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(54) **Mechanical ski jumping simulator system**

(57) Ski jumping system to make it possible for the common man to enjoy ski jumping in a safe manner, said system comprising of two towers (11 & 12), between where a wire carriage (1) is movable via a transport wire (10), which in turn is driven by an electric motor and where said wire carriage (1) is directed via a guide wire (3), and

where said wire carriage (1) comprise actuation means to regulate lifting wires (8), which operational manner depends upon pre-set input parameters, and said actuation means comprise reels (7) independently commanded by electronically controlled electro-mechanical units (5) via drive belts (6).

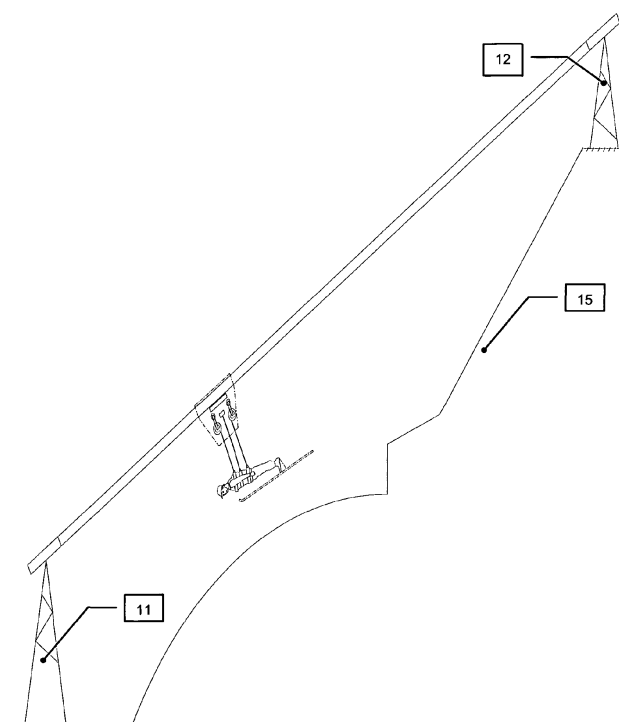


Figure 2. Ski jump slope with towers, side view

Description

Field/Scope of Invention - General system overview

[0001] The invention concerns a system making it possible for the common man to experience ski jumping, without the necessity of possessing special- skills and training needed for performing professional ski jumping in a safe manner. ("Professional ski jumping" is in this context defined as the sport where a person using skis is sliding down a man made hill by the force of gravity on a surface covered by snow and then jumping out of an edge aiming to touch ground as far as possible from said edge).

[0002] The invention can be used year around, which means that there is no need for snow or ice for making it work. The invention can be used by any person in normal health also including professional ski jumpers, who can benefit of practice ski jumping off season in a safe manner.

[0003] Suitable locations for establishing the invention are amusement parks, but also locations in close proximity to normal ski jumping facilities where off season training of professional ski jumpers can be managed.

[0004] The invention consists of a wire system wherein the main components are a drive tower (11), a slave tower (12) and a wire carriage (1) whereto the ski jumper is attached in a harness (9). The system should be located in a slope (natural or manmade), since it is essential for making the ski jump realistic. The slope surface itself shall be made of a low friction material, wherein tracks for the skis are moulded. The skis used can be of ordinary bottom glide type or be equipped with a roller mechanism.

Field/Scope of Invention - Detailed functional description

[0005] The person who is about to use the invention will be attached to a safety harness (9), which has three attachment points (for upper- and lower back) and for a safety line (13). The harness (9) is connected to two lifting wires (8), which are regulated independently by two electro mechanical AC-units (5). Each AC-unit consists of an electrical step motor, which has a built-in actuator. Each AC-unit transmits its movement/steps to a reel (7) via a drive belt (6). Weight sensors are located in the AC-units, which means that the tension in the lifting wires will be regulated by the ECM (4) via the AC-units. The tension is a function of input parameters, such as ski jumper body weight and desired speed.

