United States Patent [19]

Tsai

[11] **3,861,497**

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[54] **LIFE LINE**

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[52] **U.S. Cl.** **182/5,** 182/192, 182/193

[51] **Int. Cl.** **A62b 1/14**

[58] **Field of Search** 182/5, 6, 7, 192, 193, 182/191; 188/65.1, 65.2

[56] **References Cited**

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Attorney, Agent, or Firm—Armstrong, Nikaido & Wegner

[57] **ABSTRACT**

A life line comprising a rope, a speed regulator, a safety belt and a checking steel wire. The speed regulator is substantially in the form of a cylinder having a penetrating hole for passing the rope and is made of a material permitting its inner peripheral surface to come into contact with the rope to thereby regulate descending speed when the speed regulator is grasped by the hands. The safety belt is fixed to the speed regulator. The checking steel wire has one end connected to the safety belt and the other end surrounding the rope and attached to a metal retainer fixed to the speed regulator.

9 Claims, 6 Drawing Figures

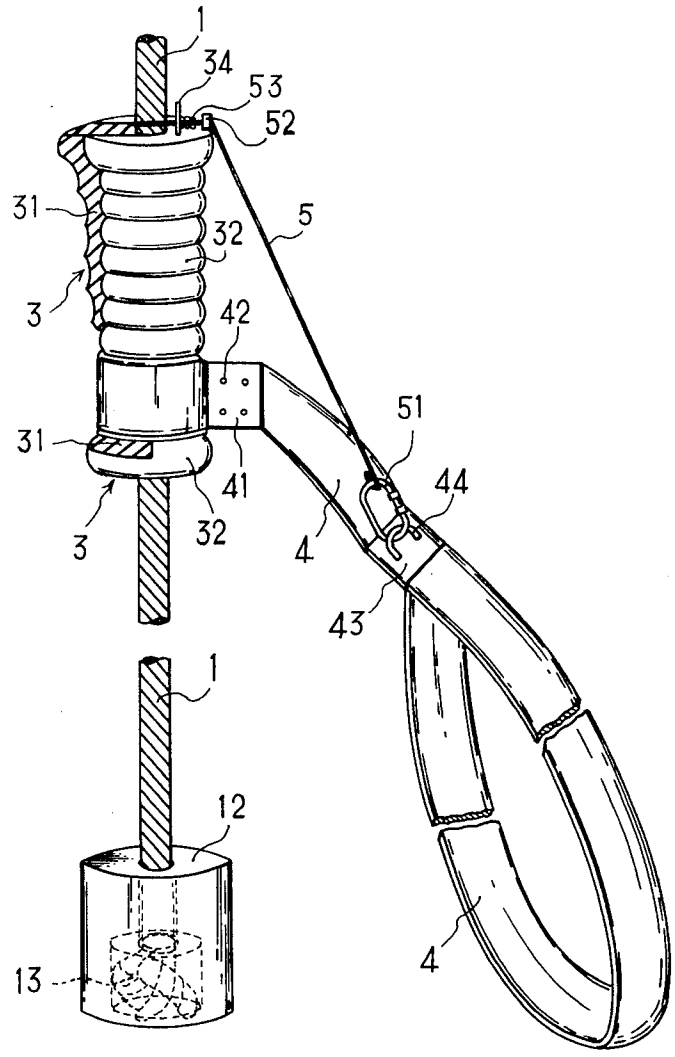


FIG. 1

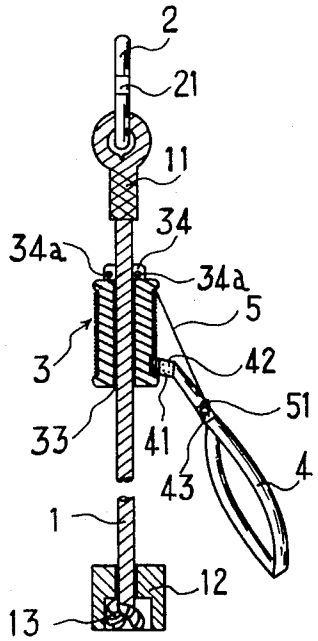


FIG. 2

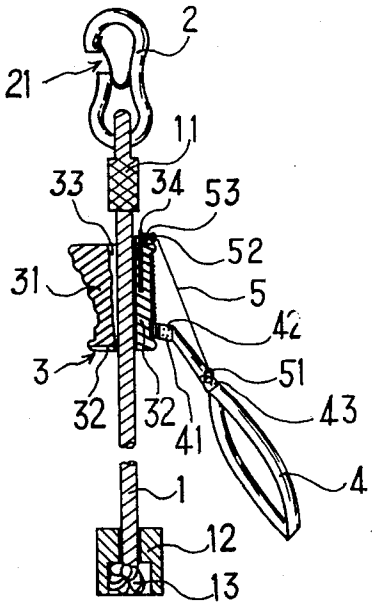


FIG. 5

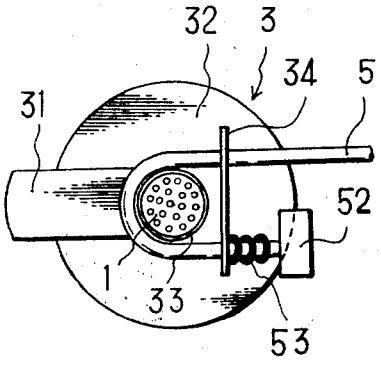


FIG. 6

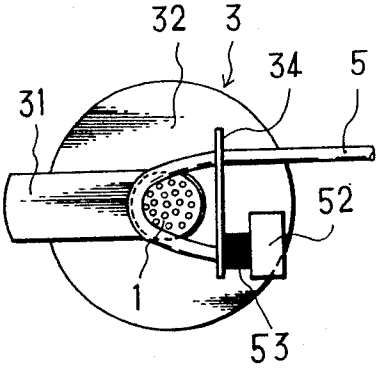


FIG. 3

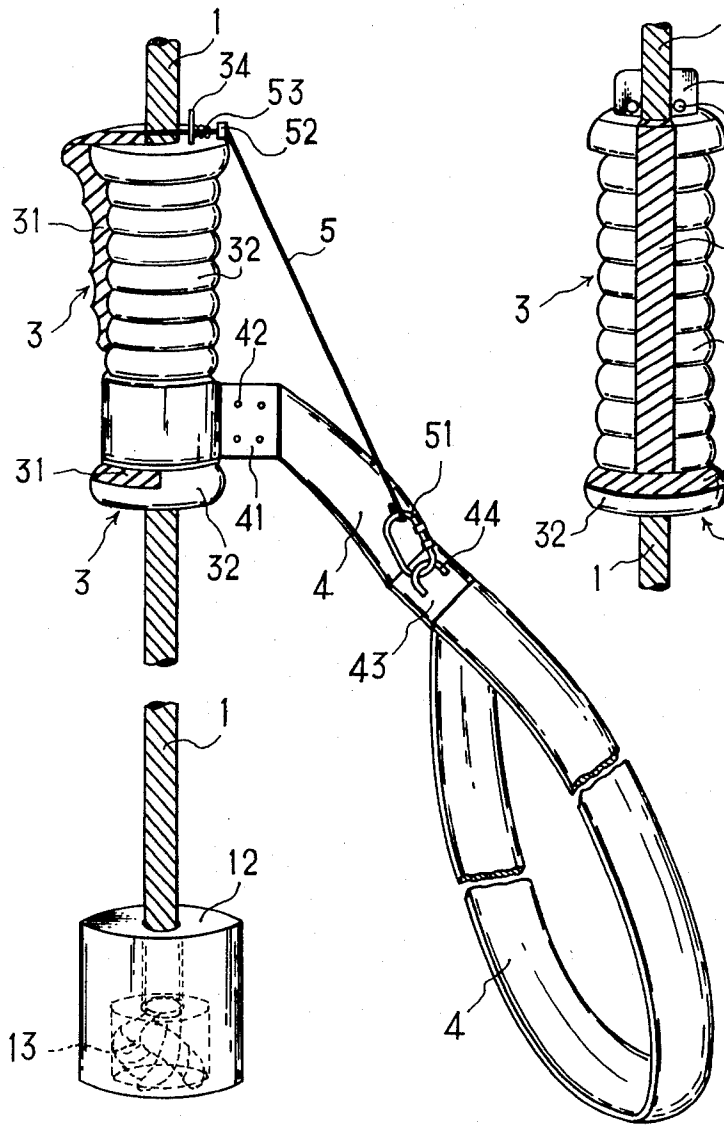

1
34
53
52
31
32
5
3
42
31
41
3
32
51
44
4
43
1
12
13
4

FIG. 4

1
34
34a
31
3
32
31
32
1
3

LIFE LINE

SUMMARY OF THE INVENTION

This invention relates to a novel life line, more particularly to a life line which simply comprises a rope equipped with a specific speed regulator and a checking steel wire and which is usable with ease and free of danger as when a fire breaks out in a building.

DESCRIPTION OF THE PRIOR ART

