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(54) **SECOND-GENERATION BINARY TRACK SAFETY TRAVERSE SYSTEM**

BINÄRER SICHERHEITSÜBERQUERUNGSSYSTEM DER ZWEITEN GENERATION FÜR SCHIENEN

SYSTÈME DE TRAVERSÉE DE SÉCURITÉ DE VOIE BINAIRE DE DEUXIÈME GÉNÉRATION

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Description

TECHNICAL FIELD

[0001] The present disclosure relates to the transport of human passengers in forests and other natural areas where environmental impact is counter indicated and a more particularly to a second-generation dual line safety traverse system.

BACKGROUND

[0002] U.S. Patent No 8,272,476 discloses a magnetic descent control device forming a vehicle for supporting/securing harnessed operators on a single safety line.

[0003] U.S. Patent No 5,934,408 discloses fall arrest device for use on an elongate safety line.

[0004] In U.S. Patents Nos. 8,505,462, and 9,045,146, a first-generation dual line safety traverse system is disclosed. In particular, such first-generation dual line safety traverse system includes a wide selection of configurations for the designer without being limited necessarily by the environment as to where it is possible to install by increasing the range of angles of attack in the installation. In general, such first-generation dual line safety traverse system includes a series of suspended platforms in trees, towers, and/or walls between which a rail is anchored at both ends and human passengers slide from a higher platform to a lower one while tethered to a pulley vehicle.

[0005] Such first-generation dual line safety traverse system includes an ultra-strong polymer cable that is much stronger and quieter than steel cable, as well as being an insulator rather than a conductor of electricity. A single cable is strung around an anchor pulley to create an upper flexible rail and a lower flexible rail. By using only 1 cable with an anchor pulley, the rails are self-equalizing, *i.e.*, loads on both rails are continuously distributed equally between the two rails. The user vehicle unit is slidably attached to both the upper rail and to the lower rail. A first tether is fixed to the upper rail and to a first base. A second tether is fixed to the lower rail and to the first base. Both tethers are located between the user vehicle unit and the anchor pulley. By such arrangement, the vehicle slide will not fall if either the upper rail or the lower rail breaks.

[0006] Inherent shortcomings to this first generation dual line system described in U.S. Patents No. 8,505,462, and 9,045,146 system, however, have proven to be several starting with outside variations in environment and participant weight, as well as wind, sun, and temperature, which interject an infinite combination of variables into the system, which affect, for example, velocity and deceleration characteristics of the system, which are difficult to compensate for through traditional angle and tension adjustments currently used. Therefore, systems adjusted to a fixed optimum angle during installation probably will no longer be optimum on a consistent and predictable basis, as weather, wear, and

weight of passenger are constantly changing.

[0007] The second problem with zip lines as a business model is that the original concept was a guided tour through the canopy of the rainforest with a 6 to 1 participant/guide ratio. It has since morphed into a thrill ride where literally boatloads of participants are being driven through systems as fast as humanly possible at the lowest possible price. This has created an environment where the industry, as a whole, has become unsustainable and dangerous. This disclosure will advance the safety and throughput of passengers, so that the tour operator will still make a sufficient margin to remain in business.

BRIEF SUMMARY

[0008] The invention is directed to a vehicle for supporting/securing harnessed riders on a dual line continuous belay system, according to claim 1. Further developments are according to dependent claims 2-16.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] For a fuller understanding of the nature and advantages of the present method and process, reference should be had to the following detailed description taken in connection with the accompanying drawings, in which:

Fig. 1 is an isometric view of both ends of the disclosed second-generation dual line safety traverse system;

Fig. 2 is an isometric view of the lower end of the second-generation dual line safety traverse system showing the safety brake system;

Fig. 2A is a sectional view taken along line 2A-2A of Fig. 2;

Fig. 3 is an isometric view of an intermediate support post showing the continuous belay system;

Fig. 4 is sectional view taken along line 4-4 of Fig. 3;

Fig. 5 is a sectional view taken along line 5-5 of Fig. 4; Fig. 5A is an exploded view of the locking system for the vehicle carriage;

Fig. 6 is an end view of the vehicle carriage in an opened position;

Fig. 7 is a sectional view taken along line 7-7 of Fig. 3

Fig. 8 is an isometric view of the vehicle carriage;

Fig. 9 is a side view of the vehicle carriage;

Fig. 10 is a top view of the vehicle carriage;

Fig. 11 is a sectional view taken along line 11-11 of Fig. 10 with the vehicle carriage with the dual hand brakes in a "ready to be engaged" position and cams released position to stop travel of the vehicle carriage rearward when the carriage is vertical;

Fig. 12 is a sectional view taken along line 11-11 of Fig. 10 with the vehicle carriage with the dual hand brakes released for movement of the vehicle carriage along the dual lines in any orientation with cams locked open;

Fig. 13 is an isometric view of a vehicle carriage brake "rail-splitter" assembly in a closed condition; and

Fig. 14 is an isometric view of a vehicle carriage brake "rail-splitter" assembly in an open condition splitting the dual lines for stopping a vehicle carriage.

[0010] The drawings will be described in greater detail below.

DETAILED DESCRIPTION

[0011] The traverse line configuration in the drawings is simple in that it has but two runs; yet, it illustrates the principles of the disclosure, as many more runs can be added in accordance with this disclosure. An upper launch station, 10, is where the rider gets on the zip line tour. Upper launch station 10, consists of a tower that includes an upstanding generally vertical pole, 12, and a lower platform assembly, 14, which includes a deck, 16, having a railing, 18, supported by a series of 6 vertical poles, typified by a pole, 20. Deck 16 is accessed via a stairway, 22. Once the rider ascends stairway 22 to deck 16, an operator employee, can fit the rider into a harness assembly or the rider could have been fitted with the harness assembly prior to ascending stairway 22. It will be appreciated that a variety of methods for gaining access to lower platform assembly 14 can be envisioned for the tour operator to provide for use by the rider. For example, deck 16 could be accessed using a rock climbing wall or other means, as disclosed in WO 2016/090457 A1. It further will be appreciated that the illustrated poles can be replaced with one or more of trees, cliffs, and sufficiently high ground for gravity to propel the rider down the course.

[0012] The dual lines are attached at the upper end or beginning of the tour into a securing assembly, 24. It is at this point that the vehicle carriage assembly (described in detail below) is secured to the dual lines. A rope, 26, is attached to the harness worn by a rider, 28, at one end, around an upper pulley assembly, 30, and back down to a mechanical powered spinnaker assembly, 32, comprising a pulley assembly, where a first tour worker, 34, grasps the lower end of rope 26 for pulling rider 28 up to an upper platform, 33, from which the zip line commences. A hole has been cut in upper platform 34 through which rider 28 gains access to upper platform 34, although other configurations of upper platform 34 can be envisioned by an experienced course designer. Pulley assembly of the mechanical powered spinnaker assembly 32 desirably can rotate only in one direction so that a loss of grasp of rope 26 by the first tour worker 34 does not cause rider 28 to fall downwardly. Another safety feature is that the vehicle carriage used by rider 28 can only move in one direction (forward) along the dual lines of the course. The design and features of the vehicle carriage also will be detailed below. A second tour worker, 35, stands on upper platform 33 to assist rider 28, if need-

ed, and to ensure safety of rider 28, as the first run of the tour commences. This also provides another opportunity for the second tour worker 35 to check that the harness is properly secured to rider 28.

[0013] The dual line is connected to pole 12 by a continuous belay, so that the rider does not need to disengage the vehicle carriage in order to transition from a vertical ascent to a horizontally downward descent along the dual lines. In fact, a continuous belay attachment may be used at all intermediate positions of the zip line tour until its termination.

[0014] In the illustrative tour in Fig. 1, a single intermediate stop is shown, but it is illustrative of one or more such intermediate stops that may be used on a multi-run zip line tour, challenge course, or similar sporting/amusement adventure. Again, an intermediate post, 36, carries about its upper end an intermediate platform, 38, atop which another tour worker, 40, is stationed for providing any needed assistance for rider 28. As stated, a continuous belay attachment system, 42, carries the dual lines and will be described in detail below.