[0006] The wire carriage assembly is a confined box and contains all necessary equipment for a safe and reliable operation of simulating a ski jump. The wire carriage (1) is using two wires to be movable between the drive tower and the slave tower; a guide wire (3) - which is running through the carriage supported by guiding rolls (not shown) - and a transport wire (10), which is cut in two parts and each part is permanently connected/bolted to the carriage- back and front respectively. The transport wire has no relative velocity compared to the carriage itself. Inside the carriage the electrical AC-units (5) are controlled by a programmable computer (4), ECM, and to obtain a smooth and stable ride without uncomfortable oscillations, a gyro (not shown) can be installed to improve stability. A battery pack (inside the wire carriage, not shown) can either be charged via the power- & communication cables (2) or use the carriage's kinetic energy during movement and convert it to electric energy via a generator (not shown) with a pulley rolling on the guide wire (3). The battery pack must have enough electrical capacity of lifting/lowering the ski jumper in case of an emergency situation. During normal operation the electricity is fed to the wire carriage through the power- & communication cables (2). Also, electronic information is continuously exchanged between the ECM (4) and the drive motor control unit (not shown) via said power- & communication cables (2) to ensure smooth operation. The electronic information concerns mainly parameters such as present- speed and position of the wire carriage (1).

[0007] Pre-set input parameters to the Electronic Control Module (ECM) needed for safe operation:

- Weight of ski jumper (will be confirmed by ECM via weight sensor)
- Desired length of jump
- Desired acceleration and maximum speed during the event
- Competition mode

References to prior art

[0008] DE10128452 discloses a ski jump facility for unskilled users comprising a cable system held in position by a suitable number of holding frames, which have articulated joints. A guide profile for fixing eyelets attached by a short cable to the harness of the jumper is mounted on the support cable. The facility is a pure mechanical system, i.e. has no controlled actuation means for regulate tension in harness cable or to control speed during the event. Moreover, the ski jumper harness is attached to a pulley running along the support cable. The present inventor has devised and embodied this invention to offer increased system safety and flexibility to allow the common man enjoyment of a ski jump event.

[0009] AT410756B, which comprises some of the features in claim 1, such as a cable system with towers comprising big reels for endless loop of support/transport cable, but the system uses an elastic mechanical traction mechanism without any continuously controlled actuators or other involvement of electronics. Furthermore, a drive motor positioned in one of the towers as described in said Austrian application is not a necessity for the present inventor who has devised and embodied this invention to offer increased system safety and flexibility to allow the common man enjoyment of a ski jump event.

Items, figures & designations

[0010]

Item No.	Shown in figure No.	Designation	Qty
1	1, 3 & 4	Wire carriage	1
2	1	Power- & communication cables	1
3	1 & 4	Guide wire (running through the wire carriage, fixed to the towers)	1
4	1	Electronic Control Module (ECM)	1
5	1	Electro-mechanical unit (AC-motor with actuator to regulate the lifting wires)	2
6	1	Drive belt	2
7	1	Reel for lifting wires	2
8	1 & 3	Lifting wires	2
9	3	Safety harness (attachment of ski jumper to lifting wires)	1
10	1 & 4	Transport wire (fixed to wire carriage, running in a sling around the towers)	1
11	2 & 4	Drive tower (can contain an electrical motor driving a big reel for transport wire, item 10)	1
12	2 & 4	Slave tower (big reel, supporting and following transport wire, item 10)	1
13	3	Safety line (as restraint belt in car)	1
14	3	Ski jumper	1
15	2	Ski jump slope	1

List of figures

[0011]

Figure No.	Figure designation
1	Wire carriage assembly (cut-through view)
2	Ski jump slope with towers, side view
3	Wire carriage with ski jumper, side view
4	Functional sketch; Ski jump wire system, top view (no scale)

Claims

1. Ski jumping system to make it possible for the common man to enjoy ski jumping in a safe manner, said system comprising of two towers (11 & 12), between where a wire carriage (1) is movable via a transport wire (10), which in turn is driven by an electric motor and where said wire carriage (1) is directed via a guide wire (3), and where said wire carriage (1) comprise actuation means to regulate lifting wires (8), which operational manner depends upon pre-set input parameters, and said actuation means comprise reels (7) independently commanded by elec-

tronically controlled electro-mechanical units (5) via drive belts (6), **characterized in that** at least said actuation means (5, 6 & 7) are integrated in single unit mounted inside said wire carriage (1).

