

[54] FIRE ESCAPE DEVICE WITH BELT TIGHTENING SLIDE

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[51] Int. Cl. A62b 1/14

[58] Field of Search 182/5, 6, 7

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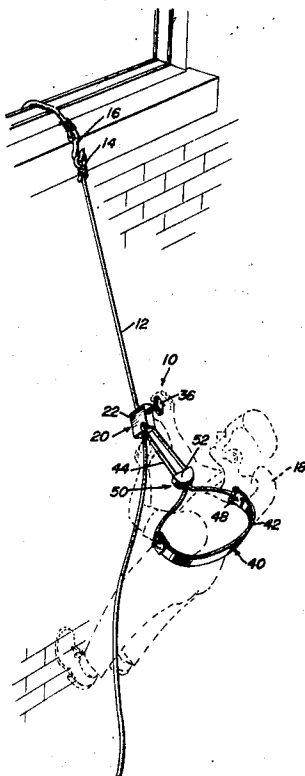
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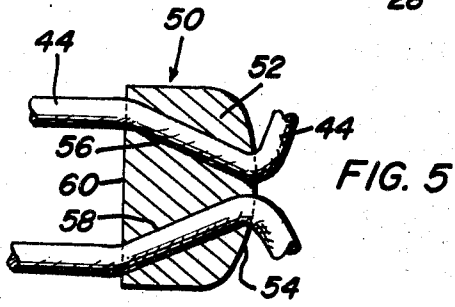
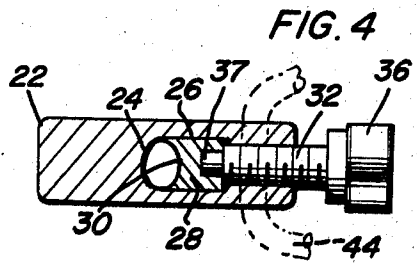
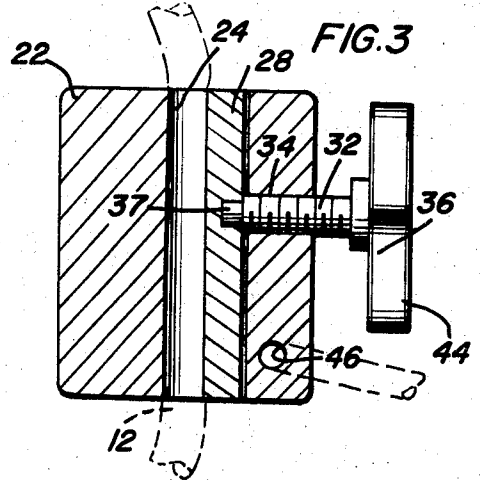
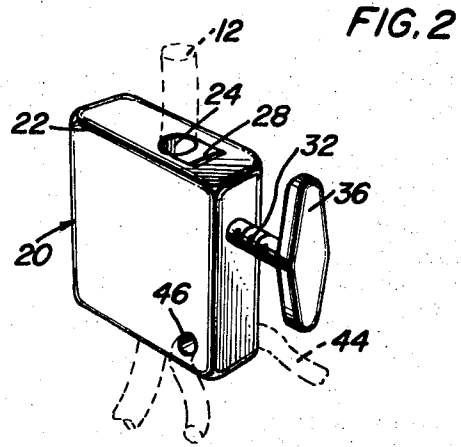
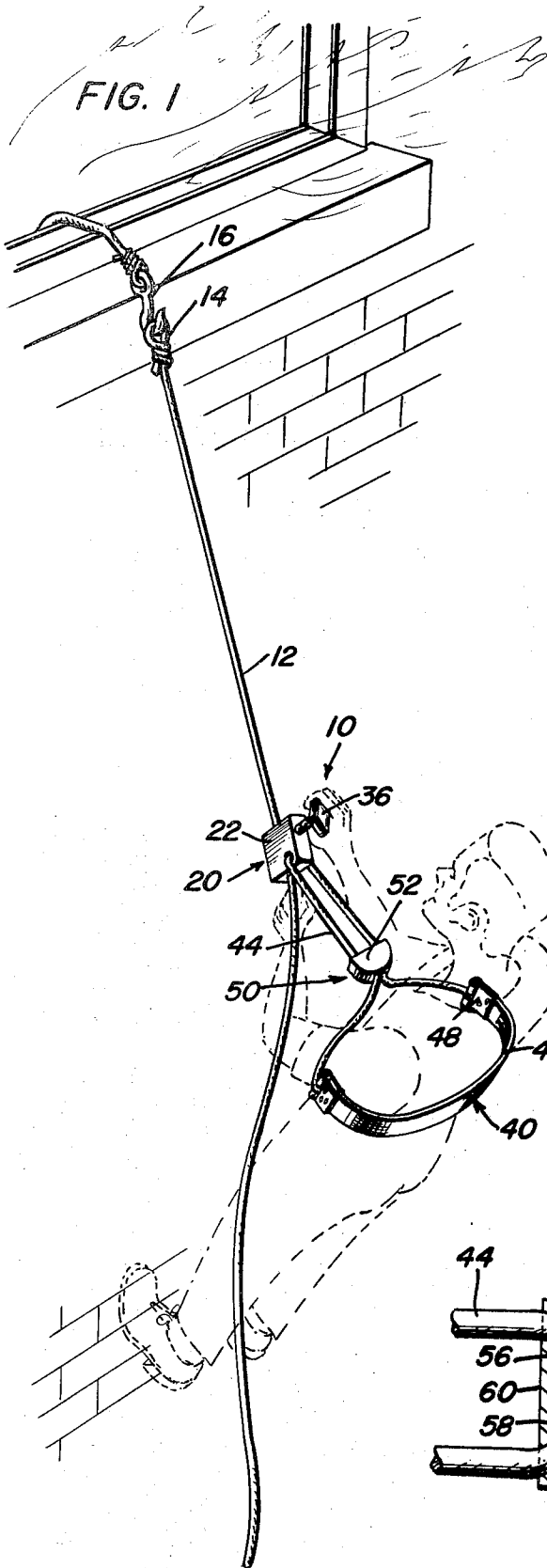
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[57] ABSTRACT