[0015] The tour terminates at a lower platform, 44, atop which a further tour worker, 46, is stationed. While the novel vehicle carriage incorporates a dual safety brake operable by the rider, safety still dictates that a braking system, 48, be used. Braking system 48 is carried by a lower pole, 50, and will be described in detail below. Referring additionally to Fig. 2, a speed (velocity) sensor, 52, also is carried by lower pole 50 and senses the speed at which rider 28 is approaching the terminus of the tour. If the sensed speed or velocity is deemed unsafe (too fast), braking system 48 may be automatically engaged by being in continuous communication with sensor 52 or may be engaged manually by tour worker 46. In either event, the speed of rider 28 is slowed to a sufficiently slow rate so that rider 28 can safely stop and stand atop lower platform 44 whereat the vehicle carriage can be unlocked by tour worker 46, as described in further detail below, or passed off the end of the line after the splitter closes.

[0016] Steel cable has a greater resistance to braking than does synthetic line construction; thus, it may be advisable to replace the ultimate 25 feet or so of the synthetic line with steel cable, such as the case for the split cable section approaching lower pole 50. Fig. 2A illustrates a zero relief connector, 53, whose placement is seen in Fig. 2 with the run being a synthetic cable, 55, uphill of zero relief connector 53 and a steel cable, 57, downhill thereof. In particular, wedges, 59 and 61, connect synthetic cable 55 with steel cable 57. Wedge 59 is swaged on steel cable 57, while wedge 61 tightens the wedge pair onto synthetic cable 55, optionally using an epoxy or other adhesive. The overall diameter of zero relief connector 53 is around 12,7mm (1/2 inch). This construction also will facilitate replacement of the synthetic cable with but a loss of a few inches of steel cable during such replacement operation. It should be observed that the synthetic cable is made from an inner core and an

outer sheath, that may be removed so that the core is inserted into the connector to maintain the overall diameter at connector 53 the same as the diameter of both the steel cable and synthetic cable.

[0017] Referring now to Figs. 3-6, dual lines, 54 and 56, are seen carrying a vehicle carriage, 58. As illustrated in Fig. 3, vehicle carriage 58 moves in a direction from left to right. Continuous belay attachment system 42 consists of a leading bracket assembly, 60, and a trailing bracket assembly, 62. As used herein, upper refers to a higher elevation, while lower refers to a lower elevation with the ride running by gravity from a higher or upper elevation to a lower elevation. As vehicle carriage 58 confronts leading bracket assembly 60 (Fig. 4), horizontal upper and lower arms, 64 and 66, each of which holds lines 54 and 56, respectively, by a tubular clip permit vehicle carriage 58 to continue to move down the dual lines and around intermediate pole 36.

[0018] Vehicle carriage 58 then confronts trailing bracket assembly 62 carried by intermediate post 36 and which serves one entirely different additional function than leading bracket assembly 60. Trailing bracket assembly 62 carries a sprocket on its vertical arm, which carries a chain, 68, whose ends are capped by a pair of horizontally extending tubular clip assemblies, 70 and 72, that capture, respectively, dual lines 54 and 56. Upper clip assembly 70 is like the tubular clips carried by leading bracket assembly 60 in that the dual lines are free to move. Lower clip 72, however, as seen in Fig. 7, has a pair of wedges, 74 and 76, pushed therein for tightly securing line 56. Self-equalization of line 56 is achieved by chain 68 and its ability to move about the sprocket carried by lower bracket assembly 62.

[0019] Referring now to Figs. 5, 5A, and 6, a top element, 78, and lower element, 80, pivot open about a central element, 79, to open vehicle carriage 58 so that dual lines 54 and 56 can be secured. A semicircular cutout, 81 (Fig. 6), along the bottom surface of upper element 78 along with a semicircular cutout, 83, along the top surface of central element 79 capture upper line 54 when upper element 78 is closed. Similarly, a semicircular cutout, 85, along the bottom surface of central element 79 along with a semicircular cutout, 87, along the top surface of lower element 80 capture lower line 56 when lower element 80 is closed. The surfaces of these circular tubes for lines 54 and 56 may be polished, coated with a friction reducing material, and/or other treatment to reduce friction when vehicle carriage slides along the dual lines.

[0020] A locking mechanism for elements 78 and 80 with central element 79 is shown in Figs. 5 and 5A. An elongate hole formed through a downwardly extending front leg of upper element 78 and upwardly extending front leg of lower element 80 and into central element 79. Each hole carries a spring, 82, in upper element 78 and, 84, in lower element 80 that push against, respectively, pins, 86 and 88, that also are found in central element 79 and through each extending leg of element 78 and 80, respectively, to prevent rotation of elements 78 and

80. A key, 90, can be inserted into the two elongate holes to push pins 86 and 88 inwardly and away from the extending legs of each element 78 and 80, and permit rotation of upper element 78 by a piano-type hinge, 92, in lower element 80 by a piano-type hinge, 94, in the lower element 80. An elongate slot, 89, in pin 86 and slot, 91, in pin 88 have retaining pegs, 96 and 98, respectively, for in which the pins move and for retaining the pins. Without key 90, vehicle carriage 58 will stay secured to dual lines 54 and 56. This safety feature prevents rider 28 from unadvisedly detaching vehicle carriage 58 with consequent increase in harm.

[0021] Continuing the description of vehicle carriage 58, reference is made to Figs. 8-12. A dual braking system for the rider is provided by an upper brake lever, 100, and lower brake lever, 102, that rider 28 squeeze, respectively, against central element 79 to apply pressure to upper line 54 and lower line 56. Both levers can be easily grasped by one hand of the rider for slowing down and/or stopping the rider's descent. Rollers, 104 and 106, in upper element 78 engage upper line 54, while rollers, 108 and 110, in central element 79 engage lower line 56.

[0022] Upper element 78 also carries a pair of eccentric pieces, 112 and 114, which are connected by a bar, 116. In similar fashion, lower element 80 also carries a pair of eccentric pieces or cams, 116 and 118, which are connected by a bar, 120. While vehicle carriage 58 is in a horizontal orientation, as shown in Fig. 12, eccentric pieces, 116 and 118 ride along upper line 54. However, when vehicle carriage 58 is in a vertical orientation, as shown in Fig. 11, eccentric pieces 116 and 118 connected by a bar, 120, rotate counter-clockwise to press against line 54 and prevent movement of vehicle carriage 58 in the reverse direction. Simultaneously therewith while vehicle carriage 58 is vertical, eccentric pieces, 122 and 124, in lower element 80 and connected by a bar, 128, rotate clockwise to press against line 56 and prevent movement of vehicle carriage 58 in the reverse direction. Such mechanisms permit rider 28 to ascend as shown in Fig. 1 and not slide downwardly. Such mechanism also permit rider 28 to only descend along the extent of the tour.

[0023] Finally braking system 48 is shown in a home or rest position in Fig. 13 and in an active position in Fig. 14. Braking system 48 can be actuated pneumatically, hydraulically, or electrically. Such actuating system can be housed within a container, 128 (see Fig. 1), located adjacent to lower platform 44. Braking system 48 has pair of elongate tubes, 130 and 132, for capturing upper line 54 and a single tube, 134, for capturing lower line 56. Tube 132 clamps down on line 54, while line 54 freely moves through tube 130. Tube 134 can clamp down on line 56. Tube 132 is attached to a movable carriage, 136.

[0024] When rider 28 is traveling too fast approaching lower platform 44, carriage 136 is moved upwardly carrying upper line 54 running through tube 130, resulting in lines 54 and 56 being split; thus, reducing the speed of rider 28 eventually to a standstill.

[0025] Materials of construction for vehicle carriage 58

desirably will be metal and stainless steel may find advantage for its resistance to corrosion. The same will be true for most other components, except for the rollers housed within vehicle carriage 58, which may be made from plastic to reduce resistance against the lines. The preferred rail composition will be the sheathed plastic rope disclosed in U.S. Patent No. 8,505,462; although, other composition rail materials could be used, as well as metal or any combination thereof. While the use of poles is shown, either end or any intermediate position of the system could be affixed to a tree, a cliff, or to other relatively stable and immovable locations.