- 5 **2.** System as in Claim 1, **characterized in that** said actuation means (5, 6 & 7) and said lifting wires (8) are each of quantity two.
- 3.** System as in Claim 1, **characterized in that** said wire carriage (1) comprise at least one gyro for enhanced stability during ski jump.
- 10 **4.** System as in Claim 1 and 2, **characterized in that** said wire carriage (1) contains an onboard back-up battery pack for emergency operation of said electro-mechanical units (5), to provide a safe decent if power failure occurs during ski jump.
- 15 **5.** System as in Claim 1 and 2, **characterized in that** said wire carriage (1) contains said back-up battery pack, which is charged by an onboard generator, converting the kinetic energy caused by the relative velocity between said wire carriage (1) during movement and the stationary guide wire (3).
- 20 **6.** System as in Claim 1, **characterized in that** said wire carriage (1) comprises a safety line (13) attached to a safety harness (9).
- 25 **7.** System as in Claim 1 to 3, **characterized in that** the movement of said wire carriage (1) is actuated by a drive unit comprising an electric motor with pulley, either acting directly on said guide wire (3) mounted inside said wire carriage (1), or located stationary in the drive tower (11) acting on said transport wire (10).
- 30 **8.** System as in Claim 1, **characterized in that** the user skis can be of ordinary bottom glide type or be equipped with a roller mechanism.

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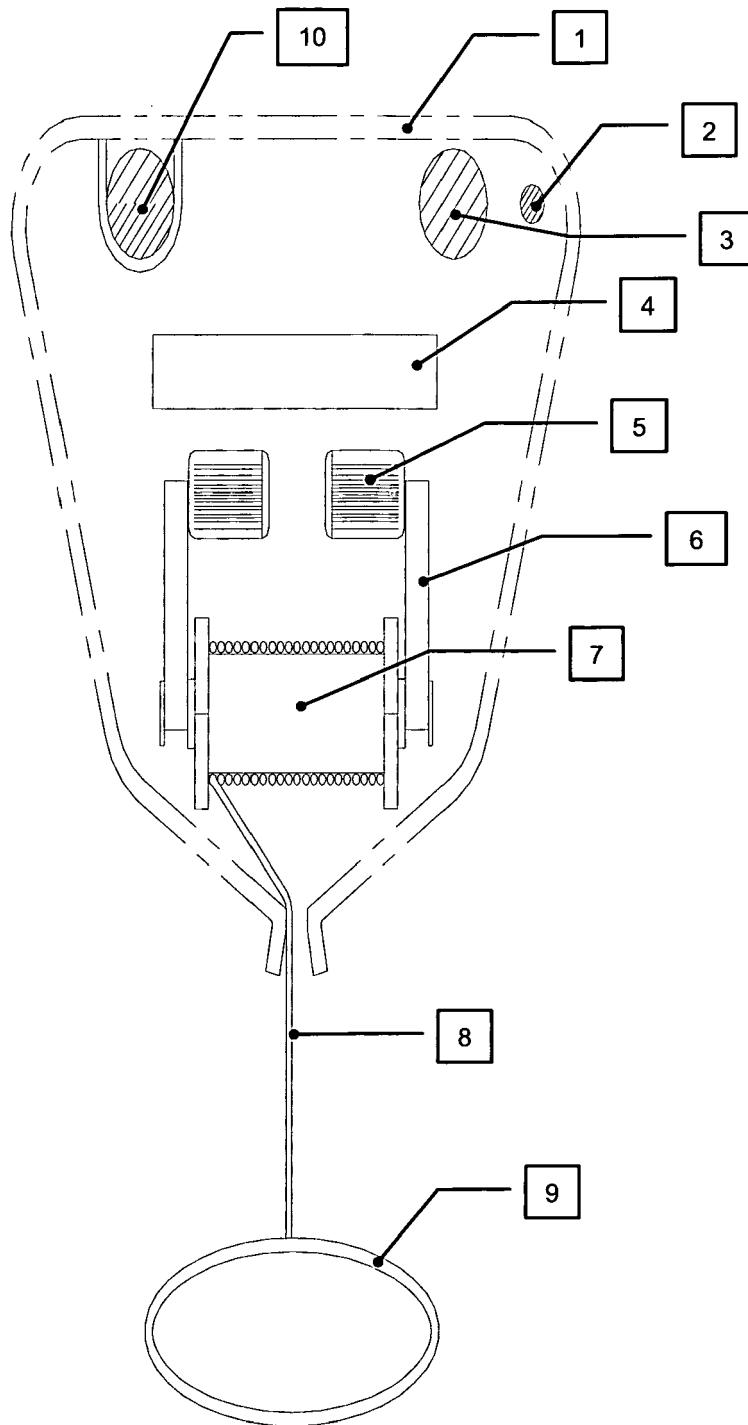


