United States Patent [19]

Arancio

[11] **3,738,449**

[45] **June 12, 1973**

[54] **SAFETY DESCENT APPARATUS**

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[22] Filed: **Aug. 11, 1970**

[21] Appl. No.: **62,981**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 830,003, June 3, 1969, abandoned.

[52] **U.S. Cl.** **182/7**

[51] **Int. Cl.** **A62b 1/16**

[58] **Field of Search** 182/3, 4, 5, 6, 7

[56] **References Cited**

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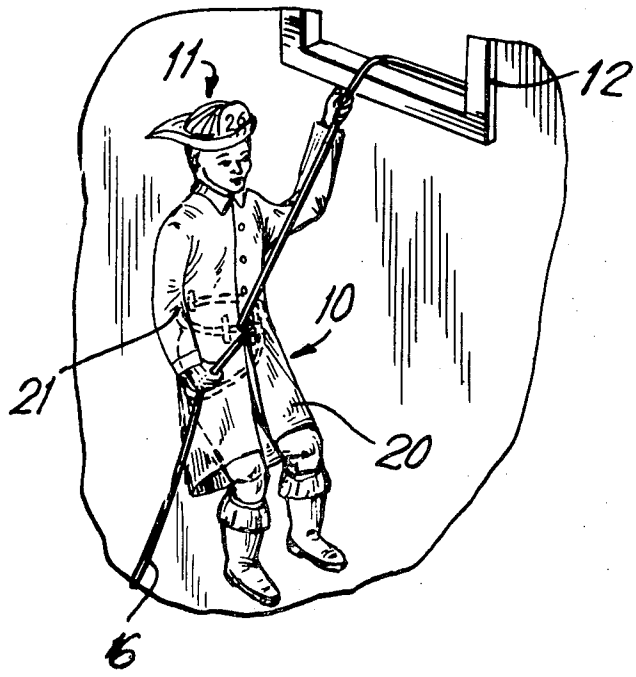
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Primary Examiner—Reinaldo P. Machado
Attorney—J. B. Felshin

[57] **ABSTRACT**

A harness is detachably supported inside a coat, and can be detachably fastened loosely around the wearer's waist and buttocks, so that the wearer can move around when the apparatus is not in use. A hook at one end of a rope is anchored around any substantial object, and the hook snapped onto the rope. The loose end of the rope is then thrown out of a window. The user wraps the rope three or four times around a hook on the harness and lets himself out of the window, supported by the anchored rope. To stop, the rope is pulled. To descend, the rope is fed up.

17 Claims, 14 Drawing Figures



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SHEET 1 OF 4

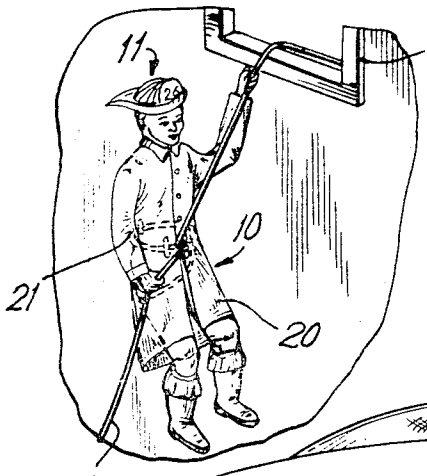
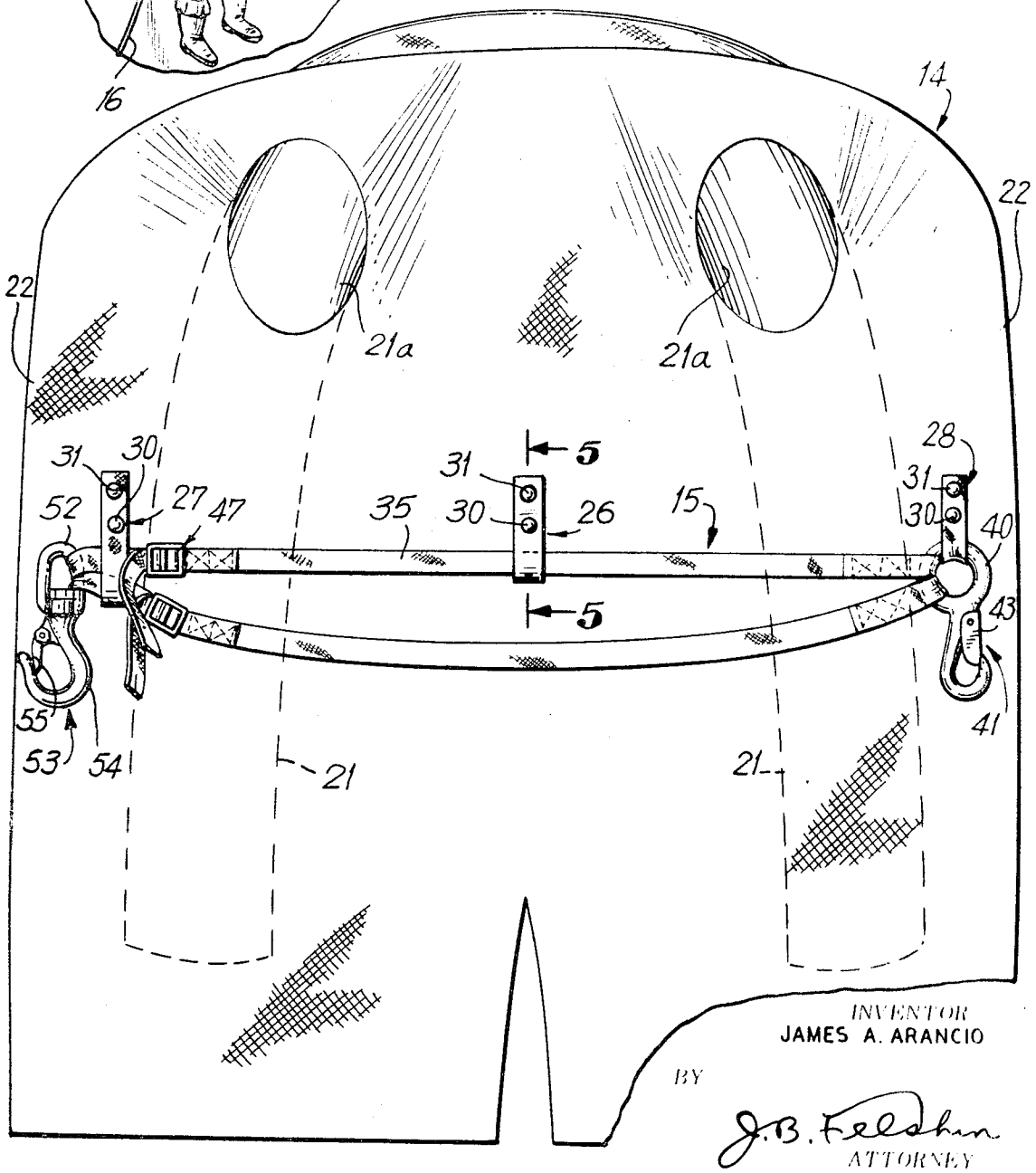