[0026] While the apparatus, its components, and its use have been described with reference to various embodiments, those skilled in the art will understand that various changes may be made and equivalents may be substituted for elements thereof without departing from the scope and essence of the disclosure. In addition, many modifications may be made to adapt a particular situation or material to the teachings of the disclosure without departing from the essential scope thereof. Therefore, it is intended that the disclosure not be limited to the particular embodiments disclosed, but that the disclosure will include all embodiments falling within the scope of the appended claims. In this application all units are in the metric system and all amounts and percentages are by weight, unless otherwise expressly indicated.

Claims

1. A vehicle for supporting/securing harnessed riders on a dual line continuous belay system, which comprises a vehicle carriage (58) having:

- (a) an upper cavity through which an upper line (54) can run, and carrying upper rollers (104, 106) located to contact said upper line (54), the upper cavity having a generally horizontal slot extending to the outside through which a continuous belay can pass; and
- (b) a lower cavity through which a lower line (56) can run, and carrying lower rollers (108, 110) to contact said lower line (56), the lower cavity having a generally horizontal slot extending to the outside through which a continuous belay can pass.

2. The vehicle of claim 1, which is propelled by gravity.

3. The vehicle of claim 1, which includes:

- (a) a central element (79) having a portion of the upper cavity and carrying said lower rollers (108, 110);
- (b) an upper element (78) attached to the central element and carrying said upper rollers (104, 106) and a portion of the upper cavity; and

(c) a lower element (80) attached to the central element (79) carrying a portion of the lower cavity.

4. The vehicle of claim 3, wherein said upper element (78) and said lower element (80) are each hingedly attached to the central element (79).
5. The vehicle of claim 1, wherein the vehicle carriage (58) extends rearwardly about its center so as to form an extended center between the upper and lower lines (54, 56), carries an upper hand brake lever (100) extending rearwardly, and a lower hand brake lever (102) extending rearwardly, wherein the brake levers (100, 102) can squeeze the upper and lower lines (54, 56) between each hand brake lever and the extended center.
6. The vehicle of claim 3, wherein an upper hand brake lever (100) extends from the upper element (78), a lower hand brake lever (102) extends from the lower element (80), and the central element extends rearwardly for a distance adequate for the brake levers (100, 102) to squeeze the upper and lower lines (54, 56) between each hand brake lever and the extended central element.
7. The vehicle of claim 1, wherein a pair of cams (116, 118) are located on either side of the upper rollers (104, 106) and connected by a bar (120), wherein orienting the vehicle vertically rotates the cam pair (116, 118) for the bar (120) to press against the upper rollers (104, 106) to prevent the vehicle from moving downwardly.
8. The vehicle of claim 7, wherein a pair of cams (122, 124) are located on either side of the lower rollers (108, 110) and connected by a bar (126), wherein orienting the vehicle vertically rotates the cam pair (108, 110) for the bar (126) to press against the lower rollers (108, 110) to prevent the vehicle from moving downwardly.
9. The vehicle of claim 1, wherein said vehicle is configured for supporting harnessed riders on the dual line system, and comprises a hand-operated brake for the harnessed riders to hand actuate for slowing down the vehicle.
10. The vehicle of claim 9, comprising a hand-operated brake for each of the upper and lower lines (54, 56) forming the dual line system.
11. The vehicle of claim 9, wherein the dual line system is a gravity dual line system.
12. The vehicle of claim 9, further comprising a cam actuated fall arrest system (116, 118, 120, 122, 124,

126) preventing the vehicle from moving downwardly when the vehicle is oriented in a vertical orientation.

13. A dual line system, comprising:

a vehicle according to any one of claims 1-12, having a hand-operated brake for harnessed riders to hand actuate for slowing down the vehicle; and
a secondary failsafe braking system (48) prior to end of the dual line system.

14. The dual track system of claim 13, wherein one or more intermediate bypass anchor termination systems are incorporated into the infrastructure that supports, aligns, and provides the dual line system with continuous belays.

15. The dual line system of claim 13, wherein the secondary failsafe braking system (48) separates the upper and lower lines (54, 56) for braking the vehicle.

16. The dual line system of claim 13, wherein the vehicle is propelled by gravity.

Patentansprüche

1. Fahrzeug zum Stützen/Sichern von angeschnallten Fahrern auf einem kontinuierlichen Doppelseil-Sicherungssystem, das einen Fahrzeugschlitten (58) aufweist, der folgendes umfasst:

(a) einen oberen Hohlraum, durch den ein oberes Seil (54) verlaufen kann und der obere Rollen (104, 106) trägt, die so angeordnet sind, dass sie das obere Seil (54) berühren, wobei der obere Hohlraum einen im Allgemeinen horizontalen Schlitz aufweist, der sich nach außen erstreckt und durch den ein kontinuierliches Sicherungsmittel verlaufen kann; und
(b) einen unteren Hohlraum, durch den ein unteres Seil (56) verlaufen kann und der untere Rollen (108, 110) trägt, die so angeordnet sind, dass sie das untere Seil (56) berühren, wobei der untere Hohlraum einen allgemein horizontalen Schlitz aufweist, der sich nach außen erstreckt und durch den ein kontinuierliches Sicherungsmittel verlaufen kann.

2. Das Fahrzeug nach Anspruch 1, das durch die Schwerkraft angetrieben wird.

3. Das Fahrzeug nach Anspruch 1, das Folgendes umfasst:

(a) ein zentrales Element (79), das einen Teil des oberen Hohlraums aufweist und die unteren

Rollen (108, 110) trägt;

(b) ein oberes Element (78), das an dem zentralen Element befestigt ist und die oberen Rollen (104, 106) und einen Teil des oberen Hohlraums trägt; und

(c) ein unteres Element (80), das an dem zentralen Element (79) befestigt ist und einen Teil des unteren Hohlraums trägt.

4. Das Fahrzeug nach Anspruch 3, wobei das obere Element (78) und das untere Element (80) jeweils schwenkbar an dem zentralen Element (79) befestigt sind.

5. Das Fahrzeug nach Anspruch 1, wobei sich der Fahrzeugschlitten (58) um seine Mitte nach hinten erstreckt, um eine erweiterte Mitte zwischen den oberen und unteren Seilen (54, 56) zu bilden, einen oberen Handbremshebel (100) trägt, der sich nach hinten erstreckt, und einen unteren Handbremshebel (102), der sich nach hinten erstreckt, wobei die Bremshebel (100, 102) die oberen und unteren Seile (54, 56) zwischen jedem Handbremshebel und der erweiterten Mitte zusammendrücken können.

6. Das Fahrzeug nach Anspruch 3, wobei sich ein oberer Handbremshebel (100) von dem oberen Element (78) aus erstreckt, ein unterer Handbremshebel (102) sich von dem unteren Element (80) aus erstreckt und das zentrale Element sich nach hinten über eine Strecke erstreckt, die für die Bremshebel (100, 102) ausreicht, um die oberen und unteren Seile (54, 56) zwischen jedem Handbremshebel und dem verlängerten zentralen Element zu drücken.

7. Das Fahrzeug nach Anspruch 1, wobei ein Paar von Nocken (116, 118) auf beiden Seiten der oberen Rollen (104, 106) angeordnet und durch eine Stange (120) verbunden ist, wobei eine vertikale Ausrichtung des Fahrzeugs das Nockenpaar (116, 118) dreht, damit die Stange (120) gegen die oberen Rollen (104, 106) drückt, um zu verhindern, dass sich das Fahrzeug nach unten bewegt.

8. Das Fahrzeug nach Anspruch 7, wobei ein Paar von Nocken (122, 124) auf beiden Seiten der unteren Rollen (108, 110) angeordnet und durch eine Stange (126) verbunden ist, wobei eine vertikale Ausrichtung des Fahrzeugs das Nockenpaar (108, 110) dreht, damit die Stange (126) gegen die unteren Rollen (108, 110) drückt, um zu verhindern, dass sich das Fahrzeug nach unten bewegt.

9. Das Fahrzeug nach Anspruch 1, wobei das Fahrzeug so gestaltet ist, dass es angeschnallte Fahrer auf dem Doppelseil-System trägt, und eine handbetätigte Bremse umfasst, die von den angeschnallten Fahrern von Hand betätigt werden kann, um das

Fahrzeug abzubremsen.