A fire escape in the form of an elongated flexible member anchored at the upper end thereof to a building structure or stationary device associated with the building structure with the flexible member being of sufficient length to reach to the ground or some other lower level by which a person may safely escape from a fire in the building. A slidable, manually actuated device is mounted on the flexible member for longitudinal sliding movement in relation thereto with the rate of movement or descent being manually controlled by a person supported therefrom by a belt type sling. The sling includes a flexible member such as a rope having its ends connected to the ends of a belt and a central portion extending through the slidable device with a slide receiving both portions of the rope for movement toward and away from the person whose torso is encircled by the sling thereby enabling the sling to be snugly engaged with the torso of the person using the device thereby preventing the person from sliding downwardly through the sling thereby providing a fire escape device which is easy to use but yet will effectively retain the user in the belt type sling.

7 Claims, 5 Drawing Figures





FIRE ESCAPE DEVICE WITH BELT TIGHTENING SLIDE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention generally relates to a fire escape device and more particularly a portable window fire escape device which enables persons trapped in the interior of a building or other enclosure to safely descend from the building.

2. Description of the Prior Art

Many instances occur of fatal injuries resulting from being trapped in the interior of a building above the ground floor by fire. While many buildings are equipped with permanent fire escape stairways, it sometimes occurs that access to such fire escape stairways is precluded by the location of the fire or by other factors which results in preventable injury and loss of life. In my prior U.S. Pat. No. 3,504,763, issued Apr. 7, 1970, there is disclosed a fire escape device in the form of an elongated rope that is anchored to a portion of a building together with a sleeve that is slidable thereon and provided with a sling for supporting a person with the occupant of the sling being capable of manually controlling the rate of descent of the sling. Other prior patents disclose sling type devices such as U.S. Pat. No. 188,817, issued Mar. 27, 1877; U.S. Pat. No. 269,268, issued Dec. 19, 1882; U.S. Pat. No. 896,241, issued Aug. 18, 1908; U.S. Pat. No. 926,430, issued June 29, 1909 and U.S. Pat. No. 1,169,760, issued Feb. 1, 1916. While such devices may perform satisfactorily under some circumstances, one of the problems which occur with most such devices is the capability of a person engaging the sling with the portion of his anatomy which the sling is intended to engage and to retain engagement between himself and the sling during descent.