Conventionally, various devices for escaping for example from a burning building have been proposed. Such escape devices must fulfil the requirements of being easy and safe to handle, inexpensive and durable, but none of the known devices fully satisfy these requirements.

OBJECT OF THE INVENTION

The object of this invention is to provide a life line having a simple construction in which a specific speed regulator and a checking steel wire are attached to a rope, the life line being adapted for use with ease and safety in the event of a fire in a building or like accident.

Other objects and features of this invention will become apparent from the following description.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a front view showing an embodiment of the life line of this invention;

FIG. **2** is a side elevation of the same;

FIG. **3** is an enlarged perspective view of a speed regulator;

FIG. **4** is a front view of the same;

FIG. **5** is a top plan view of the speed regulator while a checking steel wire is not acting on the line; and

FIG. **6** is a top plan view of the speed regulator when the checking steel wire is acting on the line.

DETAILED DESCRIPTION OF THE INVENTION

With reference to the drawings, there is shown a rope **1** whose upper end is looped to provide connecting means **11.** The lower end of the rope **1** is knotted as at **13** to retain a weight **12** for preventing the rope **1** from twisting. Usually, the rope **1** is made of natural or synthetic fibers which have been rendered nonflammable as needed. Alternatively, a metal wire is of course employable. A link **2** connected to the connecting means **11** is in the form of an elongated ring having a cutout portion and a V-shaped spring **21** fitted therein. From the cutout portion, the rope **1** is forced into the link **2** against the force of the spring **21,** whereupon the spring returns to close the cutout portion by virtue of its elasticity and to thereby prevent the escape of the rope. A speed regulator is indicated at **3,** a safety belt at **4** and a checking steel wire at **5.