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Dorr

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(54) **WINCH LINE SAFETY DEVICE AND METHOD THEREFOR**

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(51) **Int. Cl.**[7] **B66D 1/00**
(52) **U.S. Cl.** **254/323**
(58) **Field of Search** 254/323; 43/19, 43/42.39, 42.49

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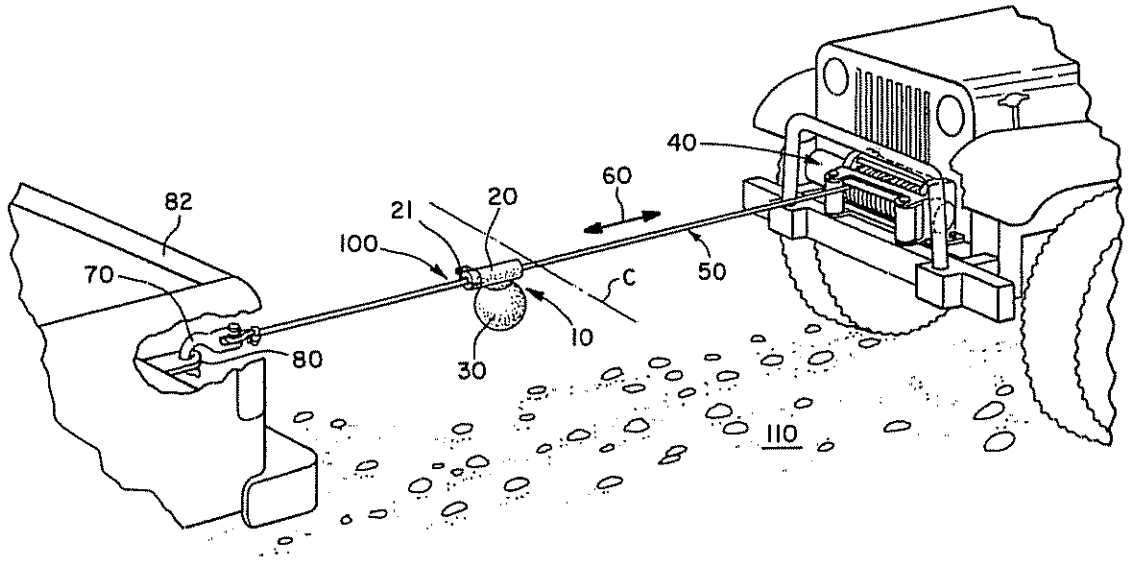
(57) **ABSTRACT**

A safety device for a winch for minimizing line whipping when the line improperly releases. A weight is coupled to the line at a selected region on the line when the line is extended from the winch to winch an object. When the extended line suddenly releases the weight provides a weighted pivot for the released cable. The safety method provides coupling a weight to the line and, locking the weight at a selected region of the line when the line is extended from the winch for winching. When the extended line suddenly releases the locked weight provides a weighted pivot for the released cable.