Figure 1. Wire carriage assembly (cut-through view)

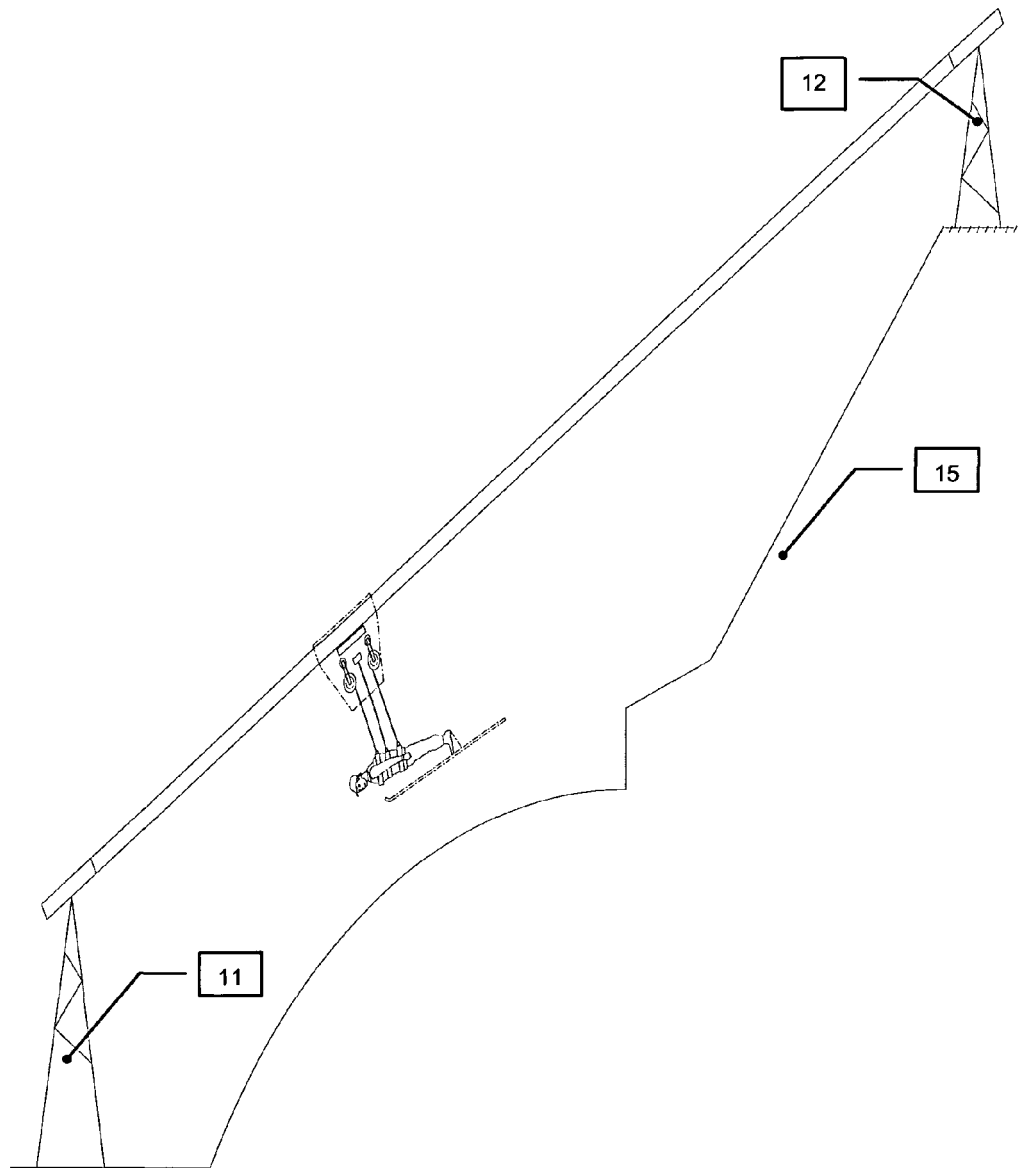


Figure 2. Ski jump slope with towers, side view

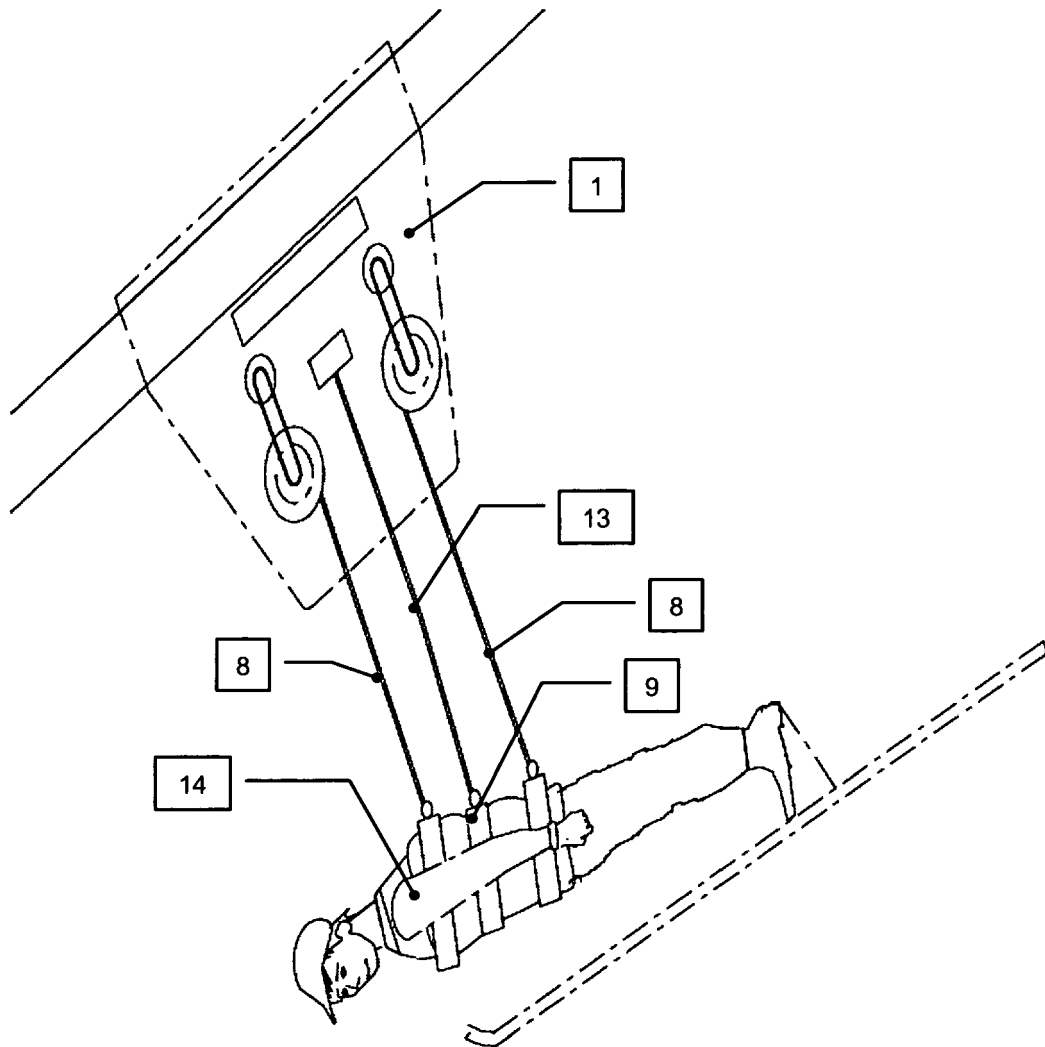


Figure 3. Wire carriage with ski jumper, side view

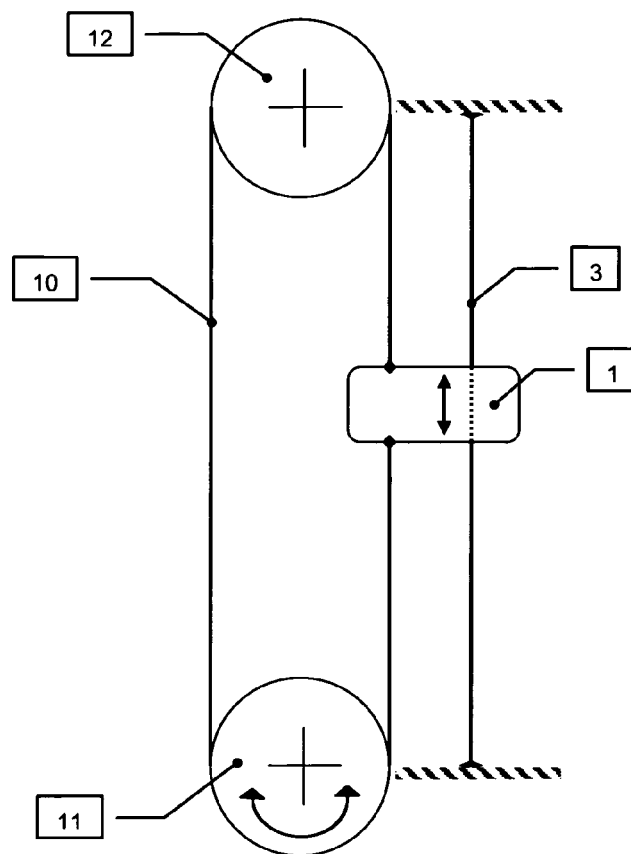


Figure 4. Functional sketch; Ski jump wire system, top view (no scale)



EUROPEAN SEARCH REPORT

Application Number
EP 10 00 4373

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	AT 410 756 B (GOLSER ADOLF [AT]; BAUMANN CHRISTOPH MAG [AT]) 25 July 2003 (2003-07-25) * the whole document *	1	INV. A63B69/18 A63C19/10 A63G21/20
A	EP 1 270 053 A1 (PONDORFER WALTER [AT]) 2 January 2003 (2003-01-02) * the whole document *	1	
A	EP 1 502 630 A1 (TONI LEDERMANN [DE]) 2 February 2005 (2005-02-02) * the whole document *	1	
A	WO 03/035473 A1 (NOLL CHRISTIAN [DE]) 1 May 2003 (2003-05-01) * the whole document *	1	
A	DE 203 18 707 U1 (LEHNERT MARTIN [DE]) 4 March 2004 (2004-03-04) * the whole document *	1	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			A63B A63C A63G
Place of search		Date of completion of the search	Examiner
Munich		12 August 2010	Lundblad, Hampus
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 10 00 4373

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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12-08-2010

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EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- DE 10128452 [0008]
- AT 410756 B [0009]