FIG. 1

FIG. 2

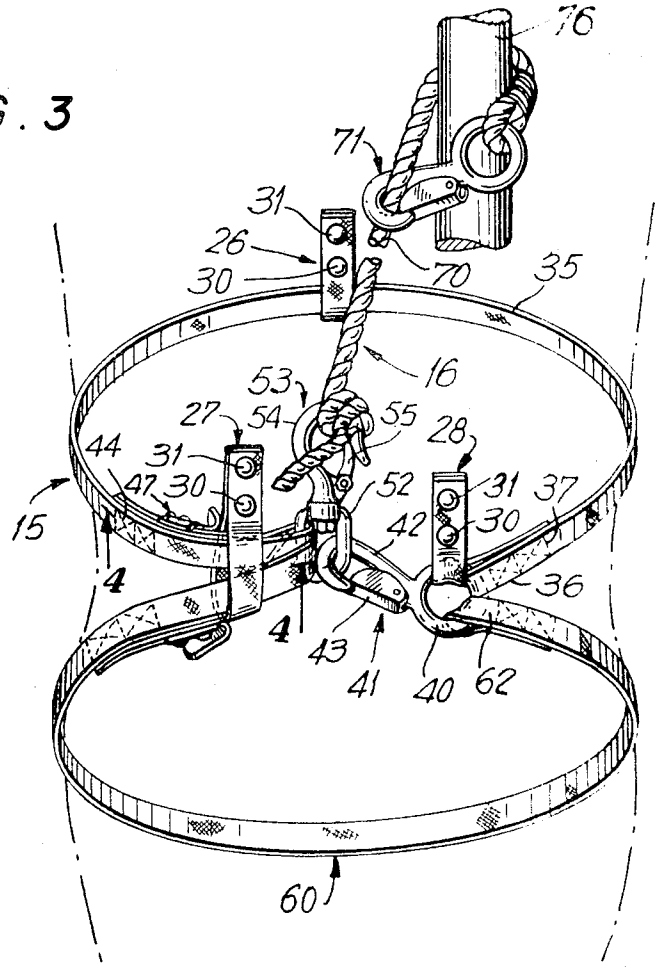


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FIG. 3



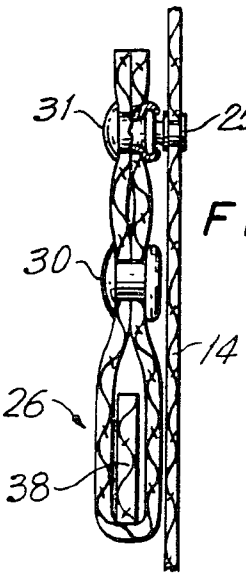


FIG. 5

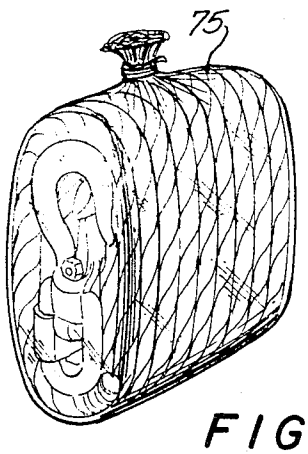
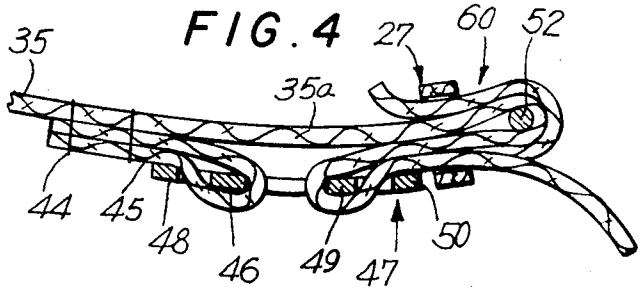