15 Claims, 6 Drawing Sheets



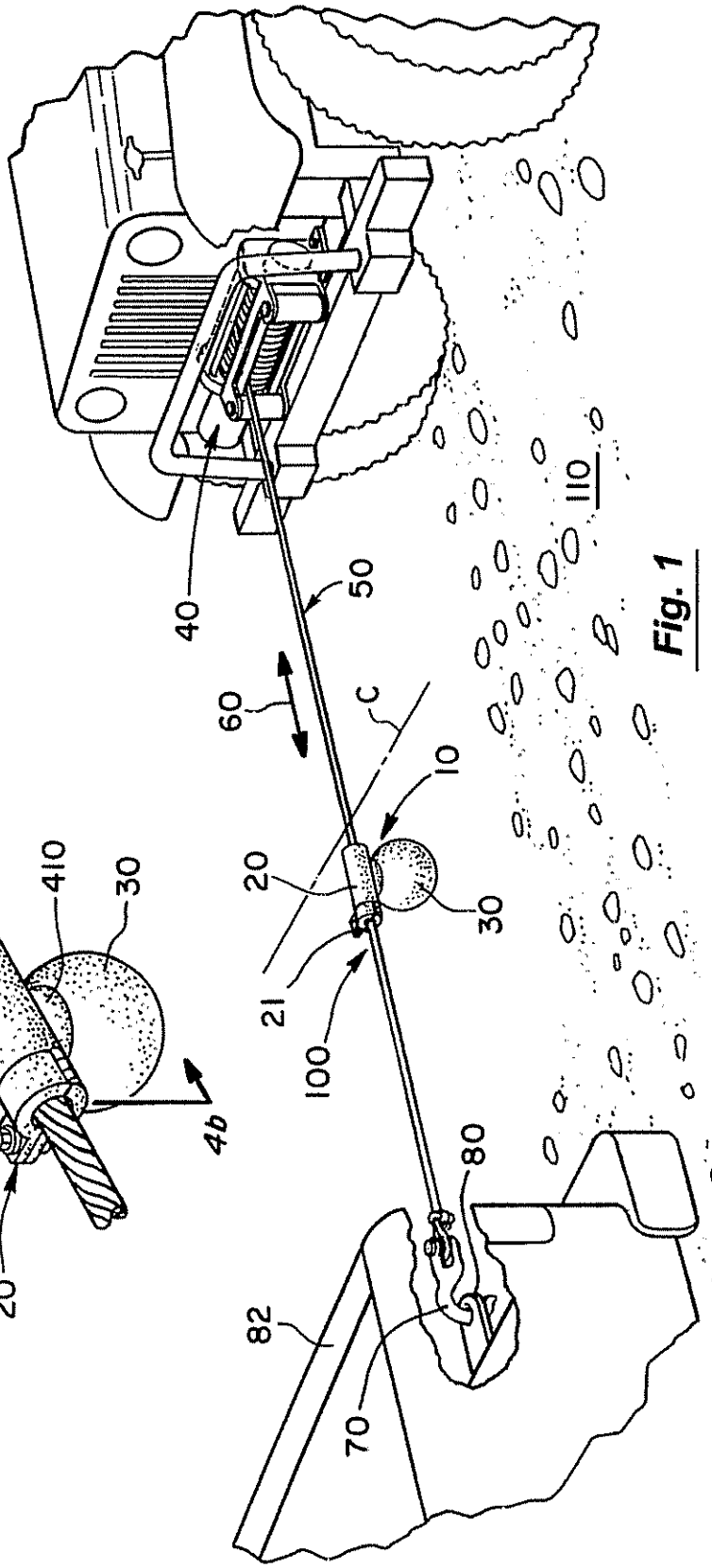


Fig. 1

Fig. 3

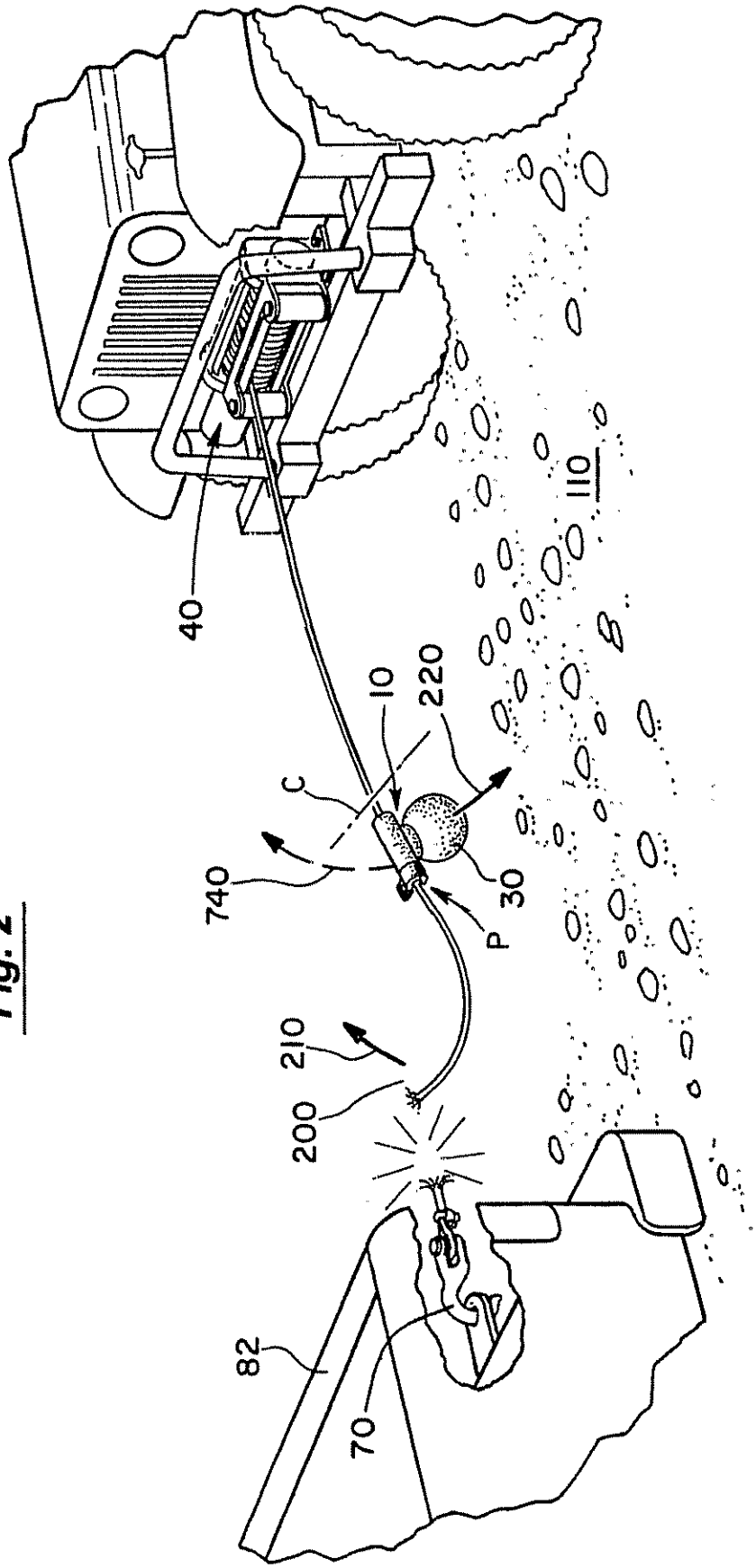


Fig. 2