10. Das Fahrzeug nach Anspruch 9, umfassend eine handbetätigte Bremse für jede der oberen und unteren Seile (54, 56), die das Doppelseil-System bilden.

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11. Das Fahrzeug nach Anspruch 9, wobei das Doppelseil-System ein Schwerkraft-Doppelseil-System ist.

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12. Das Fahrzeug nach Anspruch 9 umfasst ferner einnockenbetätigtes Absturzsicherungssystem (116, 118, 120, 122, 124, 126), das verhindert, dass sich das Fahrzeug nach unten bewegt, wenn es in einer vertikalen Ausrichtung steht.

13. Ein Doppelseil-System, das Folgendes umfasst:

ein Fahrzeug nach einem der Ansprüche 1 bis 12 mit einer handbetätigten Bremse für angeschnallte Fahrer, die von Hand betätigt werden kann, um das Fahrzeug zu verlangsamen; und ein sekundäres ausfallsicheres Bremssystem (48) vor dem Ende des Doppelseil-Systems.

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14. Das Doppelseil-System nach Anspruch 13, bei dem ein oder mehrere zwischengeschaltete Bypass-Ankerabschlusssysteme in die Infrastruktur integriert sind, die das Doppelseil-System stützt, ausrichtet und mit durchgehenden Sicherungen versieht.

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15. Das Doppelseil-System nach Anspruch 13, wobei das sekundäre ausfallsichere Bremssystem (48) das obere und das untere Seil (54, 56) zum Abbremsen des Fahrzeugs trennt.

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16. Das Doppelseil-System nach Anspruch 13, wobei das Fahrzeug durch die Schwerkraft angetrieben wird.

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Revendications

1. Véhicule destiné au support/à la sécurisation d'utilisateurs équipés d'un harnais de sécurité sur un système d'assurage en continu du type à double ligne, qui comprend un chariot (58) faisant office de véhicule, qui possède :

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(a) une cavité supérieure travers laquelle peut s'étendre une ligne supérieure (54), ainsi que des galets supérieurs de support (104, 106) qui sont disposés de manière à entrer en contact avec ladite ligne supérieure (54), la cavité supérieure possédant une fente de forme généralement horizontale qui s'étend vers l'extérieur, à travers laquelle peut passer un assurage en continu ; et

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(b) une cavité inférieure à travers laquelle peut s'étendre une ligne inférieure (56), ainsi que des galets inférieurs de support (108, 110) qui sont destinés à entrer en contact avec ladite ligne inférieure (56), la cavité inférieure possédant une fente de forme généralement horizontale qui s'étend vers l'extérieur, à travers laquelle peut passer un assurage en continu.

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2. Véhicule selon la revendication 1, qui est propulsé par la force de gravité.

3. Véhicule selon la revendication 1, qui englobe :

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(a) un élément central (79) qui possède une portion de la cavité supérieure et qui supporte lesdits galets inférieurs (108, 110) ;

(b) un élément supérieur (78) qui est fixé à l'élément central et qui supporte lesdits galets supérieurs (104, 106), ainsi qu'une portion de la cavité supérieure ; et

(c) un élément inférieur (80) qui est fixé à l'élément central (79), qui supporte une portion de la cavité inférieure.

4. Véhicule selon la revendication 3, dans lequel ledit élément supérieur (78) et ledit élément inférieur (80) sont fixés en articulation à l'élément central (79).

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5. Véhicule selon la revendication 1, dans lequel le chariot (58) faisant office de véhicule qui s'étend vers l'arrière autour de son centre de façon à obtenir un centre agrandi entre les lignes supérieure et inférieure (54, 56) supporte un levier supérieur (100) faisant office de frein à main qui s'étend vers l'arrière et un levier inférieur (102) faisant office de frein à main qui s'étend vers l'arrière ; dans lequel les leviers (100, 102) faisant office de frein peuvent comprimer les lignes supérieure et inférieure (54, 56) entre chaque levier faisant office de frein à main et le centre agrandi.

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6. Véhicule selon la revendication 3, dans lequel un levier supérieur (100) faisant office de frein à main s'étend à partir de l'élément supérieur (78), un levier inférieur (102) faisant office de frein à main s'étend à partir de l'élément inférieur (80) et l'élément central s'étend vers l'arrière sur une distance adéquate pour faire en sorte que les leviers (100, 102) faisant office de frein compriment les lignes supérieure et inférieure (54, 56) entre chaque levier faisant office de frein à main et le centre agrandi.

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7. Véhicule selon la revendication 1, dans lequel une paire de cames (116, 118) sont disposées de chaque côté des galets supérieurs (104, 106) et sont reliées par l'intermédiaire d'une barre (120) ; dans lequel le fait d'orienter le véhicule dans une direction verticale

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- déclenche la mise en rotation de la paire des cames (116, 118) pour faire en sorte que la barre (120) exerce une pression sur les galets supérieurs (104, 106) dans le but d'empêcher un déplacement du véhicule vers le bas.
8. Véhicule selon la revendication 7, dans lequel une paire de cames (116, 118) sont disposées de chaque côté des galets inférieurs (108, 110) et sont reliées par l'intermédiaire d'une barre (126) ; dans lequel le fait d'orienter le véhicule à la verticale déclenche la mise en rotation de la paire des cames (108, 110) pour faire en sorte que la barre (126) exerce une pression sur les galets inférieurs (108, 110) dans le but d'empêcher un déplacement du véhicule vers le bas.
9. Véhicule selon la revendication 1, dans lequel ledit véhicule est configuré pour supporter des utilisateurs équipés d'un harnais de sécurité sur le système du type à double ligne, et comprend un frein actionné à la main pour permettre aux utilisateurs équipés d'un harnais de sécurité d'intervenir manuellement dans l'intention de ralentir le véhicule.
10. Véhicule selon la revendication 9, qui comprend un frein actionné à la main pour chacune des lignes supérieure et inférieure (54, 56) qui forment le système du type à double ligne.
11. Véhicule selon la revendication 9, dans lequel le système du type à double ligne représente un système du type à double ligne basé sur la force de gravité.
12. Véhicule selon la revendication 9, qui comprend en outre un système antichute actionné par une ou plusieurs cames (116, 118, 120, 122, 124, 126) qui a pour but d'empêcher un déplacement du véhicule vers le bas lorsque le véhicule est orienté dans une direction verticale.
13. Système du type à double ligne, qui comprend :
- un véhicule selon l'une quelconque des revendications 1 à 12, qui possède un frein actionné à la main afin de permettre aux utilisateurs équipés d'un harnais de sécurité d'intervenir manuellement dans l'intention de ralentir le véhicule ; et
 - un système de freinage secondaire (48) du type à sécurité intégrée qui peut être actionné avant d'atteindre la fin du système du type à double ligne.
14. Système du type à double piste selon la revendication 13, dans lequel un ou plusieurs systèmes intermédiaires de terminaison d'ancrage de dérivation sont incorporés dans l'infrastructure qui supporte,
- met en alignement et procure le système du type à double ligne d'un assuage en continu.
15. Système du type à double ligne selon la revendication 13, dans lequel le système de freinage secondaire (48) du type à sécurité intégrée sépare les lignes supérieure et inférieure (54, 56) pour freiner le véhicule.
16. Système du type à double ligne selon la revendication 13, dans lequel le véhicule est propulsé par la force de gravité.

