carried by said person, a clamp for gripping said cord, and an intermediate member connecting the harness to the clamp, said clamp comprising first and second jaws pivotally connected to each other, resilient means biasing said jaws apart, a latch longitudinally slidable in said first jaw and provided with a return spring biasing it in one direction, a hooked bolt carried by said latch which cooperates with an opening in the second jaw, said intermediate connecting member being pivotally attached to said first jaw and shaped as a cam to urge the latch sliding in the opposite direction to the one in which it is biased by said spring when said intermediate member swings out of alignment with said latch.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,874,632 Dated April 1, 1975

Inventor(s) John J. Rago Page 1 of 2

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In the Grant (only) Column 7 and 8 should appear as shown on the attached sheet.

Signed and Sealed this

tenth Day of February 1976

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks

3,874,632

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on said door and passing over said pulley, means within said box for braking the advance of said cord in at least one direction over said pulley, remotely controlled means for opening said door, and means for manually gripping said cord, said gripping means comprising a pair of jaws pivotally connected to each other, resilient means biasing said jaws apart, and gravity actuated latching means for holding said jaws in a closed position.

2. Safety device as claimed in claim 1 in which the means for braking the cord consists of rollers engaging said cord, said rollers being incapable of rotation in at least one direction, and certain of said rollers being mounted in a stationary position while others are mounted on a swinging lever which swings in response to tension on said cord.

3. Device as claimed in claim 2 in which the rollers are mounted to rotate in the opposite direction so as to permit the lifting of a burden suspended from said cord by pulling in said opposite direction.

4. Device as claimed in claim 1 in which said pulley means is provided with a large groove over which the cord is wound several times to brake its advance.

5. Device as claimed in claim 4 in which the pulley is mounted to turn freely in only one direction, the number of turns of said cord over said wheel being such that the cord can slide over said pulley wheel in the opposite direction when the weight of one person is applied thereto.

6. Device as claimed in claim 4 in which said pulley is equipped with a speed regulator for regulating the speed of descent of said cord in at least one direction, said cord being wound over said wheel a sufficient number of times to prevent said cord from sliding relative to said wheel under the maximum load for which the device is designed.

7. Safety device for evacuating a person from a building which device comprises a box having a door in its bottom, a pulley within said box, an endless cord lying in said door and passing over said pulley, means within said box for braking the advance of said cord in at least one direction over said pulley, and remotely controlled

means for opening said door, said braking means comprising several braking pulleys and a speed detecting pulley over which said cord passes, together with means for stopping or braking the various braking pulleys successively at various speeds of rotation distributed between a minimum and a maximum speed.

8. Device as claimed in claim 7 in which each braking pulley comprises a groove in which the cord can slide with a certain friction and peripheral ratchet teeth in which latching means engage.

9. Device as claimed in claim 8 in which the speed detecting pulley comprises a grooved portion frictionally driven in the direction in which the cord travels and a plate fixed thereto carrying a plurality of weighted rollers mounted for radial movement thereon, said plate and rollers being encircled by three arcuate ramps concentric with said speed detecting pulley, each of said ramps being mounted for radial movement away from the pulley in response to pressure from a roller and being biased toward the pulley, each ramp being connected to actuate a latch for preventing rotation of a braking pulley when said ramp moves away from said speed detecting pulley.

10. Device as claimed in claim 9 in which each ramp is mechanically connected to a latch.

11. Device as claimed in claim 7 which also comprises means for supporting a person from said cord, said means comprising a harness carried by said person, a clamp for gripping said cord, and an intermediate member connecting the harness to the clamp, said clamp comprising first and second jaws pivotally connected to each other, resilient means biasing said jaws apart, a latch longitudinally slidable in said first jaw and provided with a return spring biasing it in one direction, a hooked bolt carried by said latch which cooperates with an opening in the second jaw, said intermediate connecting member being pivotally attached to said first jaw and shaped as a cam to urge the latch sliding in the opposite direction to the one in which it is biased by said spring when said intermediate member swings out of alignment with said latch.

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