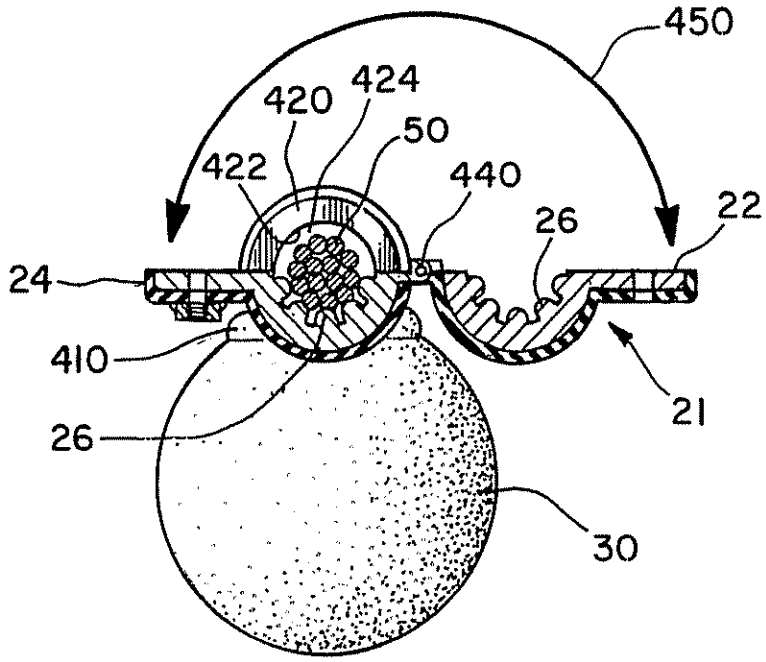

450
420
424
50
422
440
26
22
24
410
21
26
30

Fig. 4A

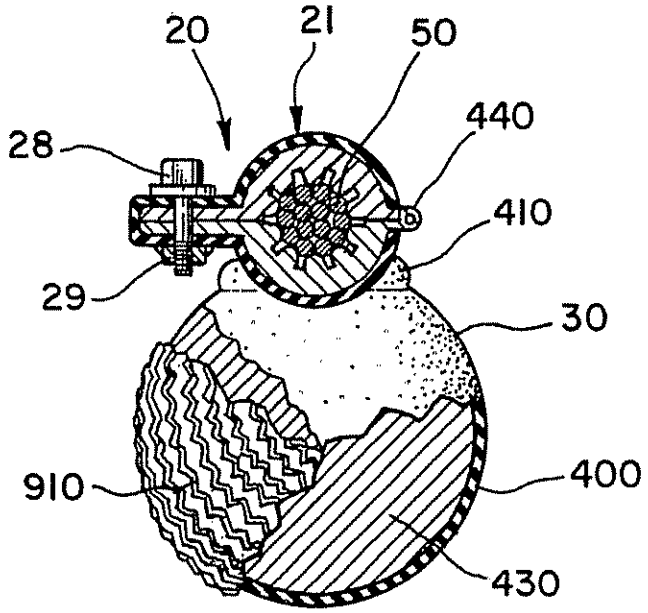

20
21
50
440
28
410
29
30
910