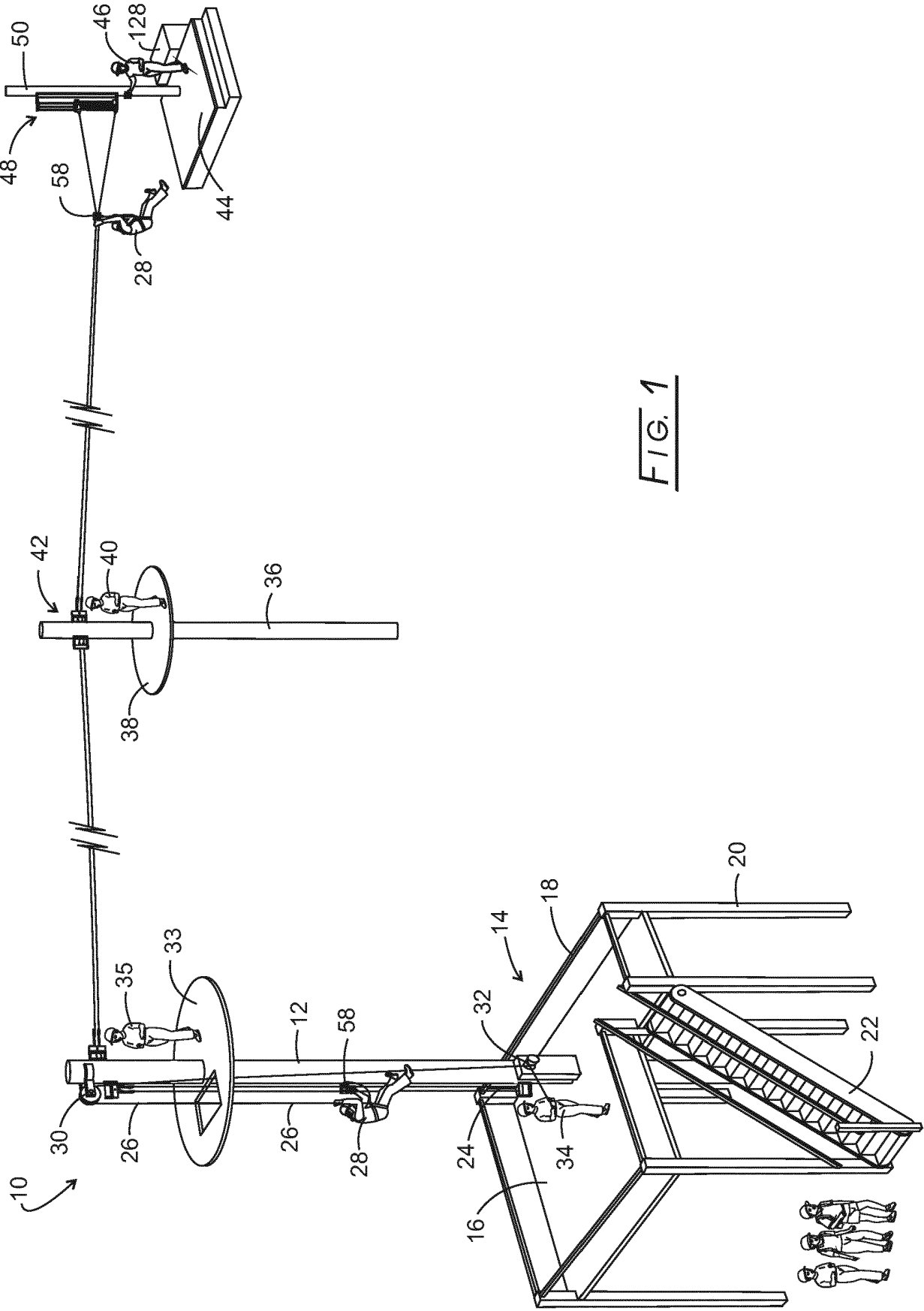
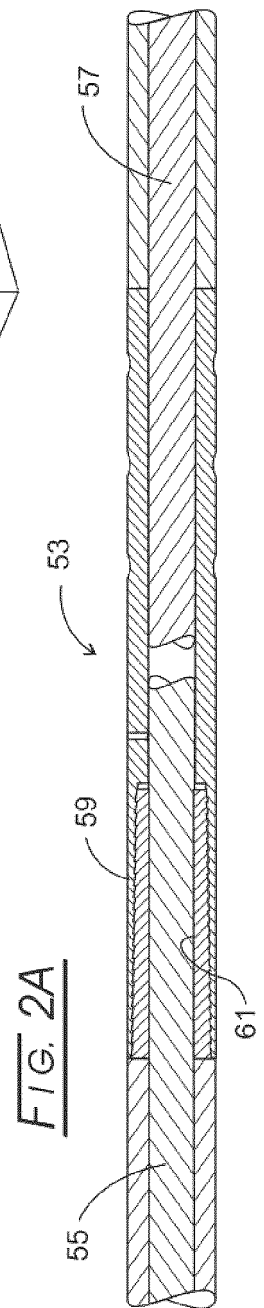
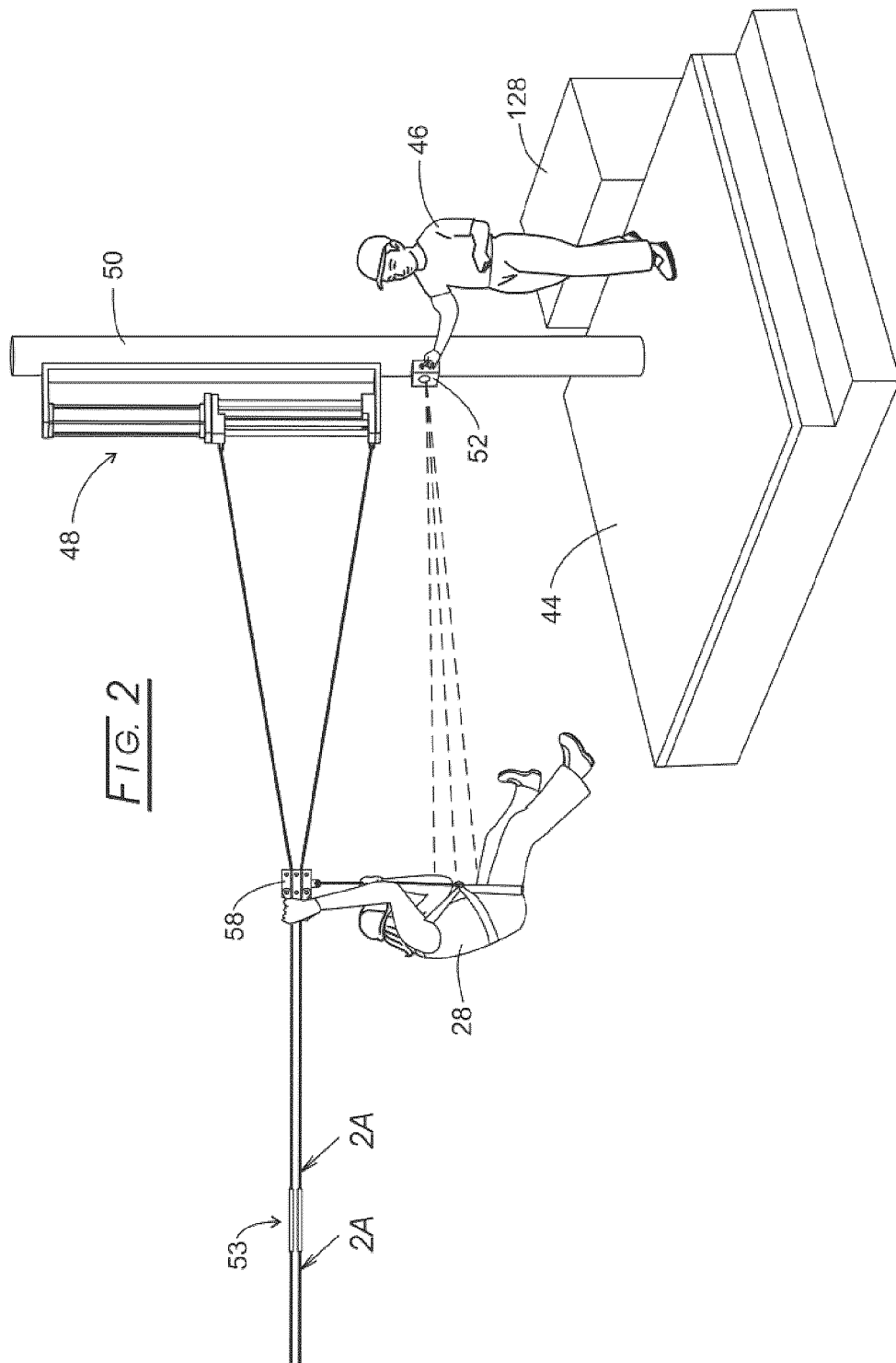
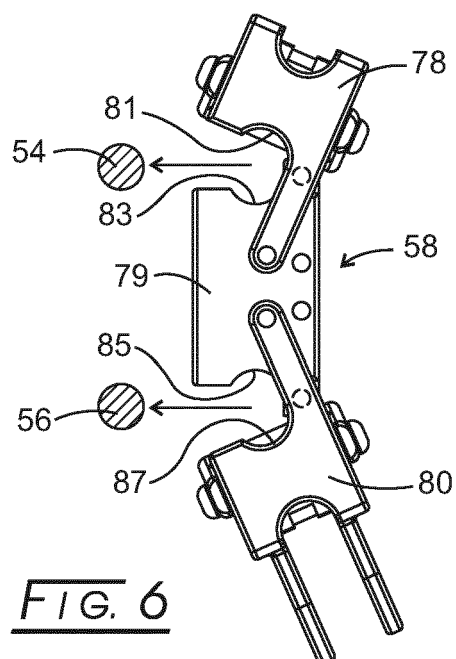
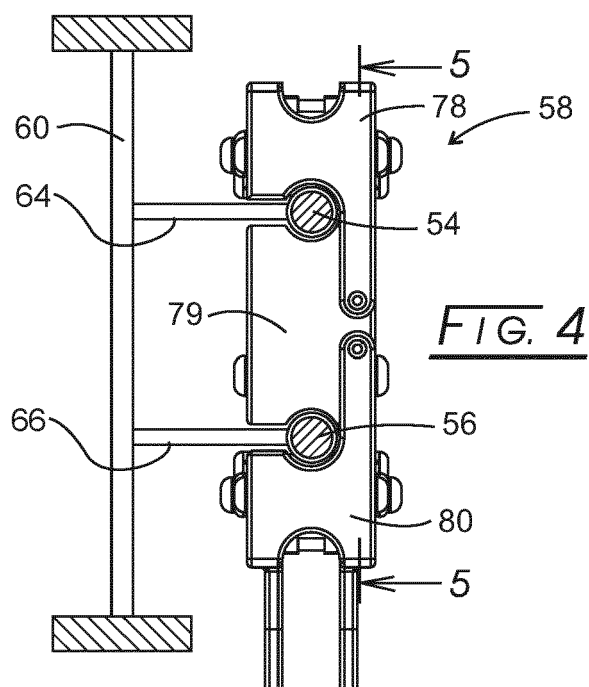