FIG. 6

FIG. 4



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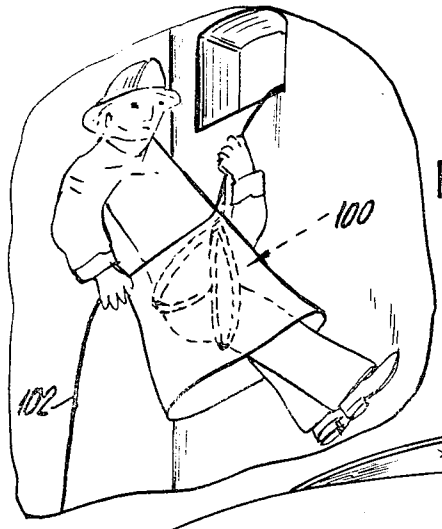


FIG. 7

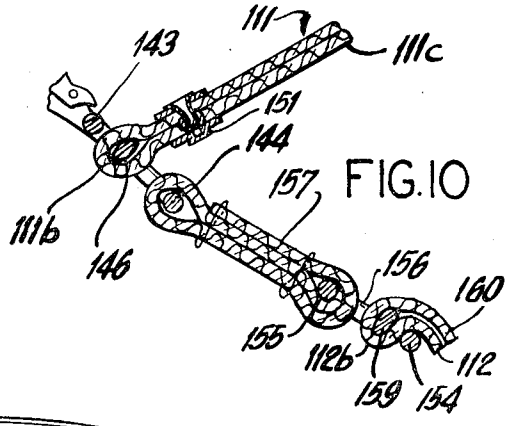


FIG. 10

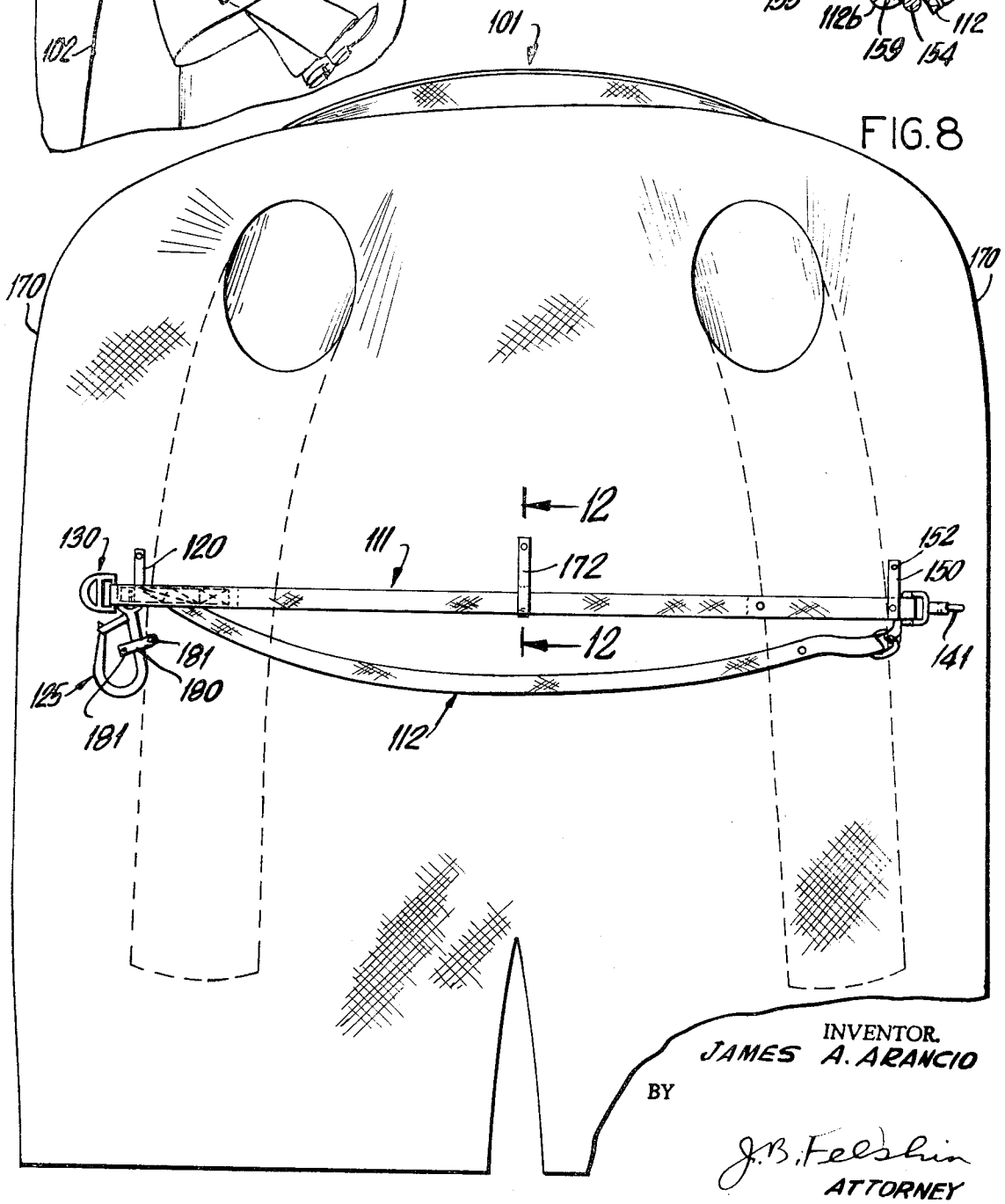


FIG. 8

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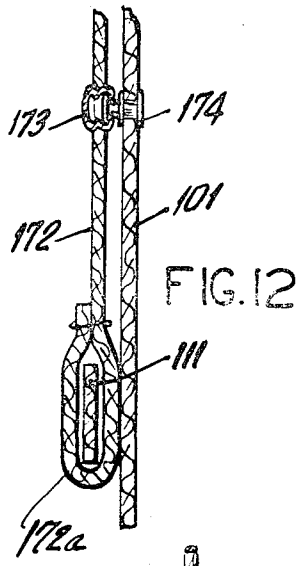


FIG. 12

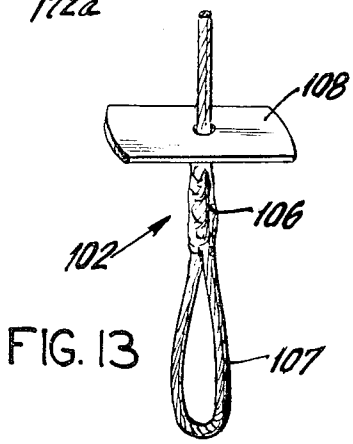


FIG. 13

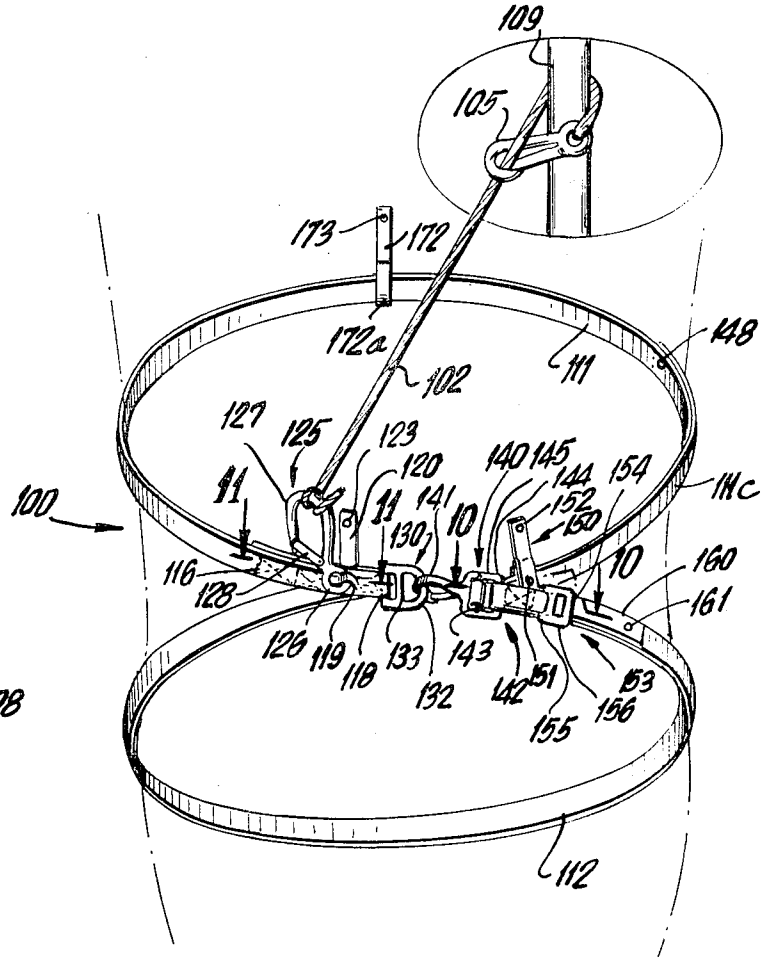


FIG. 9

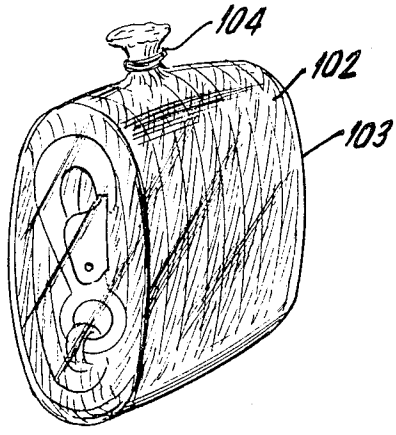


FIG. 14

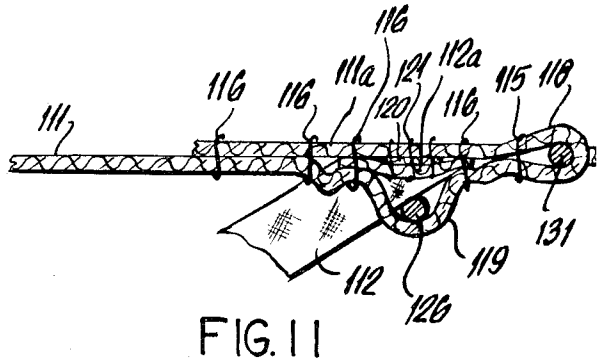


FIG. 11

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SAFETY DESCENT APPARATUS

This application is a continuation in part of my now abandoned application Ser. No. 830,003 filed June 3, 1969 for safety descent apparatus.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to safety descent apparatus for use by firemen, or for rescue, escape or searching operations. One use of this apparatus is to go to one floor below if a fireman or others are trapped on a burning floor of a building. The fireman can descend while holding one person to bring him down.