400
430

Fig. 4B

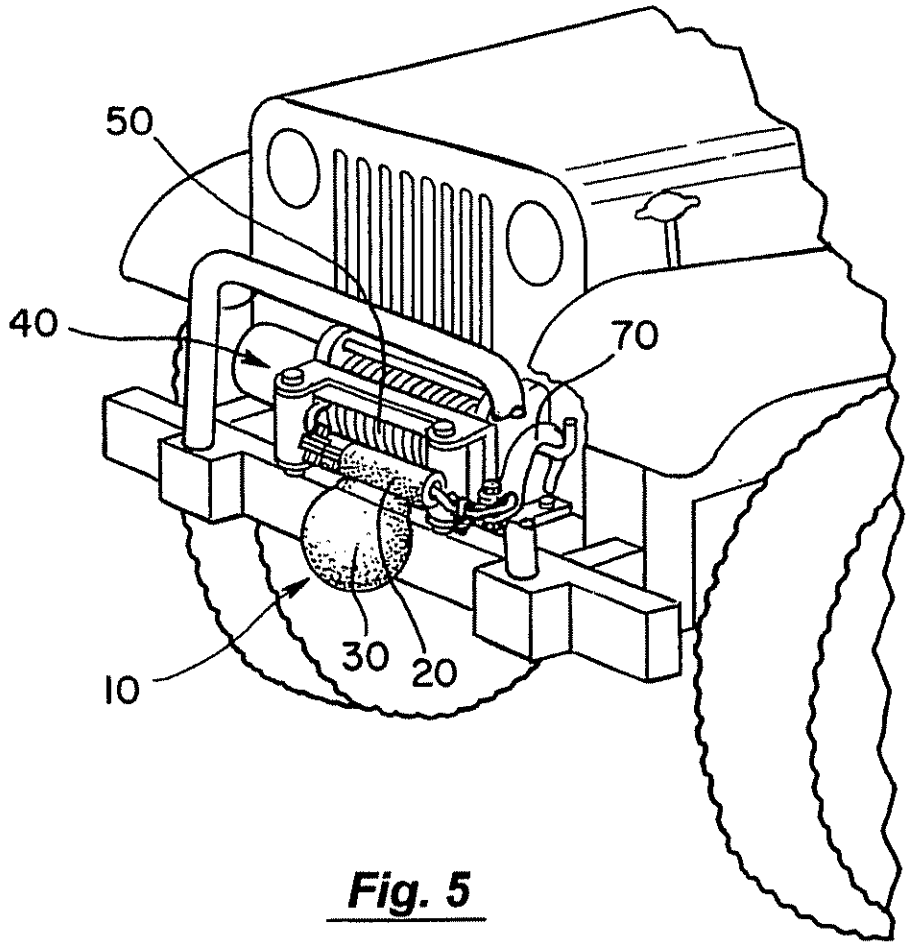


Fig. 5

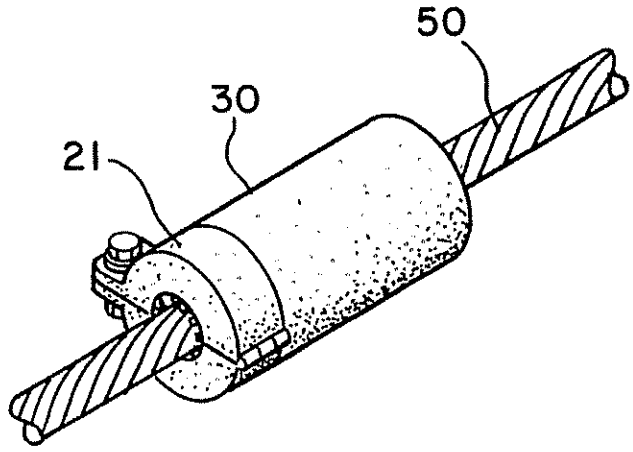
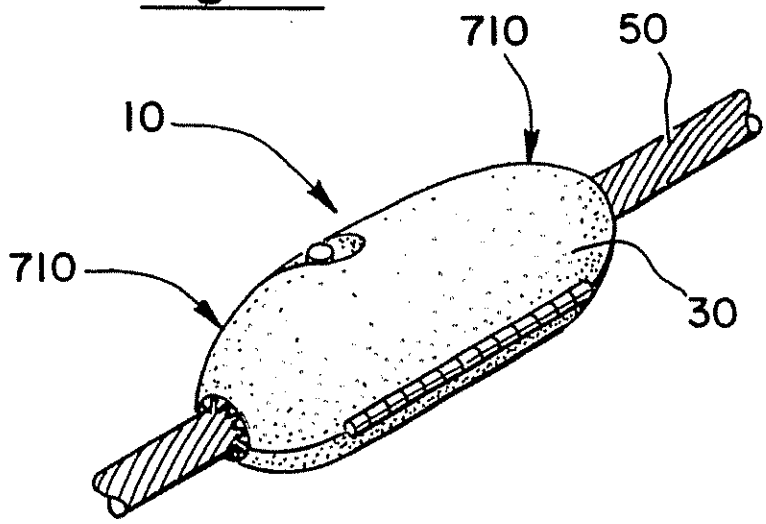