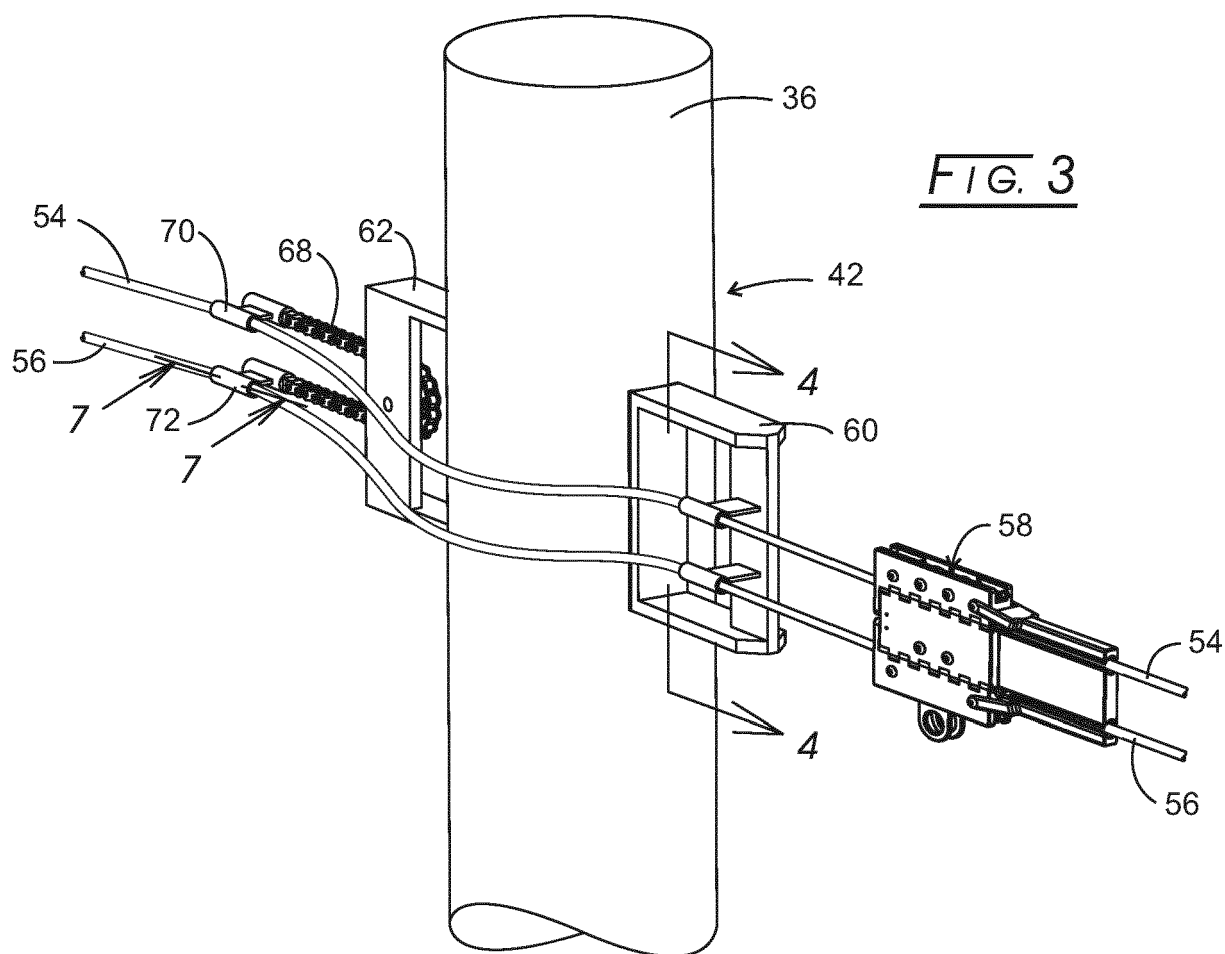
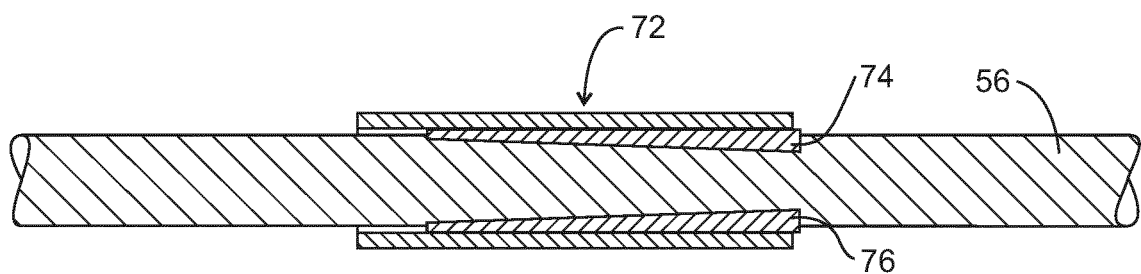
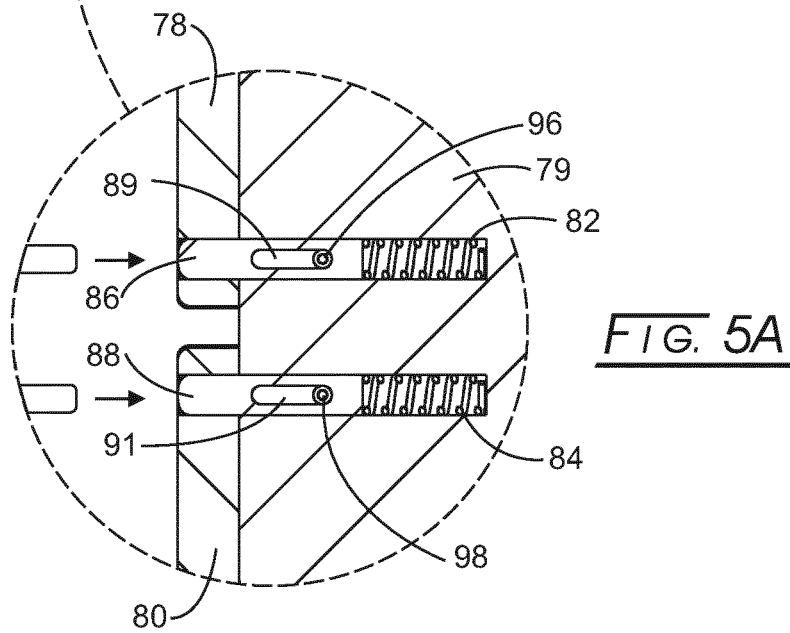
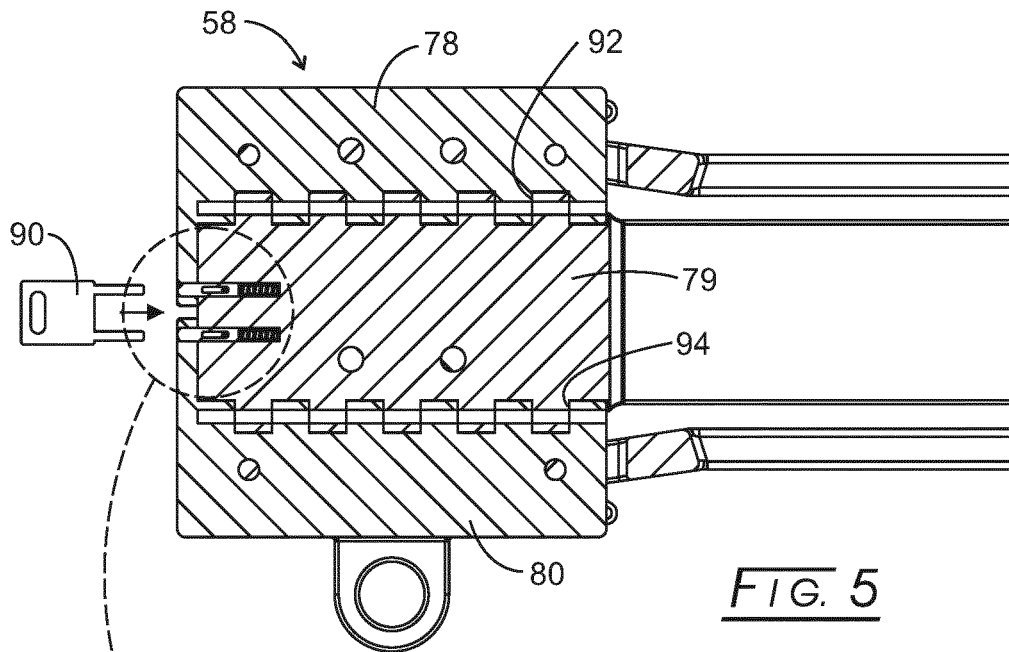