SUMMARY OF THE INVENTION

An object of the present invention is to provide a portable window fire escape device incorporating an elongated flexible rope, a slidable sleeve assembly mounted on the rope and a belt type sling connected to the sleeve for movement down the rope with the belt type sling including means for tightening the belt around the upper torso of the person using the device so that the belt type sling cannot slide upwardly over the arms and head area of the user when descending the rope.

Another object of the invention is to provide a fire escape device in which the belt type sling includes end ropes connected thereto and connected to the sleeve together with a slide on the ropes to be moved toward the person using the belt type sling thereby tightening the sling about the upper torso of the person using the fire escape device.

A further object of the invention is to provide a fire escape device that is relatively inexpensive to manufacture, easy to use, safe in operation and capable of being easily and securely associated with the person using the device which greatly facilitates the effectiveness thereof and at the same time prevents accidental disengagement or release of the person using the device.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had

to the accompanying drawings forming a part thereof, wherein like numerals refer to like parts throughout.

FIG. 1 is a perspective view of the portable fire escape device illustrating its manner of use.

FIG. 2 is a perspective view of the sleeve which slidably engages the rope.

FIG. 3 is a vertical sectional view of the construction of FIG. 2 illustrating the structural details thereof.

FIG. 4 is a transverse, sectional view illustrating further structural details of the sleeve.

FIG. 5 is a detail sectional view of the slide for securely connecting the belt type sling to the person using the device.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The portable, window fire escape of the present invention is generally designated by the reference numeral 10 and includes an elongated flexible rope 12 of natural or synthetic fiber material formed in a conventional manner with a loop 14 being formed in the upper end thereof in a conventional manner with the loop 14 engaging a hook 16 or any other stationary support positioned at any convenient location within a room, building, or the like or may be positioned slightly externally of a window or the like. The rope 12 may be connected to any stationary object capable of holding the weight of a person 18 as he descends down the rope 12. The length of the rope 12 is sufficient to reach ground level or other safe lower levels from various floor levels in homes, apartment buildings, office buildings, hotels and other similar buildings which are occupied by people above the ground floor. Thus, when the loop 14 is secured to a suitable anchor or support at the elevation of a room or other enclosed area, the other end of the rope will terminate at or adjacent ground level or other safe level so that the person 18 may safely escape from a fire by using this device.

The fire escape device 10 includes a sleeve assembly 20 that is constructed in the form of a generally rectangular block or body 22 having a vertical passageway 24 formed therein for receiving the rope 12. The passageway 24 may extend from top to bottom end of the body 22 and may be partially cylindrical in construction. One side of the passageway 24 is defined by parallel walls 26 which slidably receive a clamping plate 28. The clamping plate 28 is in the form of a block which extends from top to bottom edge of the body 22 and includes a partially cylindrical or concave clamping surface 30 which cooperates with the cylindrical or partially cylindrical passageway 24 to frictionally clamp the rope 12 when the clamping plate 28 is moved inwardly in the passageway 24.

For moving the clamping plate 28 inwardly, a screw-threaded member 32 is threaded through an internally threaded aperture 34 in the body 22 with the aperture 34 communicating with the wall of the passageway 24 which connects and is perpendicular to the walls 26. The inner end of the threaded member 32 is rotatably connected to the clamping plate 28 as at 37 so that as the threaded member 32 is threaded inwardly, the clamping plate 28 will be moved laterally inwardly thereby frictionally gripping and clamping the rope 12 between the partially cylindrical or concave surfaces of the passageway 24 and the inner surface 30 of the clamping plate 28. The outer end of the threaded member 32 is provided with a permanently connected handle 36 of any suit-

able shape and configuration which will enable the person 18 to grasp the handle 36 to rotate the threaded member 32 in either direction thereby tightening and loosening the clamp plate 28 to provide manual control for the rate of descent of the sleeve assembly 20 along the rope 12. FIG. 1 of the drawings illustrates the manner in which the user 18 utilizes his feet to avoid injury while he descends the rope by keeping his body away from the wall of the building.