Fig. 6

Fig. 7A



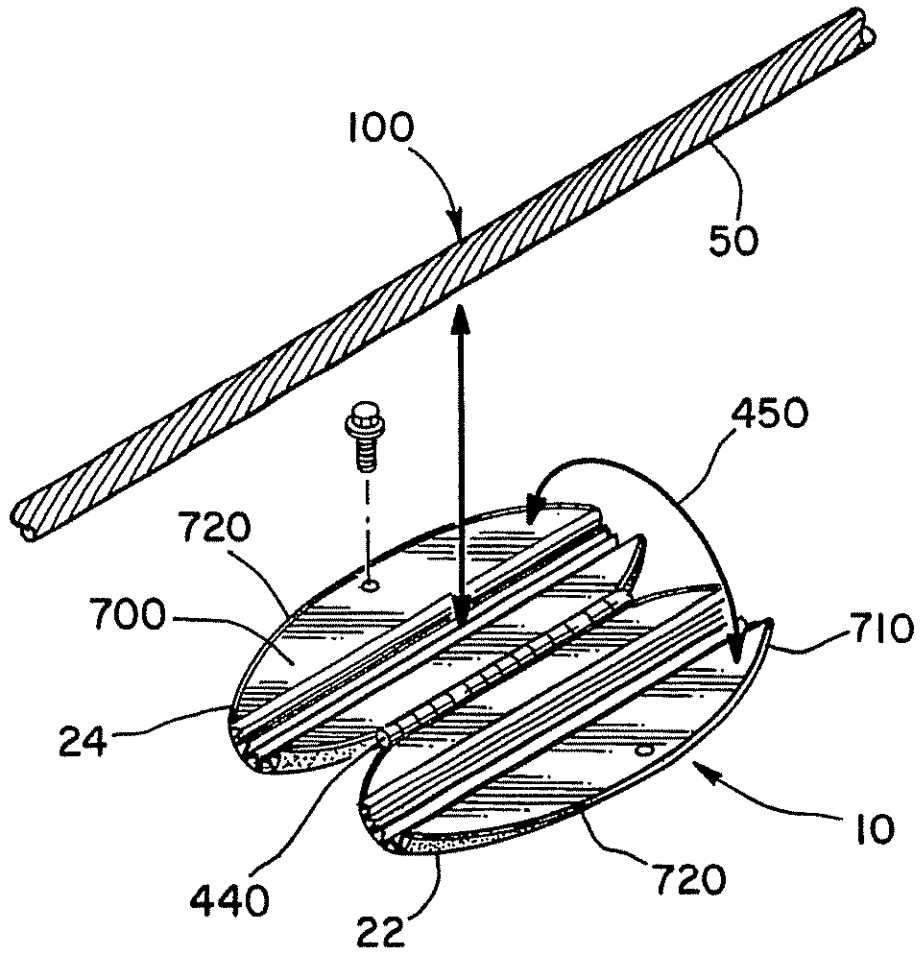


Fig. 7B

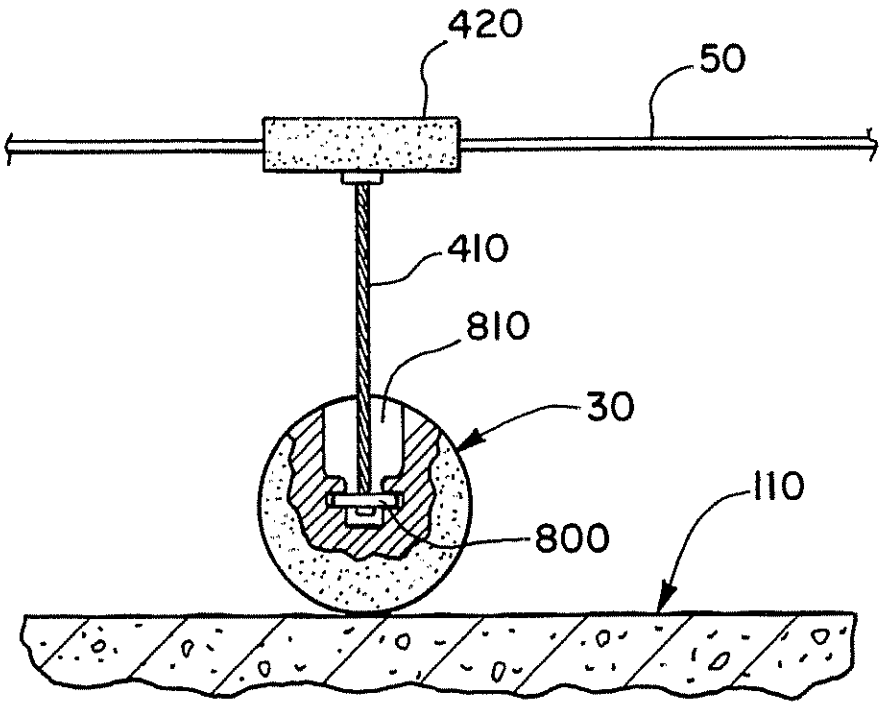


Fig. 8

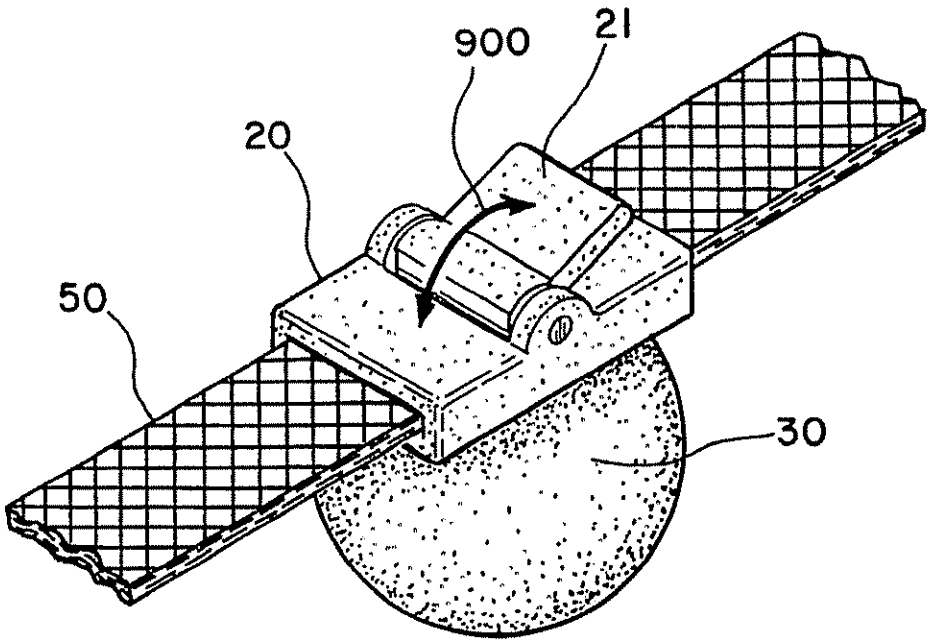


Fig. 9

WINCH LINE SAFETY DEVICE AND METHOD THEREFOR

RELATED APPLICATIONS

This application claims the benefit of U.S. Provisional Patent Application Ser. No. 60/335,525 filed Oct. 31, 2001.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a winch line safety device and method and, more particularly, to a device and method for minimizing line whipping upon line breaking or other improper line release.

2. Discussion of the Background

Off-road four-wheeling has become a major sporting and recreational past time. Most 4×4 vehicles also carry a winch which can be used for a variety of purposes. Rarely, when the line in the winch is in use and under severe tension it suddenly releases which may cause the released end of the line to whip. The sudden release may be due to the line breaking or, for example, the object hooked to may break. The whipping end of the line may cause damage to the vehicle carrying the winch such as breaking a windshield or damaging the body of the vehicle.

It is known to raise the hood of the vehicle to stop the free end of the line when whipping so as to prevent windshield damage.