** The speed regulator **3** is composed of a soft rubber portion **31** and a hard rubber portion **32** which are joined together in the form of a cylinder, through the center of which extends a penetrating hole **33** for passing the rope **1.** When the speed regulator **3** is grasped by both hands with a controlled force, the soft rubber portion **31** flexes to a variable extent to change the degree of contact between the inner peripheral surface of the regulator **3** and the rope **1,** thereby varying the descending speed as desired. A metal retainer **34** is implanted in the hard rubber portion **32.** The safety belt **4** has one end wound around the speed regulator **3** and fixed thereto by a fastening member **41** having screws **42** to fasten the safety belt. Secured to the belt **4** is a metal member **43** to which a connector **44** is attached. The checking steel wire **5** has one end connected by a link **51** to the connector **44** on the metal member **43** and the other end surrounding the rope **1** and passed through a hole **34a** formed in the metal retainer **34.** The latter end is fixed to a holding member **52.** A spring **53** is interposed between the holding member **52** and the retainer **34.** The checking steel wire **5** is engageable into the rope **1** as seen in FIG. **6** by being pulled by the weight of the human body acting on the safety belt **4** when the speed regulator **3** is released from the hands, whereby the human body is prevented from dropping. The steel wire has such length that when in a usual state, i.e., when the speed regulator is grasped by the hands, it is slack but when the hands should be removed from the speed regulator it will be tensioned to effect a stopping action.