FIG. 1







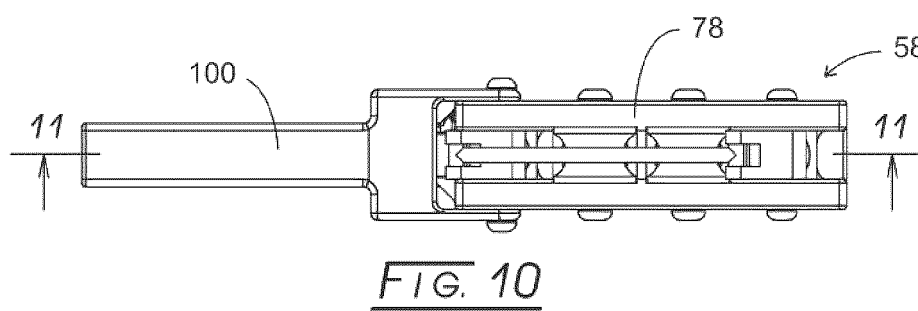
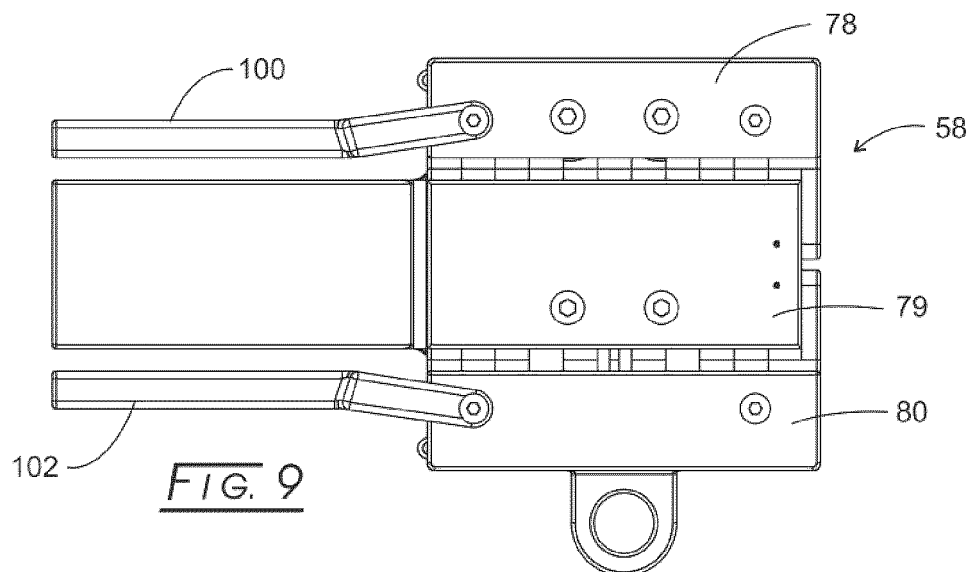
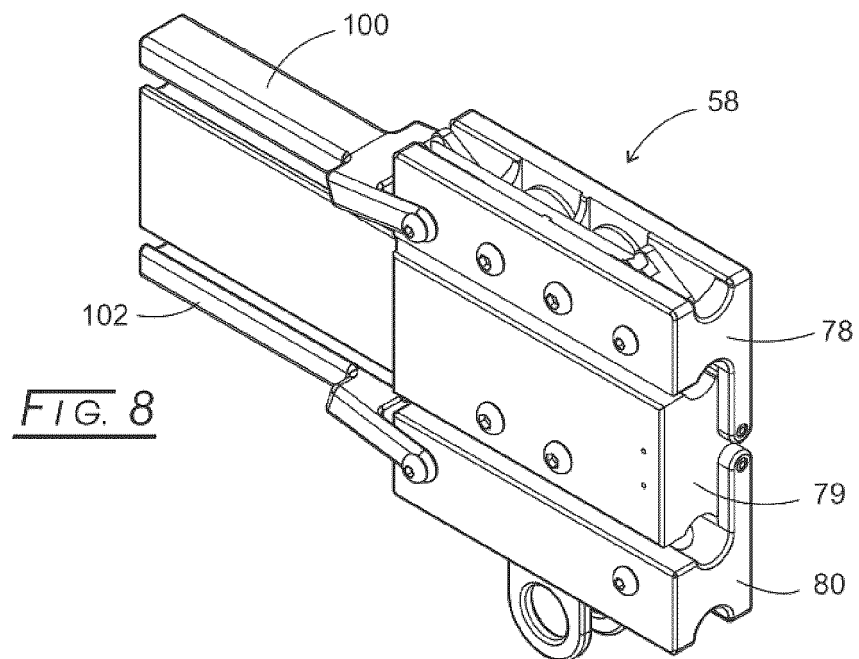