It is also known to throw an item such as a jacket, a blanket or floor mats over the line in use so that in the event the line releases and whips, the item aids to reduce line whipping through a parachute action. For example, Warn Industries recommends using a heavy quilted mover's blanket located midway between the winch and the anchor point to absorb the energy should the line break ("The Basic Guide to Winching Techniques," 2001, www.warn.com).

A need exists for a safety device and method for reducing/minimizing line whipping when a line winch is under tension and then suddenly releases.

SUMMARY OF THE INVENTION

The safety device of the present invention is used to prevent a winch line from whipping when the line improperly releases. A weight is coupled to the line at a selected region on the line when the line is extended from the winch to an object. When the extended line suddenly releases the weight provides a weighted pivot for the released line.

A safety method of the present invention provides coupling a weight to the line and locking the weight at a selected region of the line when the line is extended from the winch for winching to an object. When the extended line suddenly releases the locked weight provides a pivot for the released line.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is an illustration showing a winch with its line extended out from the winch and the safety device of the present invention coupled to the line.

FIG. **2** is the illustration of FIG. **1** in which the extended line suddenly releases with the safety device of the present invention providing a weighted pivot for the released line.

FIG. **3** is a perspective view of one embodiment of the winch line safety device of the present invention.

FIGS. **4A** and **4B** are planar views, with a partial cross section, showing the locking of the weight of the present invention to the line in a selected region on the line.

FIG. **5** is the winch of FIG. **1** with the line fully retracted into the winch and the safety device of the present invention held at the hook end of the line.

FIG. **6** is a perspective view of a second embodiment of the winch line safety device of the present invention.

FIGS. **7A** and **7B** illustrate a third embodiment of the winch line safety device of the present invention.

FIG. **8** is a fourth embodiment of the winch of the present invention.

FIG. **9** is a variation of the locking mechanism of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

1. Overview.

The safety device **10** of the present invention, as shown in FIG. **1**, includes a coupler **20** and a weight **30**. In FIG. **1**, the winch **40** has a line **50** under tension, as shown by arrow **60**, when the hook end **70** of the line **50** is hooked to an anchor point **80**. The anchor point **80** can be another vehicle **82**, a tree, etc. Whatever the anchor point **80** is, does not limit the teachings of the present invention. In the following the term "winch line" is used to discuss the invention set forth in the drawings. The term "winch line" shall mean wire rope, metal cable, nylon strap, nylon line, or any other lines manufactured of material to meet winching load requirements.

The safety device **10** of the present invention engages by locking to the line at a region **100** on the line **50** which is selected by a user of the present invention. In FIG. **1**, C is the approximate centerline between the anchor point **80** and the winch **40**. Typically, the user selects region **100** near or at the centerline C, but the present invention is not limited to use at this location. The user locates and locks the safety device **10** before the line **50** is put under tension.

As shown in FIG. **2**, when the line **50** suddenly releases (such as through breakage of the wire rope **50** or a portion of the anchor point **80** or object **82** breaking off, etc.), the free end **200** of the line **50** whips backwardly **210** usually towards the winch **40**. The weight **30** of the present invention seeks to drop in the direction of arrow **220**. The dropping of the weight **30** also tends to cause a pivot P near the weight **30** on the line **50**. The dropping of the weight **30** and the creation of the pivot P tend to restrict how far back the free end **200** can whip **210**. What causes the breakage (or release) of line **50** is immaterial to the teachings of the present invention.

In one embodiment of the present invention, as shown in FIGS. **1–6**, the safety device **10** is always coupled to the line **50**. In this embodiment, the safety device **10** is at the hook end **70** when the line **50** is fully retracted in the winch **40** as shown in FIG. **5**. When the line **50** is extended-from the winch **40**, the safety device **10** slides along the line **50** to the selected region **100** by the user wherein the user locks the safety device **10** to the line **50**.

In another embodiment, as shown in FIGS. **7A** and **7B**, the safety device **10** is releasable from the line **50** when the weight is not in use. When the line **50** is hooked to the anchor point **80**, the user locks the safety device **10** to the line **50** at the selected region **100**. This embodiment while functioning as in the first embodiment to provide a pivot P, provides an aesthetic advantage when the user does not want the safety device **10** affixed to the line **50** when driving about and not using the winch **40**. The safety device **10** can be stored elsewhere in the vehicle.

In one variation of the present invention, the safety device **10** is brightly colored, as a solid color, as a pattern, or having graphics to remind the user to use the safety device **10** on the

line **10** at a selected region **100**. The safety device **10** of the present invention can be manufactured in a number of embodiments, such as, but not limited to those presented next. The safety device **10** of the present invention, unlike the use of a conventional blanket, is coupled to the line **50** and provides a weighted pivot P. Any weighted safety device **10** performing this function and method, other than those discussed next, fall within the scope of the present invention

2. Weight **30**.

In FIGS. **3**, 4A and 4B, one embodiment of the safety device **10** of the present invention has a downwardly extending weight **30**. The weight **30** is shown as a ball **30**. Weight **30**, however, can be any shape, spherical, triangular, teardrop, square, rectangular, trapezoidal, etc. The weight can be made from one material or of a composite of more than one material. The weight **30** can be made of metal or a softer, rubber-like (or plastic) material.