2. Description of the Prior Art

Descent devices are known which comprise an anchored flexible line or rope operatively controlling a harness in descent.

SUMMARY OF THE INVENTION

An object of this invention is to provide safety apparatus of the character described in which no knots are required and in which a hook on a line is secured to a substantial object, or the line is looped around an anchoring object and the hook snapped onto the line, and the line is then wrapped several times around a hook on a harness that a fireman or rescuer is wearing, so that the wearer can descend while his weight is supported by the anchored line. The wearer pulls the free end of the line to stop and feeds the line upwardly in short increments, to allow descent. The wearer can move around and work while the harness is not being used for descent purposes.

Another object of this invention is to provide apparatus of the character described in which the harness is detachably attached inside of the fireman's coat, and comprises a dangling hook which can readily be moved to the outside of the coat so that the line or rope can be readily wrapped therearound for descent purposes. This apparatus can be used with or without the coat. The coat is a holder for the harness to keep it ready for use but yet, is concealed. The weight of the harness is quite small. When using the apparatus for descent, the weight of the body of the wearer is on the harness, and not on the coat. The line or rope can be folded compactly into a plastic film bag which can be conveniently kept in a pocket of the coat. When it is desired to use the rope, the package is taken out of the pocket, the plastic bag ripped open, and the rope taken out for use.

Still another object of this invention is to provide highly improved apparatus of the character described comprising a harness which has an adjustable waist belt or strap, and an adjustable leg belt or strap encircling the legs of the wearer at the buttocks, and which belt becomes a seat for the fireman while he descends. These straps or belts are loose on the body of the wearer, so as not to hinder movement when the apparatus is not being used for descent. These straps or belts are adjusted to the wearer, and once adjusted properly, not too tightly, the wearer can work freely without being hindered by the harness.

A further object of this invention is to provide a strong, rugged and safe apparatus of the character described which shall be relatively inexpensive to manufacture, easy to use, comfortable to wear when not in use, and which shall yet be practical and efficient to a high degree.

Often the need for a rope is called for at a fire and it is necessary to send back to the apparatus for it. Too many times the rope is obtained too late to be effective and for this reason other implements or methods are devised to substitute for it. With this in mind a light compact unit to be carried by all hands and ready for immediate use has been designed. It has been designed to eliminate time consuming knots. The following outline illustrates just a few of its many uses.

1. Safety belt
2. Ladder belt
3. For Escape purposes.
4. Rescue
5. As guide line
6. For Hauling and lifting
7. To secure personnel while performing hazardous assignment.

1. As a Safety Belt.
   a. For members riding apparatus - Engine and Truck
2. As Ladder Belt.
   a. During ladder operations member may secure himself to ladder rung.
3. For Escape Purposes.
   a. Members trapped by fire with no other accessible means of egress, uses apparatus to descent to floor below fire, single slide.
4. Rescue.
   a. For quick removal of persons trapped by fire or other hazardous situations.
   b. Eliminates time consuming bowline on the bight.
5. As a Guide line.
   a. When smoke and debris make visibility impossible.
   b. To signal back to member behind you.
   c. Unusual layouts.
6. For Hauling and Lifting.
   a. Line can be used to haul equipment to upper floors.
7. To Secure Personnel While Performing Hazardous Assignments.
   a. Sawing operations on roof.
   b. Overhauling near open shafts.

The harness is attached (detachable) inside of the fire fighter's turnout coat and is comprised of a ladder hook which can be readily moved to the outside of the coat so that the required 3 or 4 turns can easily be taken for descent pruposes. The harness can be used with or without the coat. The coat is a holder for the harness to keep it ready for use but yet is concealed. The weight of the harness is approximately 2 pounds. When using the harness for descent, the stress is on the harness only, never on the coat.

Other objects of this invention will in part be obvious and in part hereinafter pointed out.

The invention accordingly consists in the features of construction, combinations of elements, and arrangement of parts which will be exemplified in the construction hereinafter described, and of which the scope of invention will be indicated in the following claims.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a perspective view, showing apparatus embodying the invention, being used by a fireman for descent purposes;

FIG. 2 is a perspective view showing a coat opened up to reveal the harness attached thereto;

FIG. 3 is a perspective view of the harness without the coat, on a wearer's body in descent;

FIG. 4 is an enlarged cross-sectional view taken on line 4—4 of FIG. 3;

FIG. 5 is an enlarged cross-sectional view taken on line 5—5 of FIG. 2;

FIG. 6 is a perspective view of the line or rope with safety snap hook, in a package;

FIG. 7 is a perspective view showing a fireman's descent on a modified apparatus;

FIG. 8 is an inside view of a fireman's turnout coat with a harness embodying said modified form of the invention, mounted thereon;

FIG. 9 is a perspective view of the harness of FIG. 8, on a body but without the coat;

FIG. 10 is an enlarged cross-sectional view taken on line 10—10 of FIG. 9;

FIG. 11 is an enlarged cross-sectional view taken on line 11—11 of FIG. 9;

FIG. 12 is a cross-sectional view taken on line 12—12 of FIG. 8;

FIG. 13 is a perspective view of the lower end of the suspension line of FIG. 7; and

FIG. 14 is a perspective view of the suspension line of FIG. 7, packaged.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now in detail to FIGS. 1 to 6 of the drawing, 10 designates apparatus embodying the invention, shown in use by a fireman 11 for purposes of descent in FIG. 1 from a window 12.