The fire escape device also includes a sling assembly 40 that is connected to the sleeve assembly 20 and which engages and supports the user 18 from the sleeve assembly 20 which in turn supports the user 18 from the rope 12. The sling assembly 40 includes a flexible belt 42 of a length to extend around the rear portion of the upper torso of the user 18 and under the arms of the user. The ends of the belt 42 are connected to the ends of a rope 44 which has the midportion thereof extending through a transverse bore or passageway 46 formed in the bottom outer corner of the body 22 as illustrated in FIG. 1. Thus, the belt 42 is connected to the sleeve assembly 20 by the rope 44 with the ends of the rope 44 being connected to the belt 42 by suitable hems 48 and a reinforcing rod extending perpendicular to the ends of the rope 44 which is received in the hem 48. While the belt assembly 40 would be retained in position as long as the arms of the user were positioned downwardly alongside of his body, there is a possibility that due to the upward forces exerted by the belt 42 and rope 44, the belt assembly could slide upwardly over the arms and head area of the user 18 which could result in the user becoming disconnected or released from the fire escape device.

In order to prevent this possibility, the rope 44 is provided with a slide generally designated by numeral 50 and which includes a body or block 52 of generally rectangular configuration with the surface 54 thereof facing the user being curved. The body 52 is provided with a pair of passageways or bores 56 and 58 which extend from the curved surface 54 and an opposed flat surface 60. As illustrated in FIG. 5, the bores or passageways 56 and 58 are oriented in diverging relationship from an adjacent position on the surface 54 to a remote position on the surface 60. Thus, both portions of the rope 44 extend through the body 52 and the portions of the rope 44 between the body 50 and the slide assembly 20 are substantially parallel while the portions of the rope 44 between the body 52 and the ends of the belt 42 extend laterally outwardly in diverging relation. This arrangement will provide a frictional engagement between the portions of the rope 44 and the body 52 so that the body 52 will be retained frictionally in adjusted position since the portions of the rope received in the passageways 56 and 58 are oriented in one diverging relation whereas the portions of the rope 44 between the body 52 and the ends of the belt extend in opposite diverging relation as illustrated in FIG. 5. This enables the slide 52 to be moved manually along the rope 44 but the slide will be frictionally held in position after it has been moved toward the front surface of the torso of the user 18 due to the forces exerted on the rope 44 by the ends of the belt 42. Thus, when the belt 42 has been positioned in encircling relation to the torso of the body of the user, the user then may manually slide the body 52 towards his chest thus snugly embracing the belt in underlying relation to the arms and along the armpits so that even if the arms are raised to

a substantially upward position, the belt assembly will still be retained in encircling and supporting relation to the user 18.

The slide assembly 50 enables the size relationship of the sling assembly 40 to be greatly increased by being manually moved toward the sleeve assembly 20 which facilitates the sling assembly being assembled with the user either by stepping into the sling assembly by placing his feet alternately into the interior of the sling assembly or by placing the sling assembly downwardly over the head until the arms can be brought into overlying relation to the sling assembly. Then, by pulling the slide assembly 50 toward his chest, the user 18 may snugly embrace the sling assembly about his upper torso thereby precluding the possibility that he could slip down through the sling assembly while descending along the rope 12. This greatly enhances the safety factor of the fire escape device and eliminates any possibility of the fire escape device becoming disengaged from the person that it is supporting and enables the device to be used by persons that may be injured or in a condition in which they are not sufficiently strong to resist forces that would be exerted by the sling device were the slide assembly 50 not used.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.

What is claimed as new is as follows:

1. A portable fire escape comprising an elongated flexible member having an upper end capable of being anchored with respect to a building structure and having a length to depend to adjacent ground level or other safe level, a sleeve assembly mounted on the flexible member for longitudinal movement, sling means connected to the sleeve assembly for supporting a person therefrom, and means on the sleeve assembly for gripping engagement with the flexible member to control the rate of descent therealong, said gripping means including a manually actuated screw-threaded member, said sling means including a flexible belt adapted to extend across the back surface of the upper torso of a person, a rope connected to the ends of the belt and connected with the sleeve assembly, and a slide assembly mounted on the rope for movement toward and away from the person supported by the sling means to tighten the belt and rope about the upper torso of such a person thereby preventing the person from sliding down through the sling means, said slide assembly including a block having a surface facing the sleeve assembly and a surface facing the person using the sling means, a pair of passageways extending through the block and communicating the above set forth surfaces, said passageways diverging from the surface facing the person using the sling means to the surface facing the sleeve assembly for maintaining portions of the rope received therein in diverging relation, the portions of the rope extending from the block to the ends of the belt extending in diverging relation whereby the block will frictionally lock itself on the rope when outward forces are exerted on the ends of the belt and connected portion of the rope.