As shown in FIG. 4B, the weight **30** can optionally be coated **400** with a suitable coating such as a rubber-like or durable foam or any other suitable "soft" coating material that can withstand the severe environmental elements of outdoor use. The weight, in another variation, can have preformed raised shapes **410** on its outer surface such as outwardly extending shallow cylinders, cups, ridges, etc. to provide for shock absorption when the weight hits an object. Any suitable shock-absorbing material can be used such as rubberized and/or foam materials. In one variation of the present invention, the weight **30** is spherical (or teardrop) in shape with a colored or a brightly colored (e.g. yellow), durable rubberized (or plasticized) coating **400**. In other variations, the coating **400** can be a harder coating, and in some variations, the coating **400** is not used. The coating **400** in one variation covers the coupler **430**, the connection **410**, and the weight **30**.

In FIGS. **3**, 4A, and 4B, the weight **30** in one embodiment is connected **410** to a coupler **420**. Coupler **20** has two components: top **420** and connector **410**. The coupler top **420** is preferably a sleeve or cylinder of strong material which goes over the line **50**. The inside surface **422** of the coupler top **420** can be spaced **424** from the line **50** or slightly abutting it, not shown. The spacing **424** allows the user to easily slide the safety device **10** over the line **50**. Again, the coupler top **420** can be any desired shape and the invention is not limited to the shape, length, or the composition of material used. In one variation, the coupler top **420** is metallic, such as iron or steel, welded **410** to connect to the iron or steel body **430** of the weight **30**. In another variation, the coupler connection **410** is a rivet, screw, joint, pivot, or any other mechanical means for connecting the weight **30** to the coupler top **420**. In another variation, the connector **410**, as shown in FIG. **8**, is a cable (or any other line) of sufficient length that connects the weight **30** to the coupler **420** so that the weight **30** rests on the surface **110** of the ground. In one variation, the cable **410** is connected **800** internally to the weight **30** so that the cable **410** can be stored in a hollow portion **810** of the weight **30**. In another variation, not shown, the cable **410** can automatically retract, through use of a conventional spring mechanism, not shown into the cavity **810**.

In the embodiment of FIGS. 7A and 7B, the weight **30** is an elongated cylinder disposed about the line **50**. Again, any shape, such as a spherical size, could be used. The elongated cylinder as shown in FIG. 7B has the iron weight portion **700** coated with the coating material **710**. In this embodiment the edges **710** are curved or rounded. This design of rounding the edges could also be utilized with respect to the embodiments of FIGS. **3**, 4A, and 4B. The goal in using the curved edges **710** and **720** is to minimize any sharp edges. As shown in FIG. **2**, it is possible for the weight **30** to move in the direction of dotted arrows **740** if the tension **60** (FIG. **1**) is so great that it actually causes the weight **30** to be lifted up even though there is a tendency of the weight **30** to drop towards the ground. This results in a complex interaction of forces with the line **50** and the whipping end **200** in the direction of arrow **210**, the tension **60** also causing the weight **30** to lift upwardly **740** with the force of gravity seeking to drop the weight **30** in the direction of arrow **220**. The safety device **10** shown in FIGS. 7A and 7B of the present invention, having rounded edges and the use of a coating **710** minimizes such impact. The goal of the safety device **10** of the present invention is to minimize damage as it is difficult, if not impossible, to eliminate damage upon improper line **50** release as shown in FIG. **2**.

3. Coupler **20** and Lock **21**.

In FIGS. 4A and 4B, one embodiment of the coupler **20** the present invention is shown. The coupler **20** couples the weight **30** to the line **50**. In FIGS. 4A and 4B the, coupler **20** has a lock **21** with half portions **22** and **24** and a gripping region **26** which grips the outer surface of line **50** as shown in FIG. 4B. Lock **21** uses a bolt **28** to engage a nut **29**. The nut **29** is affixed to half portion **24**. The bolt **28** is tightened into place so that the lock **21** firmly engages the outer surface of the line **50**. The engagement of the outer surface is designed to firmly engage, but not damage the line **50**. The half portion **24** of the lock **21** is an integral extension of the cylinder **420** so that when the bolt **28** is tightened into place, the safety device **10** of the present invention is locked to line **50** in region **100**.

In FIGS. 7A and 7B, the weight **30** is contained in the coupler **20**, however, the two half portions **22** and **24** of the lock pivot about the hinge **440**. In this variation, the weight **30** releases from the line **50** and the safety device **10** of the present invention can be separately transported from the winch **40** so that it is not permanently mounted to the winch **40** (as shown in FIG. **5**) for the embodiments of FIGS. **3**, 4A and 4B.

It is to be expressly understood that many different mechanical approaches can be utilized to couple **20** the weight **30** to the line **50**, either in a permanent relationship or in the removable relationship as discussed above. The use of two half portions **22** and **24** hinged together as a lock is but one of many possible mechanical locking approaches. Furthermore, the use of a bolt **28** and a nut **29** is only one of a vast number of mechanical approaches for securing the lock **21**. In another variation, where the line **50** is a nylon strap, the coupler **20** is rectangular in shape as shown in FIG. **9** and the lock **21** is a cammed-lever **21** that selectively engages and releases, in the direction of arrow **900** from the line **50**. The present invention provides for any means for coupling **20** the weight **30** to the line **50** so as to slide along the line (or, in another embodiment, to release from the line) and then to lock the weight **30** at the selected region **100**. While FIGS. 4A and 4B show a weight **30** that slides along line **50**, it can be designed to be fully released from line **50**. Likewise, while FIGS. 7A and 7B show a weight **30** then can be released from line **50**, it can be designed to slide along line **50**.