The apparatus 10 comprises generally of a coat 14, a harness 15 detachably or removably mounted thereon, and an anchoring line or rope 16.

The coat 14 may be a usual fireman's coat or any coat having a body portion 20, and arms 21, arm holes 21*a* and being split down the front forming side edges 22. The coat 14 is modified only to the extent that it is provided with male snap fasteners 25 along its centerline, at the inside of its back below the arm holes 21*a*, and also at the sides in inwardly spaced relation to the edges 22, all at about the same level. Three substantially similar loops are detachably attached to three snap fasteners 25 respectively, on the coat, one being a center loop 26, one a side loop 27 and another a side loop 28. The center loop 26 comprises a strip of cloth or other suitable material folded lengthwise in half (See FIG. 5), and attached together by interengaging snap fasteners 30, mediately the ends thereof, and attached together at the ends thereof by a female snap fastener 31 which can snap onto the male snap fastener 25. Loops 27, 28 are similarly attached together and similarly detachably attached to male fasteners 25 adjacent edges 22 of the coat. These loops can be snapped into or out of the coat. They are located inside the coat.

The harness 15 comprises a waist belt or strap 35, looped at one end as at 36. The looped end is stitched back in place, as by stitching 37. The loop 36 passes through an eye 40 of a connector member such as a safety snap hook 41, which may be like the safety snap hook shown in Fig. No. 3387 of North and Judd Manufacturing Company general hardware catalog No. 262 (New Britain Conn., 06050).

This safety snap hook comprises a hook 42 fixed to the eye 40, with a torsion spring pressed pawl 43 pivoted thereto as at 44 and engaging inside the tip of the hook. The loop 28 also passes through eye 40 as shown in FIG. 3. Other snap hooks may be employed.

Stitched to the inside of belt 35, short of its outer end, as at 44, is a strip loop 45. Loop 45 engages around the second strap 46 of buckle 47 which may be like the Tabler buckle shown in Fig. 01136 of page 39 of said North and Judd catalog No. 262. Said buckle has a first strap 48, a third strap 49 and a fourth strap 50 in addition to said second strap 46. The straps 48 and 50 are outside straps. The portion 35*a* of belt 35 passes through loop 27, then through a swivel loop 52 of a connector member such as a loose swivel safety snap hook 53 which may be like the one shown on page 40 of the Star Brand Tackle Blocks and Fittings for Heavy Hardware, Public Utility and Marine Catalog No. 115 of Boston and Lockport Block Company, Inc. Of 100 Condor Street, East Boston, Massachusetts 02128, listed under No. 4185 G. In this snap hook 53, the loop 52 is swivelled on a hook 54 provided with a spring pressed snap pawl 55. The strap end 35a, after passing through swivel loop 52, again passes through loop 27 (FIG. 4) and around strap 49 of buckle 47, then again through loop 27. It will now be understood that the length of belt 35 can be adjusted to fit the wearer.

It will be understood that the hook member 53 may be engaged with or snapped onto any anchoring means such as a ring on a strap looped onto a rung of a ladder or to any other object to serve as a safety measure to hold the wearer securely while hands are free to operate any apparatus.

The harness 15 further comprises a leg belt 60. One end of belt 60 is like the adjustable end 35a of belt 35. It has a loop, like loop 45, attached thereto and similarly looped around a strap of a buckle, like buckle 47. It also has one end passing through loop 27, through said swivel loop 52 of safety snap 53, then back through said loop 27, then around a strap of the buckle, and back through said loop 27. The belt 60 passes around the legs of the wearer loosely so that the leg strap can be pulled below the buttocks to permit the wearer to sit thereon when suspended, as explained hereinafter. At the other end of belt 60 is a loop 62 passing through eye 40 of safety snap hook 41.

When the coat is worn and buckled or closed at the front, the swivel hook 53 hangs down at the middle near the front split in the coat. The harness hangs from the coat. Its weight is only a few pounds. It is loose enough on the body of the wearer so as not to hinder movement or the work being done by the fireman. The weight of the harness being small does not impede the wearer's work. When the harness is not being used for purpose of descent, it just stays in the coat but is always ready for use.

The suspension line 16 may comprise a rope or other flexible element 70, to one end of which is attached a safety snap hook 71 which may be like the hook 41 as shown in FIG. 3, or like hook 53 as shown in FIG. 6, to be explained hereinafter. The rope 70 may be made of nylon, ⅝ inch in diameter and spliced to the safety snap hook, or it may be of any other suitable material and of suitable tensile stringth, length and diameter. Any suitable flexible line or cord will do.