The life line will be used in the following manner. The link **2** is attached for example to a column of the building to suspend the line as illustrated in FIGS. **1** to **2.** The speed regulator **3** is firmly grasped, with the safety belt passed around the human body. The body then starts to descend slowly under gravity acting thereon. By adjusting the grasping force, the mode of contact between the inner peripheral surface of the speed regulator **3** and the rope changes to control the descending speed as desired. If the hands should slip off the speed regulator **3** inadvertently during descending, the gravity acting on the human body tensions the checking steel wire **5** to pull the holding member **52** toward the metal retainer **34** while compressing the spring **53.** Consequently, the steel wire **5** engages into the rope **1** as seen in FIG. **6** and prevents the body from dropping. When the speed regulator **3** is grasped again, the checking steel wire returns to the original state as shown in FIG. **5,** permitting the body to move down to the ground. The speed regulator is then lifted again for use as by pulling from above an unillustrated string tied to the top of the regulator.

As described above, the life line of this invention has a simple construction in which a specific speed regulator is attached to a rope. Even if the hands should be removed from the regulator, there is no danger of dropping or like accident. The life line is very easy to handle in that the descending speed can be regulated as desired merely by controlling the grasping power.

Although the speed regulator of the foregoing embodiment comprises a soft rubber member and a hard rubber member which are joined together in a cylindrical form to utilize the flexibility of soft rubber for speed regulation, the two members may alternatively be made of hard rubber and joined together by the fixed portion of the safety belt so as to be radially movable, such that the degree of contact between the inner peripheral surface of the regulator and the rope can be varied by controlling the displacement of the members with the grasping force for speed regulation. In this case, not only hard rubber but also any of rigid plastics and various metal materials can of course be used to make the speed regulator. When the regulator is made of rubber or plastics which permits its inner peripheral surface to contact the rope when the regulator is grasped by the hands, it may be in the form of an integral cylindrical body having a penetrating hole axially thereof.

The checking steel wire may be serrated on its inner periphery surrounding the rope to facilitate the engagement of the wire with the rope.

Of course, the life line of this invention is employable in combination with a rope ladder instead of using it singly.

The life line of this invention is simple to make and usable with safety and ease as described above. It is therefore very advantageous as life saving means in the event of a fire or like accident.

What is claimed is:

1. A life line comprising a rope, a speed regulator, a safety belt and a checking steel wire, said speed regulator having a substantially cylindrical main body formed with a penetrating hole for passing said rope, said main body being made of a material permitting its inner peripheral surface to come into contact with said rope to thereby regulate descending speed when said main body is grasped by the hands, said safety belt being fixed to said main body, said checking steel wire having one end connected to said safety belt and the other end surrounding said rope and attached to a metal retainer fixed to said main body, said checking steel wire being engageable into said rope by the weight of the human body acting on said safety belt when the hands are removed from said main body to thereby prevent the human body from dropping.

2. The life line as set forth in claim **1** wherein said material is rubber or plastics.

3. The life line as set forth in claim **2** wherein said speed regulator is shaped in the form of a substantially cylindrical integral body having the penetrating hole axially thereof.

4. The life line as set forth in claim **2** wherein said speed regulator comprises two members joined together in the form of a cylinder having the penetrating hole axially thereof.

5. The life line as set forth in claim **4** wherein one of said two members is made of flexible soft material and the other member is made of a hard material.

6. The life line as set forth in claim **4** wherein said two members are both made of a hard material and joined together by the fixed portion of said safety belt.

7. The life line as set forth in claim **1** wherein said speed regulator comprises two members made of a metal material and joined together by the fixed portion of said safety belt in the form of a cylinder having the penetrating hole axially thereof.

8. The life line as set forth in claim **1** wherein said speed regulator comprises two members joined together substantially in the form of a cylinder having the penetrating hole axially thereof, one of said members being made of a flexible soft material, the other member being made of a metal material.

9. The life line as set forth in claim **1** wherein said checking steel wire is serrated on its inner periphery surrounding said rope.

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