4. Weight of Line **50**.

Winch lines **50** which are made from wire rope or cable are of many different diameters, lengths, and tensile strengths. There is an overall weight to the line **50** which is a function of its material, diameter and length. For example and in the case of wire ropes, the weight of the weight **30** can be one half the weight of the line **50** (e.g., weight **30** is 25

pounds for a 50 pound line). The greater the percentage the weight of the weight **30** is in comparison to the weight of the wire rope **50**, the more likely the weight **30**, upon line breakage, will drop **220** directly down towards earth. The less the percentage, the greater the movement of the weight **30**, perhaps even in the direction **740**, due to the whipping of the free end **200** of the line **50**. Some users of the present invention may opt for greater safety by carrying a heavier weight **30** and other users may opt for less safety so that they can transport a lighter weight **30**. The present invention, in one variation, uses a weight **30** in a range of about 20 percent to 150 percent of the weight of the wire rope **50**. In this embodiment, for a 50 pound line, the weight of the weight **30** is in a range of about 10 to 75 pounds.

In the case of the line **50** being a nylon strap as shown in FIG. **9**, the weight of the strap may only be a few pounds so the weight **30** can be any suitable weight.

5. Methods.

The safety method for a winch **40** is set forth above wherein the winch **40** has a line **50**. The method includes coupling **20** a weight **40** to the line, locking **21** the weight **40** at a selected region **100** to the line **50** when the line **50** is extended from the winch **40**. When the extended line suddenly releases the locked weight providing a pivot P for the released line about the selected region **100**. The safety method further includes sliding the coupled weight along the line when the coupled weight is unlocked from the line. The weight has a weight between 20% and 150% of the weight of the line. The method further includes releasing the coupled weight from the line when the weight is not in use. The method further includes resting the weight on a ground surface when the weight is locked to the line.

The above disclosure sets forth a number of embodiments of the present invention. Those skilled in this art will however appreciate that other arrangements or embodiments, not precisely set forth, could be practiced under the teachings of the present invention and that the scope of this invention should only be limited by the scope of the following claims.

I claim:

1. A safety device for a winch having a winch line, said safety device comprising:

a weight coupled to said winch line,

a lock on said weight, said lock locking said weight to said winch line at a selected region on the winch line when the winch line is extended from the winch and hooked under tension to an object, when said extended line suddenly releases said weight providing a pivot for the released line at said selected region,

wherein the weight further comprises:

a coupler,

a connector connecting said weight to said coupler, said lock located on said coupler.

2. The safety device of claim **1** wherein the weight is formed from metal material.

3. The safety device of claim **2** wherein the weight has a protective coating of material around the metal material.

4. The safety device of claim **1** wherein the weight is formed of rubber-like material.

5. The safety device of claim **1** wherein the weight has rounded edges.

6. The safety device of claim **1** wherein the weight is colored.

7. The safety device of claim **1** wherein the connector is of sufficient length for the locked weight to rest on a ground surface.

8. The safety device of claim **7** wherein the connector is a cable, said cable stored in a hollow portion of said weight not in use.

9. The safety device of claim **1** wherein outwardly extending shapes are formed of shock-absorbing material on an outer surface of the weight.

10. A safety device for a winch having a winch line, said safety device comprising:

a weight coupled to said winch line,

a lock on said weight, said lock locking said weight to said winch line at a selected region on the winch line when the winch line is extended from the winch and hooked under tension to an object, when said extended line suddenly releases said weight providing a pivot for the released line at said selected region, wherein said weight slides along said winch line when said weight is unlocked from the winch line, said weight carried at an end of said winch line when said line is fully retracted into said winch.

11. A safety device for a winch having a winch line, said safety device comprising:

a weight coupled to said winch line,

a lock on said weight, said lock locking said weight to said winch line at a selected region on the winch line when the winch line is extended from the winch and hooked under tension to an object, when said extended line suddenly releases said weight providing a pivot for the released line at said selected region, wherein said safety device releases from said winch line when said lock is unlocked from said winch line.

12. A safety method for a winch, the winch having a winch line, the method comprising:

coupling a weight to the winch line,

locking the coupled weight at a selected region to the winch line when the winch line is extended from the winch, when the extended winch line suddenly releases the locked weight providing a pivot for the released winch line about the selected region,

sliding the coupled weight along the winch line when the coupled weight is unlocked from the winch line.

13. The safety method of claim **12** wherein the weight has a weight between 20% and 150% of the weight of the winch line.

14. A safety method for a winch, the winch having a winch line, the method comprising:

coupling a weight to the winch line,

locking the coupled weight at a selected region to the winch line when the winch line is extended from the winch, when the extended winch line suddenly releases the locked weight providing a pivot for the released winch line about the selected region,

releasing the coupled weight from the winch line when the weight is not in use.

15. A safety method for a winch, the winch having a winch line, the method comprising:

coupling a weight to the winch line,

locking the coupled weight at a selected region to the winch line when the winch line is extended from the winch, when the extended winch line suddenly releases the locked weight providing a pivot for the released winch line about the selected region,

resting the weight on a ground surface when the coupled weight is locked.

* * * * *