The rope may be compactly folded into a clear plastic film bag 75 (FIG. 6), which may be carried in a pocket of the coat.

The suspension line thus consists of a length of nylon line, to which a forged steel safety snap is spliced to one end and a loop eye spliced to the other end. It is spe-

cially folded for quick use and is packaged in a plastic bag. Features such as compactness, lightness in weight and great strength factor make this unit practical in many aspects of fire fighting. It has been especially designed to work in conjunction with the harness. The main function of the safety snap is to eliminate time consuming knots.

To use the apparatus for descent, the bag **75** is ripped open, the hook of the line **16** is passed around any suitable, substantial, fixed object such as a riser **76**, and the hook is then snapped onto the rope. The hook **53** is then pulled out from the coat, and the rope is wrapped several times (3 or 4 times) around the hook **54** as shown in FIG. **3**. The fireman lets himself out of the window holding the loose end of the rope in one hand, as shown in FIG. **1**, and the taut part of the rope is held with his other hand. To stop, the user pulls the free end of the rope. To descend, the user feeds the rope up toward the hook **54**.

The rope should be strong enough to permit the fireman to carry a person being rescued.

In a majority of cases, where a fireman or others are trapped in a burning floor, it is only necessary to descend one floor. Hence rope lengths of 30 feet to 50 feet are usually sufficient.

This apparatus can be used for rescue operations other than those which occur in fires.

The harness may be used without the coat and is detachable from the coat. No knots are required. The harness is adjustable for various sized users. The rope can be of any desired length.

In FIGS. **6** to **14**, there is illustrated a modified form of the invention. The apparatus or device of FIGS. **6** to **14** comprise a harness **100**, a fireman's turnout coat **101** and a suspension line **102**.

The suspension line may be wound as shown in FIG. **6**, and packaged in a clear plastic bag **103** with its neck constricted and tied by a string **104**, all as shown in FIG. **14**. At one end of the suspension line is a snap lock hook **105**. The other end of the line may be folded back and spliced on at **106**, to form a stop and a loop **107**. A metal plate **108** has a hole for the rope to go through. The plate **108** can contact stop **106**. Thus, if a fireman is sliding down line or rope **102**, he won't slide off, since the plate **108** prevents sliding off. To anchor the line, the upper end of the rope or line is wrapped about a pipe or any other fixed object, and the snap hook **105** engaged with the rope.

The harness **100** comprises a waist belt **111** and a leg belt **112**. These may be made of canvas or leather or of any other suitable flexible material. One end **111a** of belt **111** is folded back onto itself as shown in FIG. **11**, and stitched to the belt as at **115**, to provide an end loop or eye **118**, and a front loop or eye **119**. The loop or eye **119** is narrowed, as shown in FIG. **9**. The adjacent end **112a** of belt **112** is inclined upwardly and interposed between belt **111** and bent back portion **111a** of said belt, and stitched thereto by lines of stitching **116**. A strap **120** has its lower end interposed between belt ends **112***a* and **111a** and stitched thereto as by stitching **121**. At the upper end of strap **120** is a female snap fastener member **123** for the purpose hereinafter appearing.

For engagement with the suspension line **102** there is provided a hook member **125** which comprises an eye **126** through which the eye or loop **119** passes. Member **125** further comprises a hook **127** integral with the eye **126**, and a spring pressed snap lock or latch **128** pivoted to the neck of the hook, for closing the hook. As shown in FIG. **9**, the suspension line may be wrapped about hook **127**. The rope is paid out to allow descent and pulled down, below the hook, to brake the descent.

A first buckle **130** has an end transverse strap **131** passing through eye or loop **118**, an end loop **132** and an intermediate cross-strap **133**.

Means is provided to interconnect the opposite ends of belts **111**, **112** to each other; to allow selective adjustment of the lengths of said belts; and to detachably connect said interconnected opposite ends of said belts to said buckle **130**. To this end there is provided a second buckle **140** having at one end a hook **141** provided with a spring pressed snap lock or latch to close the hook. Extending from hook **141** is a buckle portion **142** comprising parallel end portions **143**, **144** interconnected by parallel side portions **145**. An intermediate, transverse slider pin or rung **146** has its ends befurcated and slidably engaging side portions **145** of the second buckle. An opposite end **111b** of the waist belt **111** is wrapped around slider pin and folded back at **111c** against the outside of said belt. The length of belt **111** maybe individually adjusted. After adjustment, the folded back portion may be fixed in place against flapping and to maintain the adjustment, by a removable snap fastener **148**. A second strap **150** may be looped about belt **111** and/its folded back portion **111c**, to be disposed close to the second buckle **140**. After adjustment of the length of belt **111**, strap **150** may be fixed to said belt by a detachable snap fastener or rivet **151**. Strap **150** has a female snap fastener member **152** at its upper end for the purpose hereinafter described.

There is further provided a third buckle **153** which has two end cross straps **154**, **155** interconnected to a pair of parallel side portions **156**. Straps **144** and **155** of buckle **140**, **153** are interconnected by a flexible strap **157**. On side portions **156** is slidably mounted a cross-pin **159**.

The opposite end **112b** of leg belt **112** is wrapped around pin **159** and folded back at **160** against the outside of said belt. The length of belt **112** may be adjusted. After adjustment, belt end **160** may be detachably fastened to the main body of the belt by a snap fastener or rivet **161**.