FIG. 11

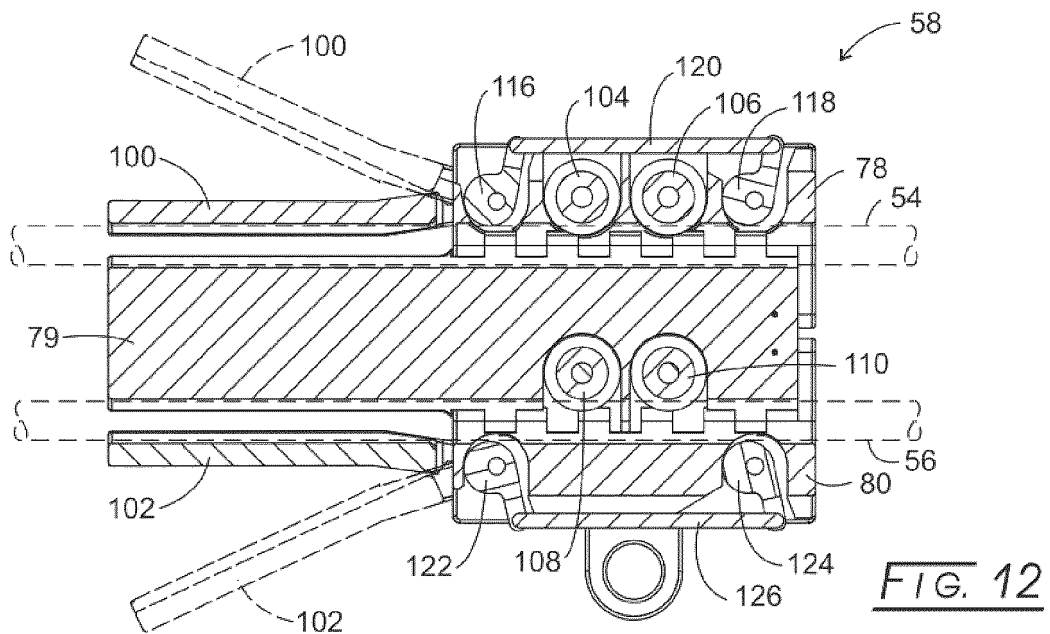
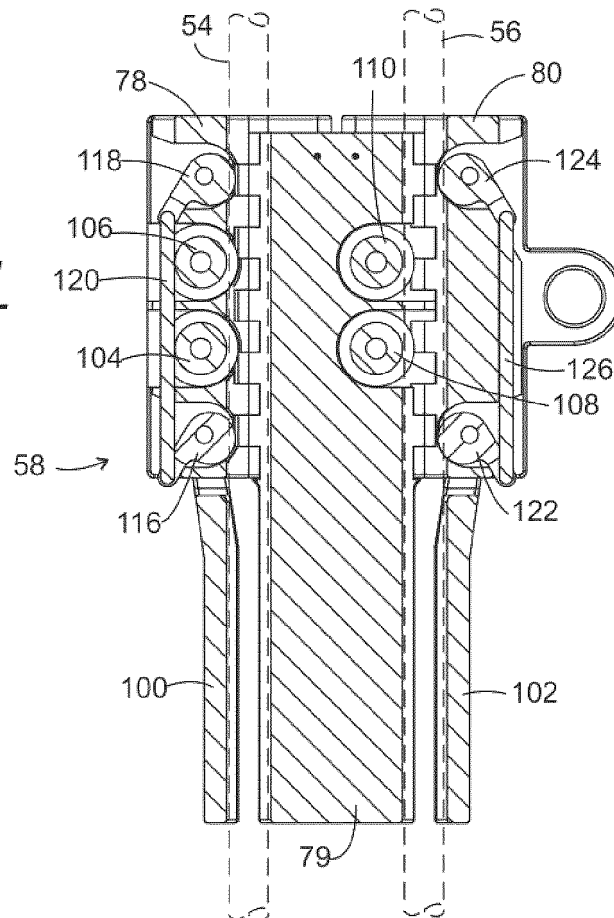


FIG. 13

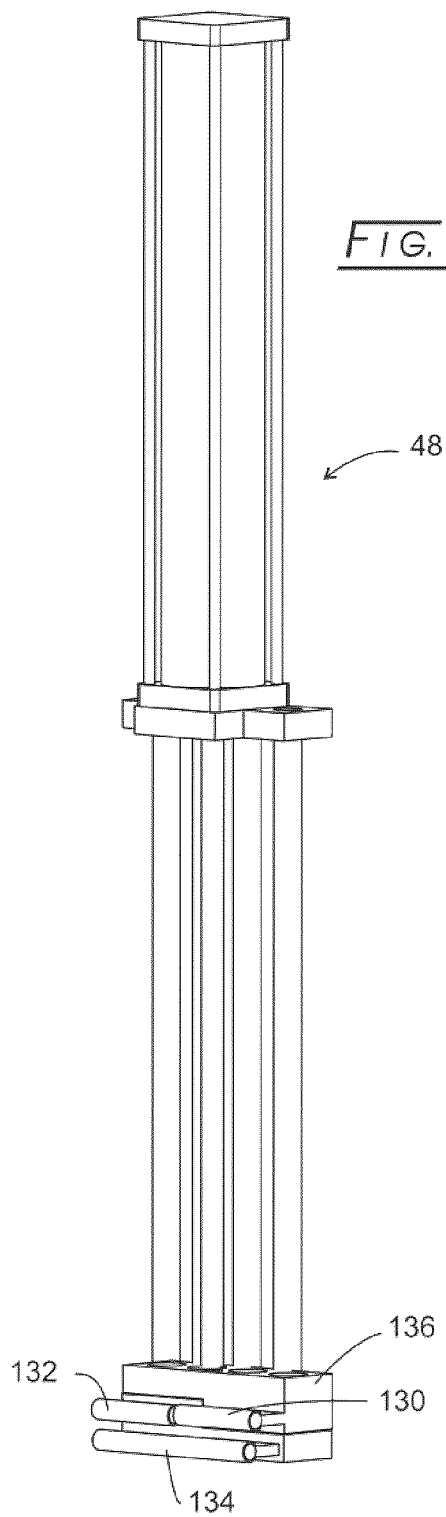
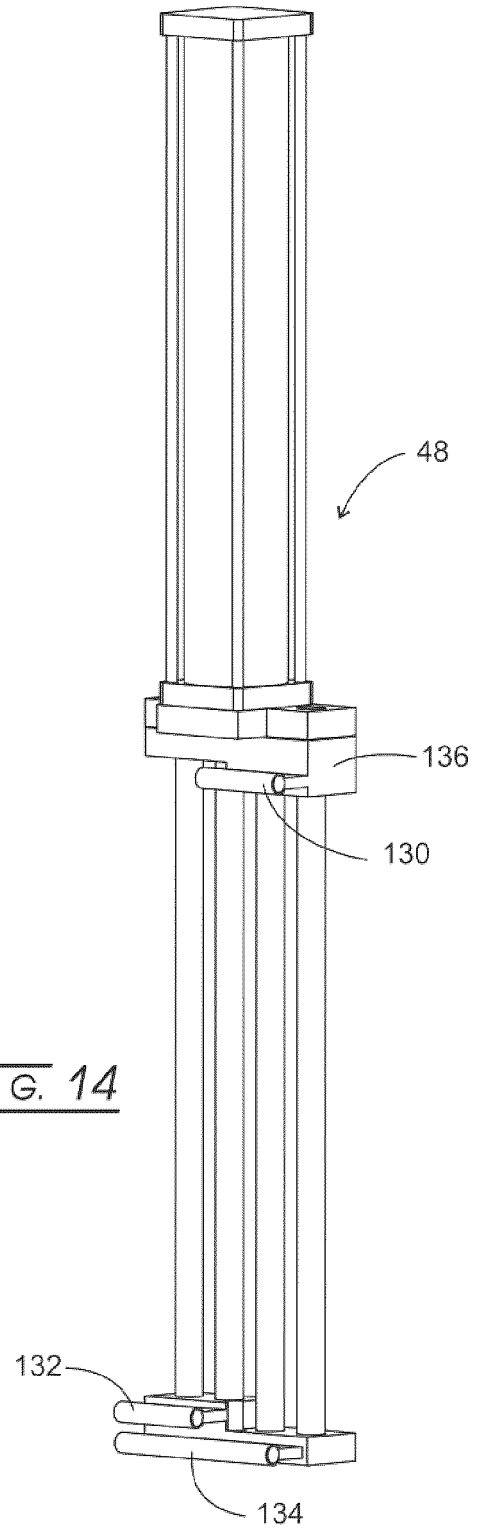


FIG. 14



REFERENCES CITED IN THE DESCRIPTION

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