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2. The structure as defined in claim 1 wherein the rope connecting the belt to the sleeve assembly includes a one piece rope having the midportion thereof extending through a passageway in the sleeve assembly.

3. The structure as defined in claim 2 wherein said sleeve assembly includes a block having a vertical passageway therein receiving the flexible member, a clamp plate in said passageway and extending throughout the length thereof for movement toward and away from the flexible member to frictionally grip the flexible member for locking the sleeve assembly in adjusted position thereon and enabling longitudinal movement therealong, said screw-threaded member engaging said clamp plate and being threaded into a threaded passageway in the block, said threaded member having a handle on the outer end thereof by which the frictional engagement between the clamp plate, passageway and flexible member may be controlled thereby controlling the rate of descent of the sleeve assembly on the flexible member.

4. The structure as defined in claim 3 wherein said flexible member is in the form of a rope having means on the upper end for connection with a stationary support.

5. The structure as defined in claim 4 wherein said rope connected to the ends of the belt extends through the lower outer corner of the sleeve assembly to facilitate movement of a person down the external wall of a building without coming into contact with the wall or projections thereon such as window ledges and the like.

6. In a portable fire escape of the type comprising an elongated flexible member having an upper end capable of being anchored with respect to a building structure and having a length to depend to adjacent ground level or other safe level, a sleeve assembly mounted on the flexible member for longitudinal movement, sling means connected to the sleeve assembly for supporting a person therefrom, and means on the sleeve assembly for gripping engagement with the flexible member to control the rate of descent therealong, said gripping means including a manually actuated screw-threaded member and said sling means including a flexible belt adapted to extend at least partially around the upper torso of a person; that improvement comprising a flexible element connected to the ends of the belt and connected with the sleeve assembly, and a slide mounted on the flexible element for movement toward and away from the person supported by the sling means to tighten the belt and flexible element about the upper torso of such a person thereby preventing the person from slid-

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ing down through the sling means, said slide including a block having a surface facing the sleeve assembly and a surface facing the person using the sling means, a pair of passageways extending through the block and communicating with said surfaces, said passageways diverging from the surface facing the person using the sling means to the surface facing the sleeve assembly for maintaining portions of the flexible element received therein in diverging relation, the portions of the flexible element extending from the block to the ends of the belt extending in diverging relation whereby the block and flexible element will frictionally lock when outward forces are exerted on the ends of the belt and connected portions of the flexible element.

7. In a portable fire escape of the type comprising an elongated flexible member having an upper end capable of being anchored with respect to a building structure and having a length to depend to adjacent ground level or other safe level, a sleeve assembly mounted on the flexible member for longitudinal movement, sling means connected to the sleeve assembly for supporting a person therefrom, and means on the sleeve assembly for gripping engagement with the flexible member to control the rate of descent therealong, said sling means including a flexible member adapted to extend at least partially around the torso of a person; that improvement comprising a slide mounted on the flexible member for movement toward and away from the person supported by the sling means to tighten the flexible member about the torso of such a person thereby preventing the person from sliding down through the sling means, said slide including a body having a surface facing the sleeve assembly and a surface facing the person using the sling means, a pair of passageways extending through the body and communicating with said surfaces, said passageways diverging from the surface facing the person using the sling means to the surface facing the sleeve assembly for maintaining portions of the flexible member received therein in diverging relation, the portions of the flexible member extending from the body towards the person using the sling means extending in diverging relation and the portions of the flexible member extending from the body to the sleeve assembly being in close parallel relation whereby the body and flexible member will frictionally lock when outward forces are exerted on the portions of the flexible member which diverge from the body for enabling the body to be moved toward the person using the sling means for snugly engaging the flexible member around the torso of such a person.

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