The harness may be detachably supported inside the fireman's turnout coat **101**, similar to coat **14** of FIG. **2**, at waist height. This is accomplished by means of straps **120** and **150**. The female fastener members on said straps are snapped onto complementary snap fastener members attached to the coat adjacent the split front edges **170** of the coat and located at the inside of the coat, at waist height.

A third strap **172** carries a female snap fastener member **173** which may be snap fastened to a male snap fastener member **174** riveted to the coat at the middle of the back at waist height. Snap fastener member **174** is similar to the male snap fasteners attached to the coat near the split edges **170** for engagement with the snap fastener members **123**, **152** on straps **120**, **150**, and are similarly riveted to the coat.

Strap **172** has a loop **172***a* slidably receiving belt **111**.

The hook member **125** may be removably strapped to the inside of coat **101** by a strap **180** having snap fasteners member **181** adopted to snap onto complementary snap fasteners on the coat. Strap **180** is used when the harness is worn but not being used, in order to keep

the hook member from swinging around. Strap **180** can easily have one end detached to allow the hook to pass out between the split edges **170** of the coat, for engagement with the suspension line.

It will thus be seen that there is provided an article in which the several objects of this invention are achieved, and which is well adapted to meet the conditions of practical use.

As possible embodiments might be made of the invention, and as various changes might be made in the embodiments above set forth, it is to be understood that all matter herein set forth or shown in the accompanying drawings, is to be interpreted as illustrative only.

I claim:

1. In a human body lowering device, a body harness comprising a flexible waist belt, a flexible leg belt, each of said belts having a first end and a second end, means to interconnect said pair of first ends of said belts, means to interconnect said pair of second ends of said belts, means to detachably connect said interconnected pair of first ends of said belts to the interconnected pair of second ends of said belts at the front of the body with the waist belt encircling the body at the waist and the leg belt encircling around and beneath both legs of the body, beneath the buttocks, and means to selectively adjust the length of each belt, said means to interconnect the first ends of said belts comprising stitching attaching said first ends to each other, said means to detachably connect said first ends of said belts to the second ends of said belts, comprising a first buckle, a first loop at said stitched together first ends of said belts engaging around an element of said first buckle, a second buckle, the second end of one of said belts adjustably passing around an element of the second buckle, a third buckle, the second end of the other of said belts adjustably passing around an element of said third buckle, and means to interconnect said second and third buckles.

2. The combination of claim **1**, and means to attach the second ends of said belts to their respective belts after adjustment of the lengths of said belts.

3. The combination of claim **1**, said means to detachably connect the interconnected first ends of said belts to the interconnected second ends of said belts comprising said first and second buckles one of said first and second buckles having a snap lock hook to engage an element of the other of said first and second buckles.

4. The combination of claim **3**, a second loop at said stitched together first ends of said belts, and means engaging through said second loop, to engage a suspension line wrapped therearound for sliding said body down said line.

5. The combination of claim **4**, said last means comprising a hook provided with a snap lock.

6. The combination of claim **5**, a coat open at the front and having front split edges, and means to detachably attach said harness to the middle of the inside of the back of the coat and to the inside of the back of the coat adjacent said front split edges.

7. The combination of claim **7**, said attachment of said harness to the back of said coat and adjacent said front split edges, being substantially at the same level.

8. In a human body lowering device, a body harness comprising a flexible waist belt, a flexible leg belt, each of said belts having a first end and a second end, means to interconnect said pair of first ends of said belts, means to interconnect said pair of second ends of said belts, means to detachably connect said interconnected pair of first ends of said belts to the interconnected pair of second ends of said belts at the front of the body, and means to selectively adjust the length of each belt, said means to detachably connect said pair interconnected first ends of said belts to the pair of interconnected second ends of said belts comprising a first hook member connected to one of said pair of interconnected ends, means on the other of said pair of interconnected ends hookingly engageable by said hook member, and a second hook member mounted on one of said first pairs of interconnected ends of said belts, and being movable relative to said hookingly engageable means, said second hook member to slidably engage a suspension line wound therearound for sliding the body down such line, said second hook member being located at the front of the body when said first pair of interconnected belt ends are connected to said second pair of interconnected belt ends.

9. The combination of claim **8**, one pair of adjacent ends of said belts being separate one from the other and movably connected one relative to the other.

10. The combination of claim **8**, in combination with said suspension line wound around and slidably contacting said second hook member in a manner allowing paying out the line as the body lowers.

11. The combination of claim **8**, and means to detachably hold said second hook member to the inside of said coat.

12. The combination of claim **8**, said suspension line comprising a flexible elongated element, and a snap hook at one end of said element.

13. The combination of claim **12**, a stop at the other end of said element, and a plate having a hole therein, through which said element passes, and said plate being located adjacent said to stop.

14. The combination of claim **8**, a coat open at the front and having front split edges, means to detachably attach the harness to the inside of the back of the coat and to the inside of the coat adjacent said split edges.

15. The combination of claim **14**, said means to detachably attach said harness to said coat comprising a plurality of loop members connected to said harness, and means to quickly detachably attach said loop members to said coat.

16. The combination of claim **15**, one of said loop members comprising a loop slidable on an intermediate portion of said waist belt.

17. The combination of claim **16**, and other of said loop members being located at the interconnected first and second ends of said belt.

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